Federal Democratic Republic of Ethiopia

MINISTRY OF TRANSPORT

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MINISTRY OF TRANSPORT

Consulting services for national integrated transport master plan study and enhance sector capacity in planning and research & development

TASK 4 – CONSOLIDATED NATIONAL TRANSPORT MASTER PLAN

"FINAL REPORT"

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ACRONYMS

Abbreviations	Meaning
AACMP	Addis Ababa City Master Plan
AACRA	Addis Ababa City Roads Authority
ACTKs	available cargo tonne-kilometres
ADD	Addis Ababa Airport
ADT	Average Daily Traffic
AfCFTA	African Continental Free Trade Area
AfDB	African Development Bank
AGP	Agricultural Growth Program
AIGCs	Agro-Industrial Growth Corridors
AMH	ArbaMinch Airport
AU	African Union
BAU	Business-as-usual
BHS	baggage handling systems
BJR	BahirDar Airport
BMC	Billion cubic metres
bn	Billion
BRT	Bus Rapid Transit
C&F	Cost and Freight
CA	Current Account
CAA	Civil Aviation Authority
CAGR	Cumulated Average Growth Rate
CAPEX	Capital expenditure
CBA	Cost-Benefits Analysis
CBDSD	Capacity- Building for Decentralized Service Delivery
CBE	Commercial Bank of Ethiopia
CDE	Chemin de Fer Djibouti-Ethiopien
CEO	Chief Executive Officer
CoM	Council of Ministers
COMESA	Common Market for Eastern and Southern Africa
CRGE	Climate-resilient Green Economy
CSA	Central Statistical Agency of Ethiopia
CSE	National Conservation Strategy of Ethiopia
CTKs	Cargo Tonne -Kilometers
Dist	Distance
EAA	Ethiopian Aviation Academy
EAAIB	Ethiopian Aircraft Accident Investigation Bureau
EAC	East African Community
EAE	Ethiopian Airports Enterprise
EAG	Ethiopian Airlines Group
EAL	Ethiopian Airlines
EA-SA	East and Southern African region
EBM	Expenditure Budgeting Model
ECA	Europe and Central Asia
ECAA	Ethiopian Civil Aviation Authority

Abbreviations	Meaning
LIC	Low-Income Countries
LPI	Logistic Performance Index
LRT	Light Rail Transit
m.a.s.l.	Meters above sea level
MCA	Multi Criteria Analysis
MCBRTA	Multilateral Cross-Border Road Transport Agreement
MDGs	Millennium Development Goals
MFI	Microfinance Institutions
mi	Miles
Mil	Million
MME	Ministry of Mines and Energy
MMT	Ethiopian Maritime and Transit Services Enterprise
MoF	Ministry of Finance
MOFEC	Ministry of Finance and Economic Cooperation
MoT	Ministry of Transport
MoUDH	Ministry of Urban Development and Housing
MoWIE	Ministry of Water, Irrigation, and Energy
MQX	Mekelle Airport
MRO	Maintenance, Repair Operation
Mt	million tonns
MUDHCo	Ministry of Urban Development and Housing
NAP-ETH	National Adaptation Plan
NDCs	Nationally determined contributions
NDP	Neighbourhood Development Plan
NEK	Nekemt Airport
NEP	National Electrification Program
NEP-IRM	National Electrification Program Implementation Roadmap
Net Wt	Net weight
NITMP	National Integrated Transport Master Plan
NLC	National Logistics Council
NMT	non-motorized transport
NRTSC	National Road Traffic Safety Council
NTMP	National Transport Master Plan
NUDSP	National Urban Development Spatial Plan
NUPI	National Urban Planning Institute
NVOCC	Non-Vessel Operating Common Carrier
O&M	Operation and Maintenance
O/D	Origin-destination
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
OECD	Organisation for Economic Co-operation and Development
OJT	On-the-Job Training
OPEX	Operating expenditure
OSBP	One-stop Border Post
OSM	Open StreetMap Database

Abbreviations	Meaning
ECARAS	Ethiopian Civil Aviation Authority Rules and Standards
ECATC	Civil Aviation Training Center
ECWC	Ethiopian Construction Works Corporation
EDCs	Economic Development Corridors
EDR	Ethio-Djibouti Railways
EFY	Ethiopian Financial Year
ELTIS	European Local Transport Information Service
EMAA	Ethiopian Maritime Affairs Administration Authority
EMDE	Emerging Markets and Developing Economies
EMSB	Environmental Monitoring and Safety Branch
EMTI	Ethiopian Maritime Training Institute
ENUDP	Ethiopian National Urban Policy
EPE	Environmental Policy of Ethiopia
ERA	Ethiopian Road Authority
ERC	Ethiopian Railway Corporation
ERCA	Ethiopian Revenue and Customs Authority
ERTMS	European standard signalling system
ERTTP	Ethiopian Rural Travel and Transport Program
ESL	Ethiopian Shipping Line, Private Company
ESLSE	Ethiopian Shipping and Logistics Services Enterprise
ETB	Ethiopian Birr
ETMP	Ethiopia Transport Master Plan
ETRE	Ethiopian Toll Road Enterprise
EU	European Union
FCEV	Fuel Cell Electric Vehicle
FDI	Foreign Direct Investments
FDRE	Federal Democratic Republic of Ethiopia
FOB	Free on Board
FTA	Federal Transport Authority
FTM	Future Transport Models
FX	Foreign exchange
FYP	Five Year Development Plan
GCNG	Graph Convolutional Network
GDP	Gross Domestic Product
GDQ	Gondar Airport
GHGs	Greenhouse Gases
GMB	Gambela Airport
GoE	Government of Ethiopia
GRSP	Global Road Safety Partnership
GTP	Growth and Transformation Plan
h	hour
HDM4	Highway Development and Management Model
HDT	Heavy-Duty Trucks
HGER	Home-Grown Economic Reform Programme

Abbreviations	Meaning
Pax	Passenger
PEHA	Public Enterprises Holding and Administration
PF	Planning Framework
PMI	Purchasing Managers Index
Pop	Population
Popn	Population
ppl	People
PPP	Public-Private Partnership
Proc. No.	Proclamation No.
PSETSE	Public Service Employee's Transport Service Enterprise
PSNP	Productive Safety Net Programme
PT	Public Transport
PTM	Present Transport Model
QNEAT	Qgis Network Analysis Tool
R&D	Research and development
RAI	Rural Accessibility Index
RED	Road maintenance program, Economic Pre-Feasibility, Road Management Tool
Reg No.	Regulation Number
RF	Road Fund
RG	Regional Government
RoRo	Roll-on Roll-off
RPE	Private Companies
RPE	Regional Public Enterprises.
RPKs	revenue passenger-kilometers
RRA	Regional Transport Authority
RSDP	Road Sector Development Program
SAATM	Single African Air Transport Market
SADC	Southern African Development Community
SDGs	Sustainable Development Goals
SNNPR	Southern Nations, Nationalities, and People' Region
SOEs	state-owned enterprises
SP	Structure Plan
SPV	Special purpose vehicle
Sqm	Square meters
STCW	Standards and Training Certification and Watchkeeping
STI	Science, Technology and Industry
SUMPs	Sustainable Urban Mobility Plans and smart city concepts
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TCP	Technical Cooperation Program
TEU	20-foot standard container
TFA	Tripartite Free Area
TOD	Transit-Orientated Developments
TransCad	Transport Model on GIS Platform
TTTFP	Tripartite Transport and Transit Facilitation Programme

Abbreviations	Meaning
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICE	internal combustion vehicles
ICT	Information and communication technology
IDA	International Development Association
IGAD	Intergovernmental Authority on Development
IHDP	Integrated Housing Development Program
IMF	International Monetary Fund
IMTs	Intermediate modes of transport
IoT	Internet of Things
IPDC	Industrial Parks Development Corporation
IRIMP	Regional Infrastructure Master Plan
ISS	Inception and Sector Situation
ITC	Information and communications technology
ITS	Intelligent Transport System
IUCN	International Union for the Conservation of Nature
KPI	Key Performance Indicators
LAC	Latin America and the Caribbean
LAPSSET	Lamu Port, South Sudan, Ethiopia Transport Corridor

Abbreviations	Meaning
TYP	long-term transport planning
UDF	Urban development Fund
UEAP	Universal Electrification Access Program
UIC	Unit Identification Code
ULDs	unit load devices
ULGDP	Urban Local Government Development Program
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Program
URRAP	Universal Rural Roads Access Program
USD	United States Dollar
VLTTS	Village Level Transport and Travel Study
WB	World Bank
WFP	World Food Programme
WHO	World Health Organization
Worldpop	Open access archive of spatial demographic datasets
WRAs	Woreda Road Authorities
WRO	Woreda Road Offices
WTO	World Trade Organisation

1 INTRODUCTION

1.1 SCOPE OF THE MASTER PLAN DOCUMENT

This Consolidated Master Plan Document represents the focus for the construction of the National Transport Master Plan and is based on the definition of different packages of integrated and inter-modal actions and measures, following defined development strategies, such as:

1) Producing a transport system that can properly stimulate international exchanges and economic development in any part of the country;
2) Making the transport offer responsive to the real passenger and freight demand in terms of capacity, performance and safety;
3) Integrate the different modes of transport for an efficient, effective and reliable transport;
4) Increasing the rural accessibility, environmental impact and social inclusion in rural areas;
5) Integrate land use/transport planning in Ethiopia, conceiving a transport system responding appropriately to the needs of committed and/or proposed land use developments, population growth, economic and social welfare in the country.
6) Introduce sustainable ways of infrastructure and maintenance financing;
7) Creating a transport system/network in the country supported by update and appropriate technologies.

Actions & measures have been identified, following the consistent planning activity already conducted by the Client and relevant agencies, verifying these initiative and policies through the Transport Model and identifying additional needed measures to better respond to the defined objectives.

Actions & measures will be detailed in the different and separated **Master Pian Documents for each sub-sector**, with priority of actions, economic analysis, financing mechanisms, human resources development, safety and security, energy savings, environmental protection and climate change aspects. The road sector document will include also the rural access planning for each region. While, the **National Transport Sector Strategy Document**, will include the assessment and review of the regulatory, legislative, institutional, financial and technical capacity of transport departments/agencies, an assessment of the extent to which the existing transport policy responds to the poverty reduction and social strategy, conforms to the international and regional conventions, agreements and protocols and needs assistance to implement the investment and policy reform program.

The Transport Master Plan here presented is a **Dynamic Integrated Master Plan**, based on **three development scenarios**, according with three possible economic development trends, influenced by the overall international situation: ***going-ahead, new-generation and limits-to-growth scenarios***. The three scenarios are not alternative each other, but are the appropriate response to different external international economy evolutions and an **optimal path** can be suggested following appropriate switching values for the change from one scenario to the other.

According to a recent request from the Client (Ministry of Transport) the **validity of the Transport Master Plan has been extended from 20 to 30 years**, to cover the total period (2021-2050). Consequently, Consultant forecasts and planning activities have been extended up to year 2050. The elongation of the validity of the Master Plan asks for the **possible validation and redressing of the Plan to be foreseen every five years**, to keep the plan updated and consequent to the possible internal and external changes.

1.2 PLANNING APPROACH

In the initial phase, the Consultant has analysed the international best practices in conducting national transport planning and has acquired the main approach concepts to guide the Ethiopia

Transport Master Plan. Major lessons learnt from best international practices were:

- Need for a clear and straightforward planning framework;
- Adopt an Integrated multimodal transport approach;
- Considering different evaluation scenarios and conduct iterative model assignments;
- Integrate the national transport master plan with the other economic development plans;
- Make investment decision according to sustainable dimensions (social, environment, climate change, etc.)
- Promote diversified funding sources and sustainable private partnership;
- Build technical capacity for institutions and local transport operators.

The Consultant approach in conducting the Study has been based on the full respect of the instructions contained in the Terms of Reference and adopting the lessons from the international best practices:

1. **Adoption of the best practice-planning framework.** In close relation with the Client, the Consultant will identify the main:
   a. **Objectives** that reflect the general sustainable socio-economic goals of the country and are shared with other (non-transport) sectors and the population;
   b. **Policy Principles** that should govern the pursuit of those goals, as guiding philosophy for decisions within the sector;
   c. **Strategies** to represent the ways in which goals are to be achieved in line with the policy principles;
   d. **Definition of Master Plan scenarios**, responding to different future situations;
   e. **Planning procedure** that is the practical programming of the transport measures and plan of actions to achieve the national objectives.
2. **Construction of an Integrated Transport Network Model of Ethiopia.** Using all the available data of the national zoning, federal roads, railway network, logistic chain and considering the traffic statistics, complemented with additional specific surveys and enquiries, the Consultant will build the Transport Model of the country, using his TRANSCAD dedicated GIS-Transportation Model.
3. **Iterative Model Applications.** Once calibrated at the present (2020), the Transport Model will be iteratively used to forecast the impact on freight and passenger demand of different master plan scenario at different horizons up to 2050. The choice of the preferred scenario (Master Plan) will be made through a Dynamic verification of the external economic conditions during the 30-years validity of the Plan.
4. **Master Plan Optimization**. Each Action or Measure of the preferred scenario will be evaluated in each sector master plans, through an economic & financial pre-feasibility analysis (MCA or preliminary CBA), in order to establish its priority, optimal opening time and correlation with the other actions & measures. For the road sector, the HDM4 model will be used.
5. **Plan of Action and Financing Strategy.** According with the action & measures prioritization, the Plan of Action, to be developed in the National Transport Sector Strategy Document, will indicate the annual implementation programme and cost. Based on the estimated financial resources available during the years of the Master Plan, the EBM-Expenditure Budgeting Model will compose a realistic programme of expenditures and call for possible participation of private funds, through the PPP financing.
6. **Enhancing the sector planning**. The Consultant will constantly communicate and transfer planning methodology and tools with local and Government experts. In particular, in the course of elaboration of the Master Plan, the Consultant will clearly document the planning process and method in his reports and will train the local experts in the different models used, here-below listed.

MODELS USED BY THE CONSULTANT

- **TransCad - Transport Model on GIS Platform:** Geo-referenced network traffic calibration (present) and assignment in future horizons (2025, 2030, 2035, 2040), road network connectivity and accessibility analysis;
- **MCA Model**: Sustainability Eco/Financial/Social/Environmental Multicriteria Matrix.
- **HDM-4 & RED**: Vehicle Operating Costs, Road maintenance program, Economic Pre-Feasibility, Road Management Tool;
- **Risk Analysis**, with Montecarlo simulation model during construction and operation.
- **EBM:** Expenditure Budgeting Model

1.3 THE NATIONAL TRANSPORT MODEL

The TransCad transport model developed in this phase has been used to simulate the present high-level integrated transport system of the country, including all modes of transport. The transport model has been integrated by the recent traffic counts and O/D surveys carried during the months of January and February 2021 and described in paragraph 3.2.

Expanding the Origin/Destination matrices of passengers and freight transport demand in the future, the future total demand at different time horizons: short (2025), medium (2035) and long term (2050) has been simulated and assigned to the transport network, in absence of interventions. This simulation is useful to identify all critique areas and bottlenecks that will be created in the future and suggest appropriate actions and measures to solve the issues.

The Transport Model presented in this report is to be conceived as a dynamic tool, that will be improved in a short time with the results of the direct counts and surveys that are being implemented and also according to additional information and consideration from the stakeholders. At the end of the study the Ethiopia Transport Model (ETM) will be delivered to the Client for successive updating, additions and planning in order to verify constantly the volumes of traffic demand and transport offer in the country.

In the next deliverable (Master Plan document by each sector) a complete detailed presentation of the Model will be included.

1.4 TRANSPORT INTEGRATION

Transport and land use are inextricably linked: transportation infrastructure attracts land use development, while land use development is unlocked by the provision of high-quality, integrated transport infrastructure and services. The main objective of land use planning is to ensure that economic development is stimulated and that the spatial locations of activities, people and amenities, in turn, have a positive impact on the local, regional and national economy. These objectives can only be achieved with the support of transport services. The ETMP 2050 Transport Master Plan has been conceived as integrated externally with the different national socio-economic development plans of Ethiopia and integrated inside between the different modes of transport.

The ETMP 2050 is considering **horizontal integration**, like transport-spatial development integration, rural-urban integration and regional integration with neighboring countries and transit ports and **vertical integration**, like integration between different modes of transport, both for passengers and freight transport.

The **transport-spatial development integration,** takes into consideration the present and foreseen development in all social-economic sectors, as described in chapter 4 and translating these developments into increased passenger and freight transport demand of specific woredas as shown

in paragraph 6.3 and assigning the transport demand matrices at the different time horizons 2025,2035 and 2050 according with the three scenarios considered. **Rural – Urban integration** is treated in the calculation of road rural accessibility index for each region and will be detailed in the sectorial report 2A – Rural Road Network.

The **regional integration** takes into consideration the Ethiopia increase of regional and overseas trade that will ask for an organized, effective and competitive logistic system, modern and well-managed truck industry and efficient infrastructures, using diversified trade corridors to different transit ports. A guide in this sense is the recent Regional Infrastructure Master Plan (IRIMP) produced by IGAD and forecasting Transport, ICT, Energy and Transboundary Water Resources infrastructure in the region at different economic corridors and timing for the whole region (as shown in paragraph 7.6).

Vertical modal integration is considered inside the ETMP transport model, inserting intermodal passenger and freight terminal between the different modes considered

1.5 TRANSPORT INNOVATION

Ethiopia Ministry of Innovation and Technology has recently prepared, with UNCTAD assistance, a Science, Technology and Innovation Policy Document, in order to create innovation systems in the country, implementing the Sustainable Development Goals (SDGs) and develop the export-oriented and manufacturing sector-based industrialization strategy. Transport Innovation in terms of technology and management is a key aspect of ETMP 2050, to plan a transport system which is efficient and sustainable in terms of environment, safety, adapt to climate change, maintainable and congruent with transport demand.

A technologically innovative transport sector will play a central role in the country economic development, being an important component of the three pillars of productive capacity: ***resources***, ***entrepreneurial capacity*** and ***production linkages*** (transport). Presently Europe is undertaking a post-covid relaunch of the continental transport system, based on the increase of the transport investment, competitiveness and **ecological transition** for all modes of transport.

A major challenge of ecological transition is the low-carbon mobility development and the use of alternative automotive energies. The Consultant has introduced a “Next generation” scenario for ETMP50, based on the use of Hydrogen engines, that could change substantially transport modes and mobility. Specific technological innovations will be identified for each mode of transport in the next deliverable (Sectorial Plans) and the stage of current advanced international researches indicated.

1.6 ACTIVITIES CARRIED OUT

After the official start date of the project in April 2020, the Consultant presented the ISS Report containing the Inception Report of the National Transport Master Plan Study and at the same time its Sector Situation Analysis Report.

The **Inception report** included the description of the activities carried out in the first month of the project: mobilizing experts and setting offices, holding the kick-off meeting with the Client, collection and analysis of the available relevant documentation and calibrating/detailing the proposed methodology. The kick-off meeting with H.E. the Minister of Transport was held on the 7th of March. With the help of the Client, the Consultant was able to collect the relevant and available documentation, like the previous Transport Master Plan (2007), GTPs - Growth & Transformation Plans, available transport sector plans and relevant transport governance documents. The revision of the methodology presented in the offer has taken the start from the analysis of the best practices and guidelines postulated by different international organizations (World Bank, OECD, United Nations, Africa Union, SATCC, Comcec) and their lessons have been the basis of the Consultant approach to the revised methodology. Besides presenting the sequence of tasks and activities of the revised methodology, details on important aspects of the Master Plan

are given: data collection methodology, multimodal simulation model, steps of the planning framework and decision & prioritization tools.

The **Sector Situation Report** contained the results of the analysis of all the relevant available documents that have been collected in the first month of activity and described: the national economic situation and perspective of the country economy, the territorial administrative divisions, the national economic development plan and the present situation/problems/perspectives for each national transport sub-sector.

In consideration of the **Covid 19 emergency**, the Consultant has put in place all the measures to minimize the impact of the Covid-19 outbreak on the project. An Emergency Governance Model has already been presented in the Kick off Meeting and has received positive remarks by H.E. The Minister of transport

- INTERVIEWS: The local expert have come to the interviewed, and will create the connection for the on-line presence of the international expert, that will be leading the interview. The interview protocol is written by international expert and revised by the local expert.
- DATA COLLECTION: The international experts requested the data set to the contract administrators. The local experts followed up and transmit the feedback.
- MODELLING: The model has been built on the work station of traffic engineers with the contribution of the other experts. Once validated the model is transferred on the computer of the GIS expert, who will install on the computer in ERA.
- DRAFT DELIVERABLES SUBMISSION: The deliverables are written by the Key International Experts and commented by the local expert before the submission. The interactions between international and national experts have been continuous and the smart working modality is supported by the technological platform “Zoom” or another equivalent device.

The **Baseline Report** of the “Ethiopia National Integrated Transport Master Plan and Enhance Sector Capacity in Planning & Research Development”. This Report was not included in the initial Terms of Reference, but was proposed by the Consultant in the Inception and Sector Situation Report, delivered in May 2020. The Baseline Report, according with the agreed workplan, included the results of the activities included in the Task 2 – Building the Present Transport Model and those of Task 3 – Planning Framework, which are preparatory to the elaboration of the Detailed Transport Master Plan document (Task 4). The Baseline Report was an essential intermediary document in order to agree with the Client, the common understanding of the present situation of transport, its problems and opportunities, the representative integrated transport model and finally the planning framework to be used in the identification of actions and measures to be proposed in the detailed transport master plan. For this reason, the present report is a sort of working progress report to be the base for comments and discussions with the Client. The Report presents the following important basilar steps:

1) **Detailed assessment of the present multimodal transport system**, to integrate the already presented Sector Situation Report. In this assessment each mode is analysed under a **Holistic approach**, represented by. Sector Administration (institutions, funding, regulations, safety), Transport Offer (infrastructures & vehicles), Transport Demand (passenger & freight), Sustainability (social, environmental, climate change), Strengths & Weakness, Planning (plans and ongoing projects). At this time not all data requested were received from stakeholders, so the assessment will be completed while proceeding with the next task: Detailed Master Plan Document. The Detailed Assessment is presented in Chapters 2 and 3.
2) **Construction of a representative Integrated Transport Model** (TransCad), able to simulate the national transport infrastructure system, the present Origin/Destination matrix of passengers and freight and calibrated with the present mobility of the country (PTM – Present Transport Model). This model is then used to simulate the transport system and mobility (FTM – Future Transport Models) in various horizons in the future 30 years, both in the situation

"with" and "without" transport master plan actions. Chapter 4 presents the calibrated PTM, while in Chapter 5 a first projection of FTM "without project" is presented, considering the O/D matrix expansion (based on the estimation of the overall economic development) and in the graph, the some of the transport investment already ongoing in each sector.

3) **Construction of a QGIS Model** for calculation of the present RAI – Rural Access Index in each of the rural regions. The method is based on the analysis of different sources: OCHA, Worldpop, WFP repository road system and travel times from HarvestChoice and International Food Policy Research Institute. The model results are presented in Chapter 6.
4) **Presentation of the Planning Framework** that the Consultant intends to apply for the identification and evaluation of the actions and measures of the detailed Master Plan. The Planning Framework intends to clearly streamline the transport master plan objectives and each action/measure with the overall recognised national development objectives and directives. Each action/measure will be evaluated according to the concrete contribution given to the supreme national objectives. The Planning framework is presented in Chapter 7.

a) **Presentation of the Capacity Building strategy**, including the capacity building measures to be included in the Detailed Master Plan and the specific training activities and Stakeholders Workshops to be carried out by the Consultant during the formulation of the National Master Plan. This part is presented in Chapter 10.

1.7 CONTENT OF THE CONSOLIDATED MASTER PLAN

The present Consolidated National Transport Master Plan includes the actions identified in each mode of transport, to be developed in the next 30 years, under different international and national future situation and includes:

Chapter 1 – INTRODUCTION - Scope of the Master Plan Document, planning approach, significance of the national transport model, main criteria of transport integration and innovations, activities carried out, follow-up activities and content of next deliverables.

Chapter 2 – PRESENT TRANSPORT SYSTEM – Description of the present transport system organization & administration, road transport offer/demand and safety, present rural road accessibility, current status, regulation and planning of railway sector, national import/export and the present organization of the logistic sector, Aviation offer/demand, pricing & cost-recovery, safety & environmental issues, Maritime & inland water transport sector, urban, land use and mobility at cities and territorial levels, environmental, social & climate change aspects of transport.

Chapter 3 – BUILDING THE INTEGRATED TRANSPORT MODEL – territorial zoning, present multimodal transport graph, transport distribution, modal choice, traffic assignment ad calibration, present integrated transport model, present level of services.

Chapter 4 – ETHIOPIA ECONOMIC DEVELOPMENT PLANNING – Economic development plans, social development plans, international trade, agriculture, industrial, energy, tourism and mining sector development plans, urban, territorial and corridor spatial development plans.

Chapter 5 – TRANSPORT SECTOR DEVELOPMENT – Transport development policy, Ministry of Transport 5- and 10-years development plans for road, rail, aviation, logistics and maritime sectors, Urban corridors development plans.

Chapter 6 – FUTURE MOBILITY DEMAND – Ethiopia development trends and transport demand factors, calculation of future transport demand O/D matrices, multimodal transport assignments at different time horizons (2025, 2035 and 2050) without plan and evaluation of future levels of services.

Chapter 7 – PLANNING FRAMEWORK – structure of the planning framework adopted, Ethiopia general development objectives, declared transport objectives, adopted Master planning framework, vision and strategies, transport system integration & innovation.

Chapter 8 – PLANNING SCENARIOS – Future external development scenarios, transport master plan scenarios and "switching criteria", investments foreseen in each scenario, transport policy for each

scenario, traffic assignment by scenario and term: short, medium, long, future transport level of service.

Chapter 9 – DETAILED MASTER PLAN ACTIONS – Detailed actions in road system, rural accessibility planning, railway sector, aviation, logistics, inland water and urban transport, integration and innovation measures.

Chapter 10 – ENHANCING TRANSPORT SECTOR CAPACITY – Definition of the capacity building strategy and training activities.

1.8 NEXT ACTIVITIES & DELIVERABLES

Following the acceptance of the present Consolidated Master Plan Document, specific Sector Plans for: road, rail, logistic, aviation, inland water transport and urban transport sectors will be elaborated in **Task 5**, together with their specific actions and measures distributed in the Master plans project life. The six sector plans documents will be delivered after two months from acceptance of this Consolidated Master Plan.

Each **Sector Plan Document** will include: Detailed and holistic (transport administration, institution, offer, demand, regulation, pricing & cost recovery, safety), analysis of the present transport system, main constraints and challenges, modal planning framework & objectives, sector development scenarios, needs for capacity building and human resources development and description of single action and measure to be included in the master plan. Each action will be defined in terms of location, technical standards, transport capacity, expected traffic, estimated investment and operating cost, time for implementation, financing procedure, economic, financial & social evaluation, type of preparatory study to be delivered, safety and security aspects, energy savings & environmental protection, climate change adaptation, innovation technology proposed.

In **Task 6**, the Consultant will detail the **Strategy of Implementation of the Transport Master Plan**, detail each action and measure, define their priority and compose the Plan of Action to be implemented. The Task will elaborate:

- Actions: detailed description of physical interventions with their costs and effects
- Measures: Necessary accompanying institutional and regulatory measures
- Prioritization of actions & measures, with prefeasibility analyses.

To reach this result, the methodology will include:

- an assessment of the regulatory and legislative environment impacting the transport performance, and the extent to which the institutional structure, financial and technical capacity of transport departments/agencies are functional to the performance;
- an assessment of the extent to which the existing transport policy responds to the poverty reduction strategy and other National Development Policies and Strategies;
- an assessment of the extent to which the existing transport policy conforms to the international and regional conventions, agreements and protocols entered by the Government of Ethiopia, including SDG and AU Agenda 2063;
- an analysis of the actual condition and the adaptations of the transport policy in view of the present and foreseeable trade patterns;
- an analysis of the actual condition and the adaptations of the transport policy in view of the present and foreseeable social conditions;
- an analysis of the financial requirements, sequencing and time frame for investment in the transport sector;
- review and development of institutional and legal framework;
- an analysis and set of monitoring indicators and selection criteria for a prioritized investment program for the different transport modes;
- review and assessment of tourism-based travel demand in relation with the expansion of transportation infrastructure with respect to all and each transport sector;
- an analysis of the modalities and the assistance required to implement the investment and policy reform program.

2 PRESENT TRANSPORT SYSTEM

The following paragraphs describe the present situation (administration, regulation, safety, transport offer/demand) of the different Ethiopian transport systems: road network and transport, railway system, aviation, logistics, maritime & Inland water transport, urban mobility and their environmental, social and climate change aspects.

2.1 PRESENT TRANSPORT ADMINISTRATION

2.1.1 Introduction

This chapter is focused on a general description of the administration model of the transport sector in Ethiopia, its main critical issues and the consultant final considerations. The representation of the sectoral part concerning an administrative/regulation description of each mode of transport is treated specifically for each sub-sector within the following sub chapters.

The administration of the transport sector is based on the constitutional principles of the FDRE. The basic principle states (Articles 51.9 and 55.2.c) that responsibilities assigned at Federal level (Federal Government and House of Representatives) concerns development, administration and regulation of air, rail, waterways and sea transport and major roads linking two or more Regional States. Below the Federal level, the Regional States are responsible for the construction, maintenance, and management of roads that start and end in their boundary. Moreover, the Federal Government may delegate the Regional States to exercise its powers (Art. 50.9), though no such delegation has been made for transport matters.

The above-mentioned public responsibilities do not only concern the aspects of administration and regulation but also those - of a more far-reaching nature - of the transport sector's development That is to say that the role of the public sector in ensuring the existence and development of networks and transport services in Ethiopia is essential.

This means that the public duty is not only to administrate/regulate citizens' behaviours and the economic entities providing services and economic activities within the sector, but also to create the conditions for the improvement of the sector itself. Although there is no specific reference to a "right to mobility" in the Ethiopian constitution, binding public authorities to undertake specific actions to ensure it, the right of "freedom of movement" could be widely considered as a duty in charge of the public entities to create the conditions that make people able to move freely throughout the country.

This broad concept of public duties on transport systems appears to be a pillar of sector development. If we look at the huge growth in the Rural Access Index achieved by the country (from 13% in 1997 to 60% in 2019, according to the last ERA RSDP Assessment Report1) it is easy to understand that the possibility of Ethiopian citizens to move from one place to another has far increased. This was possible thanks to the huge development of the road network, both national and local, resulting from notable investment programs.

On the other hand, the growth of the RAI index does not mean that accessibility has progressed at the same speed. Implementing the right to mobility means ensuring significant improvements in travel times to access the market or basic services. From this point of view, beyond the provision of physical connections through the development of infrastructure, the right to mobility for Ethiopian citizens has become more realistic due to the significant increase in transport services. Buses circulating on the national network increased by an average of 13.5% annually from 2002 to 2018, while for freight services the increase in trucks and trailers using the network was on average 11.9% annually. However, looking at the rural accessibility, the situation shows an important variability among woredas (see 2.3).

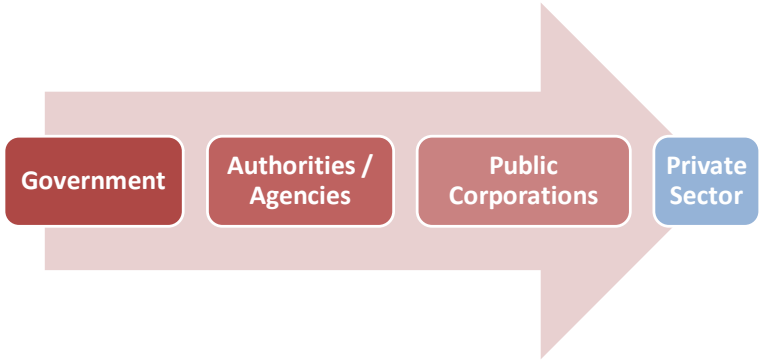
1 ERA RSDP 22 years performance assessment report, Addis Ababa, 2020

Given the low level of private mobility (currently the car possession is mainly concentrated in the capital city) and the low level of the starting point, the issue of passenger service providing remains a gap to be filled because not public nor private operators are able to provide a suitable level for quantity/cost and quality. Nevertheless, the growth trend is encouraging.

For freight services the situation is better than in passenger services, because the market development has been higher: private and public road hauliers are flanked by air cargo services and until 2016 by rail freight services along the main international corridor.

The figure below illustrates this kind of role of public powers in the Ethiopian transport sector. It represents the leverage effect starting from a policy/regulation processing centre that gives directives to technical agencies and, subsequently, to public enterprises and, eventually, on the private sector which appears to be the last and less important link in the chain.

Figure 1: The logical model of the transport sector governance



All the actors of the chain have their role, but public actors have not only administrative and regulatory tasks, but also operational and managerial ones, due to the development phase in which Ethiopia is operating. This public-led model is a classic instrument of economic development in which public action simultaneously lays the foundation and takes the place of private initiative, pending that the latter can gradually develop and replace public finances (and, in part, some public institutions) in the country's growth process.

Ethiopia is currently experiencing a transitional period, from underdeveloped country to a lower middle-income country. Within this process the role of the public sector as a whole will change because of the different stimulus coming from the economic operators and from the community of citizens.

At transport system level this means that institutions, technical/regulation agencies, public corporations will be requested to act in different fields and/or in different ways. The Transport Master Plan will contribute to design this path of change and from the administrative/regulatory side will suggest the needed process to review and adapt the regulatory environment to the development process of the transport system.

The starting point is the description of the present governance model of the transport sector which needs to consider three kinds of levels: National, Local, Horizontal; to each of these levels, correspond a group of institutions/bodies/enterprises, controlled by the public power. The following paragraphs will provide a description of these levels.

2.1.2 National Level: Ministry of Transport

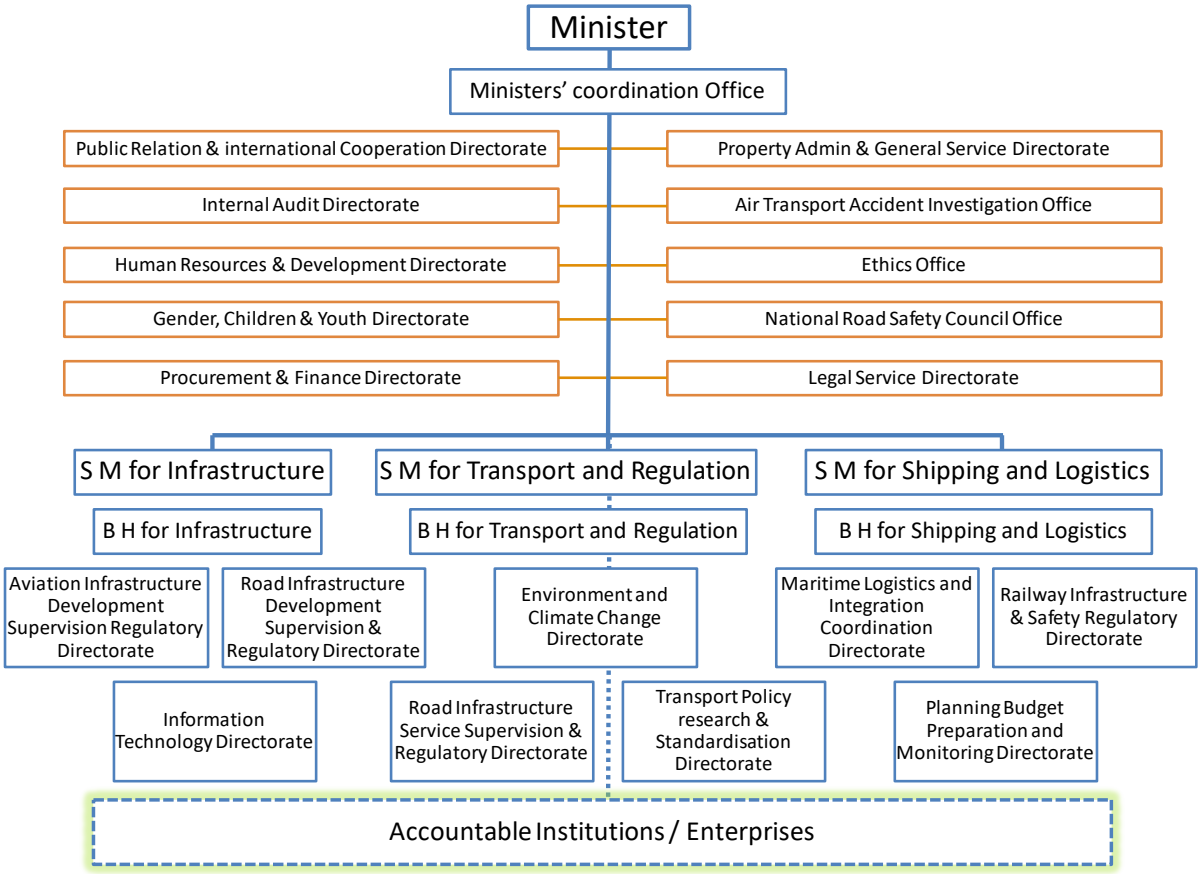
The powers and duties of the Ministry of Transport are stated in the Proc. No 1097/2018. Its organizational structure is based on Bureaus and Directorates and was the result of a redesign that brought the former directorates from six to twenty-two, organized by themes/functions. A recent revision of this structure re-focuses the directorates also on transport modes through a mixed approach by modes and themes.

The total number of people at MoT is currently 124 employees and 22 officials. Despite the fact that most of the operational tasks and many of the regulatory and planning functions are carried out directly by the sectoral authorities/agencies, with much greater resources, the number of employees of the MoT appears to be low.

There is an ongoing program to implement an increase of the staff that should reach about 380 people.

A recent assessment conducted within a World Bank technical assistance program2, identifies some critical gaps to be filled related to fast turnover of the employees, low level of wages (absolute and compared to the authorities' salary level) and training possibility.

Figure 2: Organizational structure of the Ministry of Transport

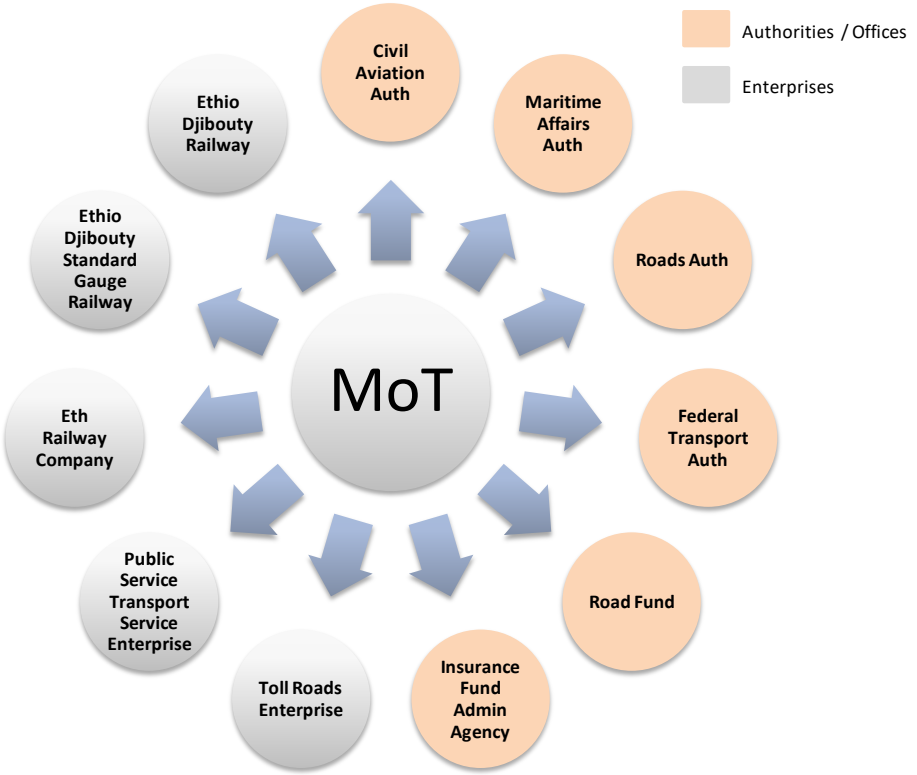


As depicted in the figure above, a numerous group of staff directorates are coordinated directly by the Minister, while the three State Ministers coordinates, through three related Bureau Heads, the main line directorates.

Each state minister supervises their respective accountable institutions/enterprises which are depicted in the figure below.

2 Expressway Development Support Project (P148850). COMPONENT 3: Road Safety and Institutional Development Support to the Transport Sector.

Figure 3: Institutions/Enterprises accountable to the Ministry of Transport



The accountable institutions/enterprises are described in details within the respective sectoral sub chapters.

2.1.3 Local Governance Level

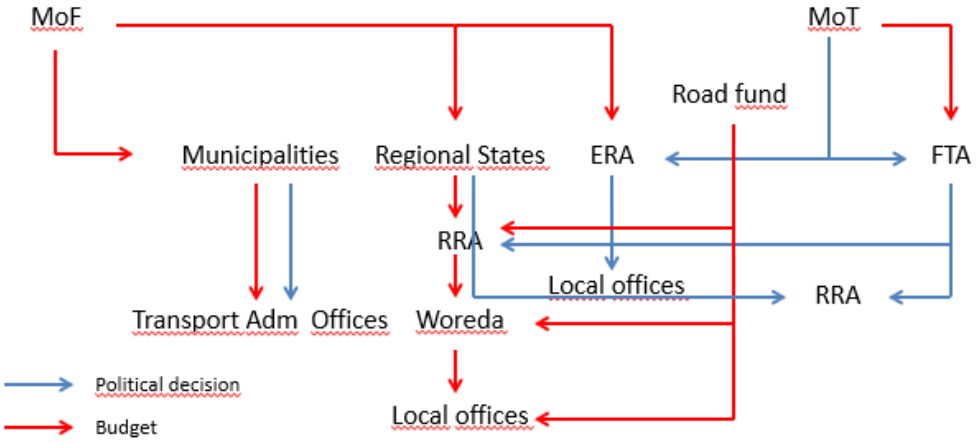
Coming to the Local Level, the Constitution states that Railway, Aviation, and Maritime are under the jurisdiction of the Federal Government that may delegate the Regional States to exercise its powers. The case of Road sub sector is different and the local organization of public powers is devoted to the Regional States.

To manage the transport issues each Regional State has basically two institutions, one for the transport service (Regional Transport Authority) and one for road construction and maintenance (Regional Road Authorities) with their subordinate branches both at Woreda and Zonal/Town level. According to the federal structure of the country, based on a wide degree of autonomy of Regional States, the RRAs have different organizational structures and different scope of work, which is often not symmetric with the related federal level.

The link between Federal and Regional States levels is also guaranteed by ERA's coordination/supervision offices throughout the country, though the offices' jurisdiction, that is to follow up ongoing project and maintenance of its roads, does not correspond to regional boundaries.

In terms of governance the example of road sector shows two main flows of decision to be considered: the political decision flow and the budgeting decision flow. In the picture below these flows are represented in a simplified form, showing a basic federal structure with a double financing channel (from MoF) for construction (through ERA) and maintenance (through Road Fund), flanked by the political decisional flow originating from MoT/Regional States and passing through FTA (for federal laws) and RRA.

Figure 4: Political and Budgeting flows interactions



As the road sector represents the largest part of the Ethiopian transport system, it is easy to see that, to be effective, the sector itself must have comparable levels of skills and competences, both among regional authorities and between the latter and the federal one.

2.1.4 Horizontal Level

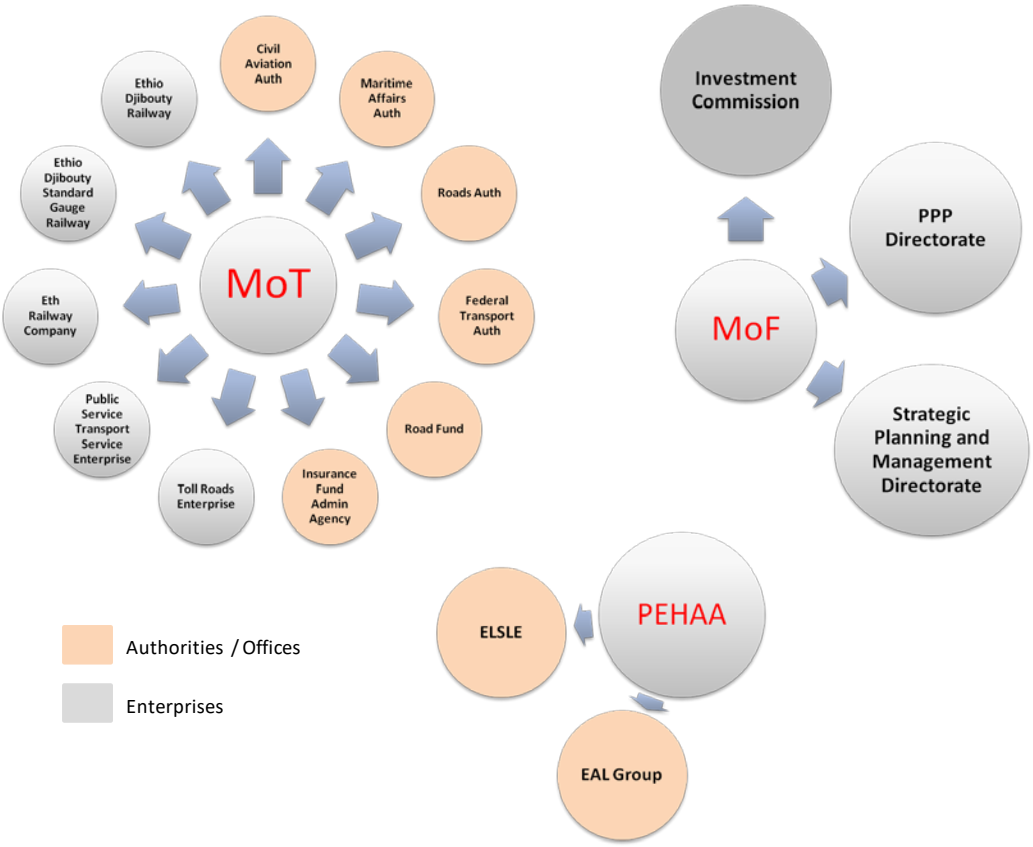
The Horizontal Level of the governance embraces some Ministries different from MoT whose duties have some competences' intersection due to the activities assigned or to the bodies supervised/regulated. It is the case of the Ministry of Finance, which is the last owner of country's public enterprises and leads planning and budgeting processes of all the institutions. Also, Ministries supervising the production activities, like the Ministry of Industry and Trade and the Ministry of Agriculture, could be included in this level.

The way in which the ministries influence the functioning of the transport sector is twofold. On one hand, through the elaboration of guidelines or strategic decisions about the economic development of the country. It is the case of both planning and budgeting processes, embracing all Ministries, Authorities and public enterprises; or the case of the country's industrial specialization or country's export-oriented industries with the related implications on industrial/agri-business investments and plants locations, input/output freight flows and working force concentration. But, below this overall level, a second issue is that of the public enterprises/entities directed/supervised by those ministries, whose behaviours and decisions may affect the implementation of the transport policies planned at high level. In fact, besides the Ministries there are some agencies/institutional entities which acts as technical implementation organ of the government policy or public bodies in charge to design and develop some specific issues of that policy. A list of main entities is as follows:

- Public Enterprise Administration Holding (former Ministry)
- Investment Board/Investment Commission
- Industrial Park Development Corporation

A synthetic scheme representing the Horizontal level is proposed in the picture below.

Figure 5: Horizontal Level of Governance



The Public Enterprises Holding and Administration (PEHA) is the former Ministry of Public Enterprises) and has been established following the reorganization of Government's powers and duties in 2018 (Proc 1097-2018). The Regulation 445-2019 provide the definition of powers and duties of the body. The main companies managed by PEHA in the transport sector are EAL Group and Ethiopian Shipping and Logistics Services Enterprise (ESLSE).

PEHA's main scope is the management of the state shares in the public enterprises by ensuring their economic viability and, at the same time, to foster a better coordination between government development policy and performance of Public Enterprises. The Holding acts as the supervising authority provided in the Proc No 25-1992 regulating the Ethiopian's Public Enterprises.

The fundamental aim of PEHAA is to develop modern corporate governance and corporate finance system within Public Enterprises in order to make them effective, competitive and profitable. Besides the classic shareholder role, PEHA has different leading powers on supervised companies on many issues. The following three are to be particularly underlined:

a) submit recommendations to the government on potential new investment areas and expansion of existing investments and implement same approval;
b) submit proposal to the government on the privatization of Public Enterprises under the auspices of the Ministry (of Finance) and upon approval, implement the same in accordance with the provisions of Proclamation Number 146/1998 and 182/1999;
c) develop dividend policy, submit recommendation to the Ministry on the amount of the state dividends to be paid to the government by Public Enterprises in each financial year, and follow up the implementation of same.

Besides public enterprises, the regulation of investments in the country represents a key tool for leading development and controlling national economic policy. The investments in the country have been historically regulated by the Investment Proclamation, giving rules and boundaries to the

private investment, both from national and foreign company/citizens. This proclamation has just been revised (by Proc. No. 1180-2020 and by Regulation No. 474-2020) introducing important changes in the country's approach to foreign investment.

In fact, the law states the principle that "any investor may engage in any area of investment except where it is contrary to law, moral, public health or security", and 'Investor' is defined as "a Domestic or Foreign investor who has invested capital in Ethiopia". Furthermore, after defining a more flexible tool (regulation) to define sectors/industries reserved to national or Government investors, the Proc 1180-2020 states that except those reserved in accordance with the quoted regulation, "all areas of investment shall be open to foreign investors"[3].

The administrative organs supervising the investment process are the Ethiopian Investment Board, the Ethiopian Investment Commission and, moreover, similar Commissions established at regional level.

The Ethiopian Investment Board has thirteen members and is chaired by the Prime Minister. It has important powers, for instance to "decide, in consultation with relevant public and private sector stakeholders, to open to foreign investors those investment areas reserved for joint investment with the government, or to domestic investors, or for joint investment between domestic and foreign investors, as well as restrict foreign investment in areas open to foreign investors where such decision is justified by public interest considerations". A practical example, directly involving the transport sector, of the aforementioned powers is the decision to open the logistics sector to private investors, approved by the Investment Board in September 2018.

The Investment Commission is a Federal Government Agency with own legal personality and is accountable to the Prime Minister. The Proclamation revised its structure in order to make it more effective at attracting foreign investments and improving the services provided to investors.

The new investment regulation (Reg. No 474/2020) groups the different investment areas into four sections:

1) Investment Areas Reserved for Joint Investment with the Government,
2) Investment Areas Reserved for Domestic Investors,
3) Investment Areas Reserved for Joint Investment with Domestic Investors,
4) Investment Areas Open to Foreign Investors.

All the investments not mentioned in the first three sections are opened to foreign capitals.

The investment area reserved to domestic investors include Maintenance and repair services, including aircraft maintenance repair and overhaul (MRO) and Aircraft ground handling and other related services. In the field of transport services an apparently extensive area is also reserved, but, through specific exceptions, railway transport, cable-car transport, cold-chain transport, freight services with more than 25 tons capacity and all the services referred to the other sections are opened to foreign capital.

There are two areas opened subject to the co-investment with Ethiopian investors, public or private. International air transport services and Bus rapid transit project call for the public partner. Several business lines are opened in partnership with domestic operators like Freight forwarding and shipping agency services, Domestic air transport service, Cross-country public transport service with more than 45 passengers' capacity and Urban mass transport service with large carrying capacity. The table below summarise the situation.

3 Proc No 1180-2020, Articles 6 and 2.

Table 1: Investment in transport sector opened to foreign investors

Joint Investment with the Government (S1)	Reserved to Domestic Investors (S2)	Joint Investment with Domestic Investors (S3)
International air transport services Bus rapid transit	Maintenance and repair services, including aircraft maintenance repair and overhaul (MRO), **but excluding** repair and maintenance of heavy industry machineries and medical equipment. Aircraft ground handling and other related services. Transport services **excluding the following areas:** - Railway transport - Cable-car transport - Cold-chain transport Freight transport > 25 tons capacity Transport services reserved for joint investments with Government or Domestic investors	Freight forwarding and shipping agency services Domestic air transport service Cross-country public transport service using buses with a seating capacity of more than 45 passengers Urban mass transport service with large carrying capacity *The share of foreign capital must not* exceed *49%,*

Consultant's elaboration on the Reg 474 2020

As Multimodal services are concerned, a recent directive for providing business license and competency certificate for multimodal transport operators has been drafted. This document lays down the criteria for the issuing of the authorization (work permit) to provide this kind of services.

Another element of the horizontal level of governance is the Public Private Partnership policy, which set another tool to incentivise the participation of private investors to the economic life of the country. In the transport sector the creation and the improvement of infrastructures is one of the core issues of the country. The related financial effort of the country is huge and would be unbearable in the long term with the sole support of public finance, so that an important role should be that of private capital, both domestic and foreign.

The Public Private Partnership matter is mainly regulated by the Proclamation No 1076-2018. The PPP model established under the Proclamation aim at: i) create a favourable framework for privately financed projects; ii) enhance transparency, fairness, Value for Money, efficiency and long-term sustainability of the projects; iii) improve quality of Public Service Activity; iv) maintain macroeconomic stability by reducing growth in public debt. A specific Board is established (PPP Board), chaired by the Minister of Finance and under the supervision of a MoF Directorate with the main task to approve all the PPP projects and to revise the risk allocation of previous approved projects.

The definition of PPP stated by the Proclamation defined it as a long-term agreement between a Contracting Authority and a Private Party under which a Private Party undertakes to perform a Public Service Activity that would otherwise be carried out by the Contracting Authority and receives a benefit by way of i) compensation by or on behalf of the Contracting Authority; ii) tariffs or fees collected by the Private Party from users or consumers of a service; iii) a combination of such compensation and such charges or fees. The Contracting Authority is the public part of the agreement and is defined as a Public Body or a Public Enterprise which intends to enter into a Public Private Partnership Agreement with a Private Party.

The kind of activities regulated under the PPP Proclamation are grouped as follows: i) Design, construction, financing, maintenance or operation of new Infrastructure Facilities; ii) Rehabilitation, modernization, financing, expansion, maintenance or operation of existing Infrastructure Facilities; iii) Administration, management, operation or maintenance pertaining to new or existing Infrastructure Facilities. The first two groups are related to the so called "greenfield" and "brownfield" investments categories, while the latter includes activities that are much more managerial than building oriented.

The process of setting a PPP scheme is based on two main roles on the public side: the contracting authority and the PPP Directorate at MoF. The proposal can be made from different sources but

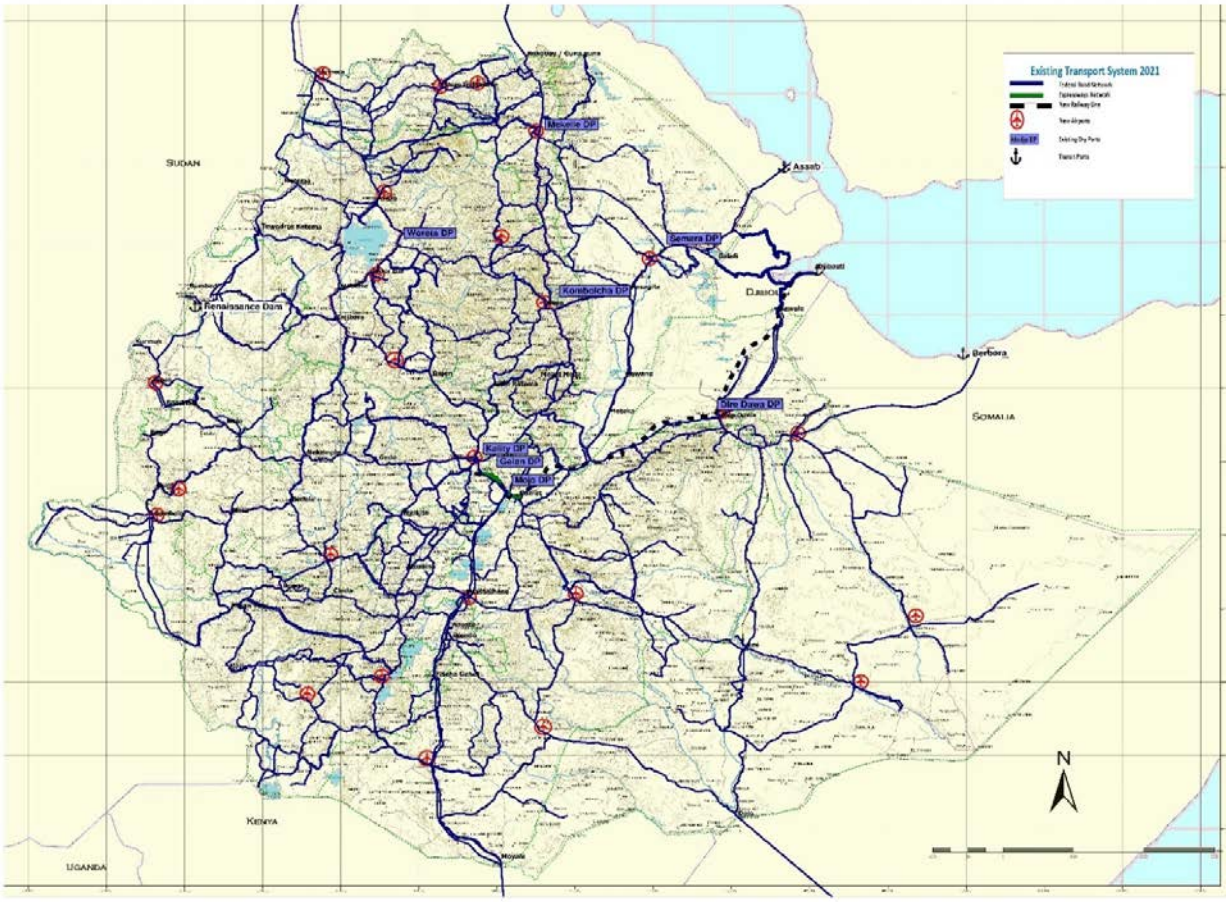
generally the public body or enterprise which has a project suitable to be financed by a private operator plays the main role. At MoF level, the PPP Directorate follows all the appraisals stages and decides if the project can be discussed at the Board level.

The PPP approach has been mainly utilised for energy and manufacturing sectors but also some transport projects followed this path. Road expressway projects like those lying on the Addis Ababa - Djibouti corridor gave birth to PPP contracts between a contracting authority and a private operator. In this case the authority is the new enterprise focused on toll roads, ETRE, as the projects includes users' charges in the benefit of the private operators.

In order to complete the framework of the horizontal elements of the governance the Industrial Park Proclamation has to be described. With the aim to attract and implement foreign investments, the Industrial Park Proclamation and the Industrial Parks Development Corporation Regulation have been issued, respectively in 2015 and 2014. The Proclamation No 886-2015 establishes the legal framework of the Industrial parks, regulating rights and obligations of the stakeholders involved in the process. The Regulation No 326-2014 established the Industrial Parks Development Corporation that is now under the responsibility of the Investment Commission. Among the objectives of the company there are the following purposes: i) Industrial Park Master Plan preparation, ii) ID development and administration, iii) to negotiate and sign loan agreements with local and international financial sources.

The transport implications of this latter element is of full evidence when one think to the planning of land use and of the manufacturing plants location. The impact of the planning of industrial park location and design affects directly the subsequently planning of transport network and services; the quality of the first by far influence the effort and the effectiveness of the latter.

Figure 6: Existing Transport System



2.2 ROAD TRANSPORT SYSTEM

The Road transport system is composed by two main components: the **road infrastructure** (generally public) that supports the **road transport** (generally private vehicles) that use the infrastructure. Both have to be regulated to make the road transport system reliable, efficient and safe. Following we describe the present Ethiopia road network, including the regional road network and the road transport organization.

2.2.1 Road system administration, funding, regulation and safety

As stated in 2.1, road sector is governed both at Federal and Regional States level. At Federal level the governance is based on the chain MoT/MoF → National authorities/agencies → Public enterprises/Market, while at Regional States level the chain is regional governments → Regional authorities → Regional enterprises/Market. Aside the administrative classification, a further distinction is needed according with the kind of public service concerned: infrastructure delivery or services providing. While the Government's responsibility is assigned to the same apical level (respectively, Federal and Regional) authorities and enterprises vary according with the kind of service concerned.

As road infrastructure is concerned, the Ethiopian Road Authority (ERA) and the Road Fund (RF) are the pillars of the road network policy in the country. ERA was re-established in 2011 by Reg. No. 247-2011 as an autonomous office of the federal government with its own legal personality. The purpose of the Authority is far-reaching: to develop and administer roads, to create favourable conditions for road development, to ensure that standards are maintained in road construction. According to this mission, the powers and duties of the ERA are numerous and varied, going from preparation of policies and laws road-related to road development planning, from procurement of civil works, design and constructions to technical support to regional road authorities.

The provision of road infrastructure as a public service mainly consists of the construction and maintenance duty. This in turn implies the need to develop adequate skills capable of planning, designing and managing infrastructures. The road sector development program (RSDP) is the main Ethiopian road development program and, over the years, has achieved very important results, not only in the physical increase of the road network but also in the progressive enhancement of the institutions (ERA first) in charge of the infrastructure providing.

Investment financing for the construction of road networks comes from the national budget or international loans, this means that for this decisive topic the role of the Ministry of Finance is crucial. In fact, ERA is under the jurisdiction of the Mot but receives from the MOF an annual amount assigned to investments on the federal road network according to the plan that the authority itself contributes to processing. This means that ERA is in a crucial point in the development and implementation of sectoral policies. Furthermore, the evolution of ERA's functions from its new institution and by the simultaneous entry into force of the Reg. 248 2011 (Ethiopian Road Construction Corporation Establishment, subsequently repealed by Reg. 366 2015) contributed to concentrating authority on high-level tasks, entrusting its operational activities to a specialized public company.

This re-focusing of the authority's tasks walked side by side during the years with the implementation of a number of capacity building programs, provided jointly with the bigger road development funding programs delivered by the leading development banks. In this way ERA has become a competence centre for the "sisters' authorities" at local level.

Nevertheless, a single well-structured agency cannot solve alone the problem arising from the accelerated growth of the road network and of a systematic maintenance lack. As also arisen from the interviews conducted al MoT's level, and reflected in the official documents aforementioned, maintenance activities, particularly below the Federal level, does not comply not with quantity, nor with quality standards requested by a growing network. This issue is well known both at MoT and ERA level and the recent reorganization of the ERA Directorate in charge of the implementation of

the Road Asset Management System, testifies that the current status of the whole national maintenance process is not satisfying.

In terms of public funding, the maintenance effort is mainly supported by the Road Fund, established in 1997 by the Proc. No. 66. The fund's mission is to finance road maintenance and road safety measures, through the resources deriving from the following sources: a) state budget, b) fuel withdrawal by purpose, c) annual vehicle license fees and d) other road tariffs possibly established. RF governance is entrusted to a Board and a RF Office. The Board is composed of representatives of the Government, Regions and road users, while the Office has an own legal personality. The Found is accountable to the PM.

In order to achieve the purpose for which it was established, RF collects road maintenance revenue and assigns it to federal, regional and urban organism in charge of maintenance. Due to the high growth of the road network, the budget allocation criteria have varied over time. In the early years of the 21st century a fixed allocation was followed; later on, the fixed criterion has been replaced by a variable mechanism grounded on the length of the roads managed at each administration level. The criterion is in force for a three years period and is then updated, the current allocation is as follows: Federal roads 65%, Rural Roads 25% and Selected Municipal Roads 10%4.

The RF Board assigns a maintenance budget to each State for the activities under its responsibility (length of roads starting and ending within the State's boundary). This leads to the current budget allocation of about 65% of the total planned amount to ERA, which is responsible for federal roads. Once defined the total amount for each Regional State, the latter provides to RF a detailed program assigning the given budget for specific maintenance works. This program is mandatory and audited by the Federal level; the States cannot divert funds from a maintenance line to another without authorization. In case of lack of funding, States can call the Government for further funds. The Government decides whether assign or not the funds according to the status of public finance and in case of justified needs of further works.

It is easy to understand that the above criterion is based on a pure administrative parameter and does not take into account any diagnosis of the real status of roads. In other words, no asset management system is currently guiding the road maintenance process. Progress on these issues are expected from the outcomes of two projects currently ongoing. The Road Functional Classification study, under review at ERA, is expected to address the allocation of responsibilities of each physical part of the network. Besides, the Federal Roads Master Plan study should identify projects to be implemented at all administrative levels (ERA, regional, and district) for the next ten years.

Next to the development of the Federal Road network, a first nucleus of toll motorways system is now operating in the country. The expressways currently open are the terminal sections along the corridor Addis Ababa - Djibouti (sections Addis Ababa - Adama and Dire Dawa - Dewele) while the central sections are under construction and a final decision on the establishment of tolls has to be taken yet.

In case of a toll mechanism adoption these infrastructures should finance their operating cost (first of all maintenance costs) mainly through tolls collection. The introduction of similar schemes is a step which can help the participation of private operators in the financing of road network development, for instance through Public Private Partnership schemes. In this case cost and revenues arising from roads utilisation are bind and devoted both to investment's repayment and operational costs coverage.

The regulatory framework has been consequently enriched by a specific Proclamation (No 843-2014) establishing the Toll Roads, while a related Regulation (No 310-2014) created the Ethiopian Toll Roads Enterprise under the supervision of MoT. Accordingly, the collection of road tolls fees has been shifted from ERA to ETRE.

[4] AAAU-EiABC (Ethiopian Institute of Architecture, Building Construction and City Development), Gap Assessment Report for FDRE - Office of Road fund, March 2021

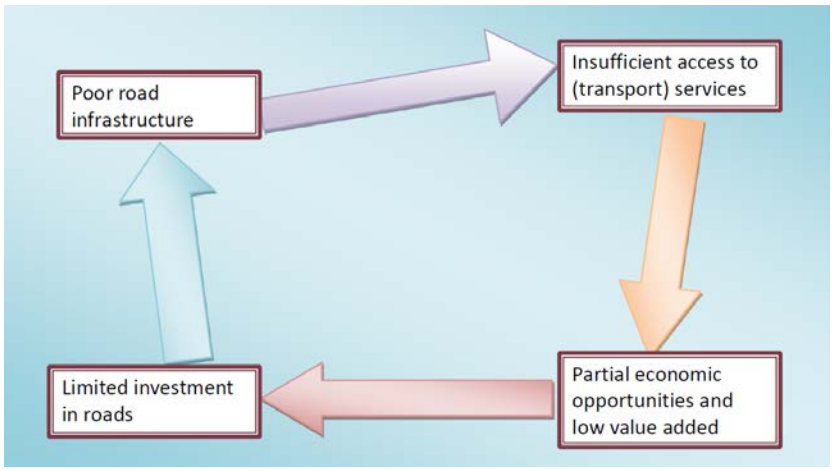
Besides this sectoral intervention, the PPP approach has been introduced into the Ethiopian legal framework (as described in 2.1.3) and ETRE could act as the public part (i.e., the contracting authority) of the PPP contract which regulates rights and duties of the parties.

Coming to the process of infrastructure providing at Regional States level, it has been said that the command chain originates from the regional government and passes through the Regional Road Authorities (RRAs) which has powers on the roads that originate and end within the regional borders. Therefore, these competences are mirroring the ERA's, though on a territorially limited level. Below the regional level (Woreda level) the Woreda Road Offices (WRO) represent the administrative and technical contact point for the rural roads.

The financing of roads constructions at local level comes from Federal budget and from international development banks. As for the domestic budgeting process, in general the Federal level set funding transfers to Regional States without any specific target; each Regional State decides on the bases of its own needs the sectoral budget allocation.

The development of local connectivity is a pillar of the infrastructure delivery. The Universal Rural Roads Access Program (URRAP) has been launched by the Ethiopian Government to connect all Kebeles by standard and affordable all-weather roads to guarantee a yearly based access. The aim of the program is to provide one of the tools to eradicate poverty from the country, by escaping from the "rural transport trap" (see Figure below) that affects many underdeveloped countries[5].

Figure 7: The rural transport trap: rationale of URRAP Program



Source W.T. Consult P.L.C. Consultancy services for impact assessment of URRAP Program

The URRAP program certainly contributed to the growth of road accessibility but, according with ERA, the ability to complete the planned works is, respectively, at 53% (quantity parameter) and 61% (disbursement) of the plan[6]. As maintenance is concerned, the disbursement is at 20% of the planned budget. This very partial accomplishment of the targets is caused by a number of critical factors that hampers the full operability of civil works at local level. These critical factors have been identified and scrutinised both by the interviews and many sources and are reported in the following list:

- Capacity Gap
- Fast turnover of skilled workforce
- Lack of funding
- Failures in procurement process
- Quantity/Quality failures of construction equipment

[5] G. Raballand, P. Macchi, C. Petracco , Rural road investment efficiency: *Lessons from Burkina Faso, Cameroon, and Uganda*. The World Bank, 2010

[6] ERA, Road Sector Development Program, 22 Years Performance Assessment Report, 2020.

- Delay of Project Handover
- Relationship between Consultants and Contractors
- Rent Seeking Behaviour
- Community Participation/contribution
- Reporting and Documenting

It is easy to see that the factors can be grouped in three critical areas: i) Financial resources, ii) Capacity skills and iii) Organization/Coordination issues.

Financial resources. The lack of funding seems to have at least two driver factors: cost increasing compared to the planned level (delays in civil works, increasing costs of the equipment/spare parts) and poor quality of works.

Capacity

Workforce skills are a huge factor of inefficiency. This influences all phases of the construction/maintenance process and influences many key roles of the process itself: from design to procurement, from project management to execution. In addition, this scenario is often made worse by a rapid change in the skilled workforce.

Organization/Coordination

Bad functioning of organizational processes and coordination activities (internal and between stakeholders) are among the most widespread critical issues in the field of infrastructures. It is therefore not surprising if they also occur in this case. The lack of coordination, both between central and peripheral entities (ERA, RRAs, Regional Governments) and between different actors with different roles (public officials, consultants, contractors) influence the performance of activities in different ways. For example, in case of new professional figures, they must be trained and framed in the organizations, providing, together with an adequate remuneration level, also an attractive career path.

Summing up the situation for infrastructure providing, the table below describes how the main functions are allocated at federal and regional states levels.

Table 2: Allocation of responsibilities on the road sub sector - Infrastructure

Function	Federal Roads		Regional & Rural Roads	
	Construction	Maintenance	Construction	Maintenance
Overall Supervision	MoT	MoT	RG	RG
Allocating Finance	MoF	RF + MoF	RG	RF + RG
Formulating Policy	MoT, ERA	MoT, ERA	RRA	RRA
Annual Plan & Executions	ERA	ERA	RRA	RRA
Delivery of works	ECWC, Private Companies	ECWC, Private Companies	RPE, Private Companies	RPE, Private Companies

MoT= Ministry of Transport, MoF=Ministry of Finance; ERA = Ethiopian Roads Authority, ECWC = Ethiopian Construction Works Corporation; RF = Road Fund; RG = Regional Government; RRA = Regional Road Authority; RPE = Regional Public Enterprises.

As Road Transport services are concerned, according with Proclamation No 468-2005, the provision of transport services is allowed to licensed operators, both public and private. They have to act in compliance with the rules issued by the competent authorities, for instance the Proc. No. 547/2007 which states the conditions for the Carriage of Goods by Land, by repealing the old provisions on the matter issued by the Commercial Code of Ethiopia.

The licensing authority is the Federal Transport Authority (FTA), established by the Proc. No 468/2005, originally in charge of all transport modes licensing (excluding air services). Afterwards FTA has progressively lost its duties as sub sectoral reforms went into force or by the establishing of specialised agencies.

Presently the Authority is in charge of the road transport organization in the country, both for passengers and freight. Its powers and duties are large, covering a large spectrum of issues, from administrative (individual/enterprise authorizations, vehicle registrations, driving license requirements and process, insurance enforcement) to technical ones (certification of technical

competences, vehicles compliance and inspections, manufacturing and import, requirements of terminals), from economic (tariffs authorisation, services' organizations) to emergency actions (transport emergency and recovery plans).

As the case of infrastructure providing, for transport services occurs the same division of powers between Federal level and Regional States, the following table describes the allocations of the main functions.

Table 3: Allocation of responsibilities on the road sub sector - Services providing

Specific Issue	Federal Government	Regional Governments
› Driving License	› Enacting laws and supervise the proper implementation of same by Regional Governments, › Issuing Federal Driving License	› Enforcing the laws enacted by the Federal government › Issuing Regional Driving Licenses
› Vehicle Regulation	› Enacting laws › Enforcing the law on all imported and locally manufactured vehicles › Enforcing the law on Cross Country Public and Fright Transport vehicles	› Enforcing the law on those vehicles registered and licensed by them.
› Speed	› Enacting laws, Enforcing the law on Federal Tall Roads	› Enforcing the Law at both Federal and Regional Roads
› Axle Load Enforcement and Weight Stations	› Enacting laws › Enforcing the law on Federal Roads	› Enforcing the laws on Regional Roads
› Cross Country Public and Freight Transport Services	› Both enacting and enforcing laws	› None
› Regional Public and Freight Transport Services	› None	› Both enacting and enforcing laws specifically governing the service
› General road regulations	› Enacting general road Users' Regulation	› Enacting additional road users' Regulation and enforcing both the Federal and Regional State Regulations
› Safety	› Enacting laws and issuing strategies	› Planning and executing safety activities

It is easy to observe a logical division of responsibilities, with each level being responsible for issuing and enforcing the regulations that fall within its scope. However, as mobility phenomena are precisely characterized by flexibility and displacement, some coordination and enforcement issues arise in this administrative area.

The case of the driving licenses is an example. The existence of three kinds of driving licenses (the one issued prior to Proc. No. 600-2008, another one that issued in accordance with Proc. No. 600-2008, and finally the one which is currently been issuing in line with the provisions of Proc. 1074-2018) can generate confusion in law enforcement. At the same time, given the same basic principles for the issuing of a license, some Regional States are tighter than others in applying it. Besides, the States' Traffic Polices often apply the law in different ways. Eventually, the lack of a ICT system able to monitor licenses and penalties on a national scale, is a real hamper to a uniform enforcement of the rules.

As far as passengers' public services are concerned, given the regime of market openness subject to licensing authorization, the role of public enterprises is not so extensive as in other fields. Services of different level of quality/tariffs are provided by public and private operators. The latter are companies or associations which are responsible for the safe and convenient movement of passengers and their baggage. The association includes private companies and/or individual vehicle owners driving for the purpose of providing transportation services. It is the interface body of the members with the FTA and organizes the requests, the questions, the requests of the members towards the public power. Since associations have offices in each terminal, they are able to follow the services provided by their members.

In the Capital City the Regulation No. 298-2013 (and its amendment by Regulation No. 362-2015) established the Public Service Employee's Transport Service Enterprise (PSETSE) with the aim to

provide transport services to federal and Addis Ababa public employees during the public offices' working hour and the possibility to provide services to all citizens outside that period. The company is accountable to MoT.

Besides PSETSE there are two public companies providing public transport services, Anbessa City Bus Service Enterprise and Sheger Mass Transport Enterprise, which are accountable to the Addis Ababa City Manager's Office, and the Transport Bureau of Addis Ababa City Administration (a more detailed description is given in 2.8.7).

To complete the picture, it is necessary to mention the "informal" supply of transport services. This is a very widespread phenomenon, in most cities not only in Africa but also in Asia and Latin America, in situations where the structured public transport model is ineffective and/or unattractive. The so called "Paratransit sector" includes formal and informal transportation services provided by operators seeking profit maximization in a non-highly regulated system[7]. In Addis Ababa Paratransit is regulated by the City Administration which set the market entry rules and the routes to be operated.

For international passenger services, Ethiopia has so far signed two agreements with Sudan and Djibouti for providing necessary framework for passenger road transport services between Addis Ababa and their respective capital city. The Agreement signed with Sudan on 4th of December 2013 was ratified by House of People's Representative on 23rd of May, 2017 (Proc. No. 1009-2017). Similarly, the Agreement signed with Djibouti on 7th of February 2015 was ratified on 2nd of November 2017 by Proc No. 1055-2017.

In a broader sense international services have to be considered within the framework of the multi-country treaties inked by the country. This has a particular meaning for road freight transport which is supposed to ensure the commercial flows between Ethiopia and the neighbouring countries. On this matter the reference is the Tripartite Free Area (TFA) which aims at establish a regime of free flows on commercial basis among the common market for Eastern and Southern Africa (COMESA), the East African Community (EAC) and the Southern African Development Community (SADC).

It is easy to understand how crucial can be the role of road freight services to reach the objective of this agreement. In fact, the lack of an integrated and liberalised road transport market in the East and Southern African (EA-SA) region hampers the trade flows by causing severe delays and increased transport costs, as well as challenges to road safety. The tripartite members agreed on the prioritisation of infrastructure development in the region through their respective treaties, protocols and agreement as part of the comprehensive Tripartite Transport and Transit Facilitation Programme (TTTFP). In 2018 a Multilateral Cross-Border Road Transport Agreement (MCBRTA) has been signed. The agreement aims at achieve "the integrated and seamless movement of goods and persons in the Tripartite Region with a view to reducing transportation costs and transit times in order to increase the competitiveness of goods produced in the Eastern and Southern African Region for distribution in regional and international markets"[8][9].

The main obstacle to be faced basically concern a common regulatory framework which requires harmonisation/adjustment actions of the countries involved. The most important issues to be faced are as follows:

- implementation of an Integrated Transport Registers and Information Platform and System,
- harmonization of Vehicle Load Management Standards,

7 Agence Française de Développement, CODATU, Paratransit: a key element in a dual system, Oct 2015; G. Lesteven, V. Boutueil, Is Paratransit A Key Asset For A Sustainable Urban Mobility System? Insights From Three African Cities. 97th Annual Meeting Transportation Research Board, Jan 2018, Washington, United States.

8

9 COMESA – EAC – SADC TRIPARTITE, Multilateral Cross-Border Road Transport Agreement (MCBRTA), Rev 3.4 Oct 2018. Somalia is not included in the agreement.

- harmonization of Vehicle and Driver Regulations and Standards.

Given the mixed regime in force in the country (public and private providing) the prices of transport services are established according to the kind of service concerned. In the following table is given an overview of the responsibilities regarding prices and tariffs of the transport services.

Table 4: Tariffs responsibilities for the road transport services

Types of the Service	Tariff establishing
Regular cross-country/International public transport services	Federal Government (FTA)
"Special" cross-country public transport services	Market
Urban and intra-city (within the same regional state) public transport services	Regional Governments
Cross Country Public and Freight Transport Services	Market
Freight transport services	Market
Regional Public and Freight Transport Services	Regional/Municipal Transport Bureaus
Fuel Transport services	Federal Government (Ministry of Trade & Industry)

The crucial role of road transport in the country has required the development of an insurance system able of growing at the same speed as vehicles spread and to manage the economic consequences of road accidents. To this purpose the Proclamation No 799-2013 states the Insurance policy of the country and provides a mandatory third-party risk insurance for all registered vehicles. Accordingly, Regulation No 300-2013 establishes the Insurance Fund Administration Agency by replacing the former Office of the Insurance Fund.

The safety issue is crucial for the road sector in Ethiopia. The increase of accidents and fatalities that followed the growth of motorization rate in the country, despite the latter it is not as high in absolute terms, called for focused strategies to tackle and, possibly, prevent a huge future increase of accidents. The table below describes the evolution of road fatalities from 1996 to 2018.

Table 5: Road fatalities in Ethiopia 2003-2018

Year	Number of Fatalities	No. of Registered Vehicles	Fatality per 10,000 Vehicles	Population in Million	Fatality per 100,000 Population	Vehicle km Travelled (VKT)	Fatality per Million VKT
2003/04	1,630	155,000	105.16	69.127	235.80	5,620,554	290.007
2004/05	1,801	170,000	105.94	73.910	243.67	5,974,540	301.446
2005/06	2,029	200,000	101.45	75.070	270.28	6,720,776	301.900
2006/07	2,047	245,000	83.55	77.130	265.40	7,565,365	270.575
2007/08	1,802	270,000	66.74	79.220	227.47	9,177,030	196.360
2008/09	2,211	310,000	71.32	79.300	278.81	9,488,910	233.009
2009/10	1,852	340,000	54.47	79.455	233.09	11,648,823	158.986
2010/11	2,250	376,000	59.84	82.101	274.05	11,948,153	188.314
2011/12	2,505	423,000	59.22	84.320	297.08	14,203,046	176.371
2012/13	2,575	582,216	44.23	87.940	292.81	14,203,046	181.299
2013/14	2,664	645,678	41.26	97.337	273.69	14,683,918	181.423
2014/15	3,172	677,044	46.85	99.873	317.60	16,273,619	194.917
2015/16	3,475	708,410	49.05	102.403	339.34	17,291,368	200.967
2016/17	3,170	831,265	38.13	104.957	302.03	18,917,205	167.572
2017/18	3,820	914,392	41.78	107.535	355.23	24,017,568	159.050
2018/19	4,597	1,071,000	42.90	110 000	471 90	28,131,059	163.414
2019/20	4,133	1,200,000	34.40	113 000	388,72	31,519,393	131.127

Source National Road Safety Council's Office, Ministry of Transport

It is easy to see that the victims of road accident increased on average by about 5,8% per year, while, considering the ratio Victims/Population, the average increase has been of about 2,8% per year. These figures are not in line with a country that intends to project itself among the middle-income countries. There are many converging factors behind this value: beyond the increase in motorization, other factors are vehicle age, poor road conditions, large share of pedestrian mobility, lack of centralized database for registering and regulating drivers and vehicles, low awareness of road safety and regulation by road

users, low enforcement capacity due both to lack of capacity and corruption.

In order to cope with this negative trend a focused body has been established. The Reg No. 205/2011 creates the National Road Safety Council (NRTSC) with the aim of develop road safety strategy and coordinate its implementation. The Council acts both as a pivotal expertise centre and monitoring/dissemination centre on road safety issues.

Beside safety issue10 other social/environmental issues need to be treated. The first one is represented by road accessibility that is one of the basic requirements to lead the country outside from poverty. As stated before, the huge increase of RAI testifies the progress of the country along this path, nevertheless the current value of the index (60%) shows that there is an important gap to be filled yet.

As far as mobility is concerned, there are positive data on the significant increase in mileage along the road network with an average annual increase of 10.6%. This increase is more or less the same for both passengers and freight vehicles (see para 5.2 for a discussion about this topic). On the other hand, the private motorization is substantially limited to the Addis Ababa area, so that the role of transport public services is more than crucial to ensure the possibility of all Ethiopian citizens to move from their residence to satisfy their primary needs (health, school, work, ...).

Under this point of view the ability of the citizens to access a public service is strictly connected with the quantity and the price of service providing. The current regulatory framework let the operators, both public and private, to decide the level of services and its quality level, according with their ability to organize the service without profit loss. The role of the public power is to issue commercial license and approve tariffs schemes for passenger services. At the same time, when public enterprises are involved in service providing, federal or regional powers are free to decide to subsidise them or not.

Such a system seems to ensure the economic equilibrium of the operators but probably does not meet the potential demand of mobility. In this area a further effort of public powers to enlarge the accessibility to mobility services could be reached through the adoption of suitable regulatory measures without hampering the private undertakings to participate to the economic activity.

In addition to traditional motorized mobility, the concept of non-motorized mobility is gaining ground. This is particularly important for a country like Ethiopia because it considers at the same time many issues of primary importance such as the share of the fragile population (like children, women, people with disabilities and others) but also of the share of isolated population in the less habited areas. In Ethiopia the share of pedestrian or animal-drawn mobility is very high, due to morphological and economic factors, a focused strategy aiming at reduce these negative elements has an important role.

This is the case of the Non-Motorized Strategy issued by the Government. The strategy is focused on the urban environment and also considers the quality of road design as one of the key factors to be affected, through an adequate review of road design manuals.

The guiding principles of the strategy prepare a rebalancing of the concept of mobility by designing the spaces for both traditional and non-motorized mobility, instead of considering the latter as an ancillary way of moving. The activities vary from the conceptualisation of non-traditional networks, as Pedestrian, Bicycle and Greenway networks, to the design review of streets, intersections, street lighting, to the management of Parking, Vendor Street, Animal-drawn vehicles.

This kind of strategy is centred on FTA and involves all the chain of public powers, from Governments' level to City level, passing through ERA at national and district offices level, regional administrations, RRA's, Federal and local police.

10 The legal framework of dangerous goods' transport is described in sub chapter 2.5.

2.2.2 Road Infrastructures

The road transport network is the most important infrastructure in Ethiopia, providing access to rural and urban areas and supporting the overall economic growth of the country. Following, the total classified national road network according with ERA official data is presented together with the number of unclassified roads detected with Open Street Map.

Table 6: Road Network in Ethiopia (2019)

OFFICIAL DATA FROM ERA								Open Street Map Data		Total
No	Region	Federal Roads (ERA) (km)	Regional RRAs Roads (km)	URRAP Roads (km)	Municipal (Urban) Roads (km)	Total Classified Road Network (km)		Unclassified roads		
1	Tigray	2.588	1.490	2.302	1.271	7.651		2.618		10.269
2	Afar	1.916	1.124		354	3.394		1.694		5.088
3	Amhara	6.502	4.786	11.000	4.304	26.593		1582		28.175
4	Oromiya	9.081	10.656	35.460	6.042	61.239		13.223		74.462
5	Somali	2.586	3.305		415	6.306		18.863		25.169
6	SNNP	4.592	10.866	6.070	6.861	28.389		8.713		37.102
7	Benishangul	735	936	519	155	2.345		2.425		4.770
8	Gambella	602	2.027	33	133	2.795		167		2.962
8	Dire Dawa	45	161	280	380	866		51		917
10	Harari	52	455	144	101	752		17		769
11	Addis Ababa				7.613	7.613		220		7.833
	Total	**28.699**	**35.806**	**55.808**	**27.629**	**147.942**		**49.573**		**197.515**

(*) Excluding Expressways

The total extent of the present classified road network of Ethiopia is 147 942 km. The extent of present Expressways is, according with ETRE, equal to 301 km. The total extent of unclassified road network (OSM) is 49 573 km. The total road country asset can be estimated at over 197 800 km, as shown in the following table.

Table 7: Ethiopia Road Network Asset

Road Network	Length (km)
Expressways & Toll Roads	301
Federal roads	28 699
Regional roads	35 806
URRAP roads	55 808
Municipal roads	27 629
Unclassified	49 573
Total (km)	**197,816**

According with Road Fund Office (RFO), the current (2021) road conditions of the classified network (147,942 km) are:

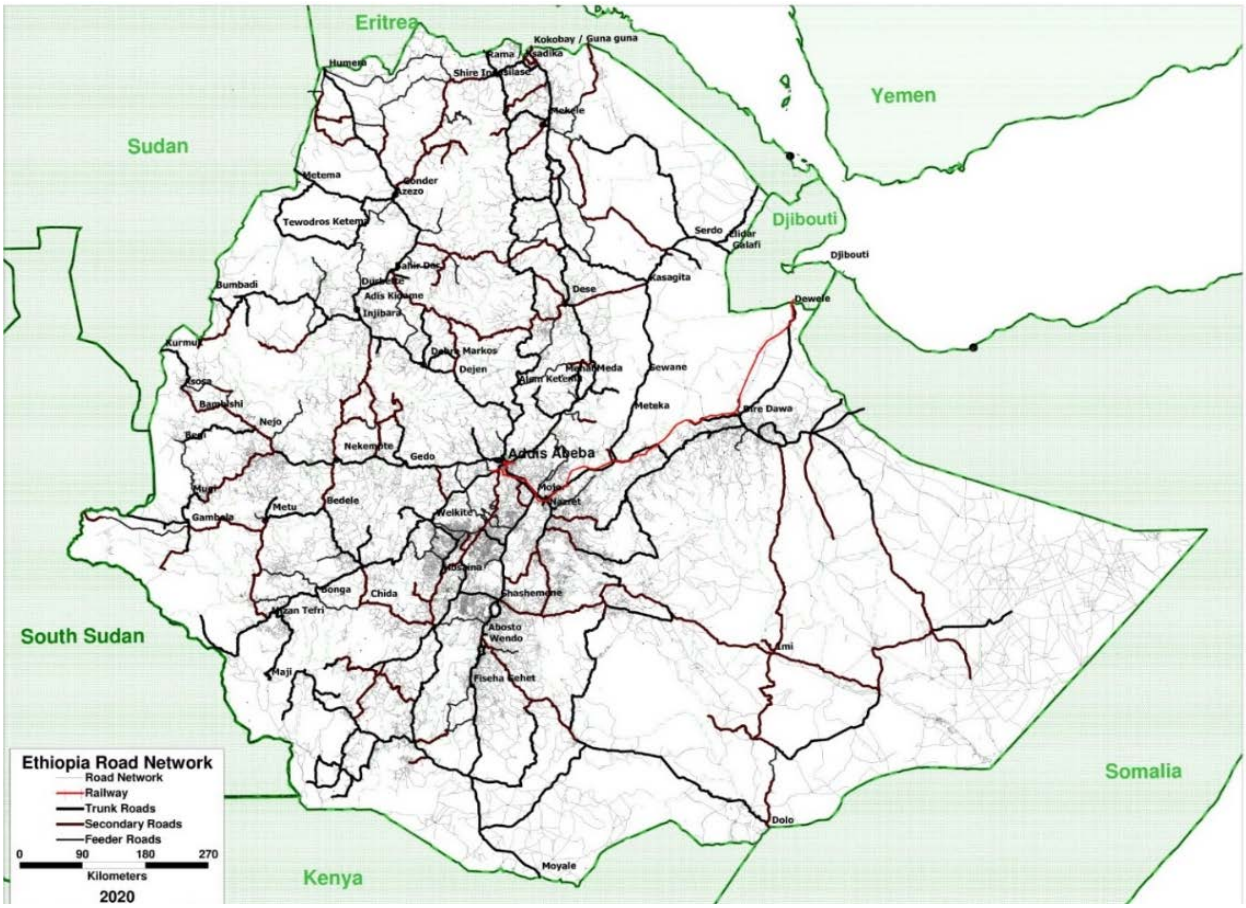
- 33,730 km (23%) are in good conditions;
- 47,579 km (32%) are in fair conditions;
- 66,633 km (45%) are in poor conditions.

And in terms of road surface type the total classified network is made up by 87% of gravel roads and 13% of asphalt roads. Following is the their road conditions:

Administration	Surface Type (in km)			Road Condition (in %)		
	Gravel	Asphalt	Total	Good	Fair	Poor
ERA	12,813	15,886	28,699	22	40	38
RRAs	35,806	0	35,806	30	20	50
Municipalities	24,416	3,213	27,629	24	30	46
Community/Woredas	55,808	0	55,808	18	37	45
Total	**128,843**	**19,099**	**147,942**	**23**	**32**	**45**
	87%	**13%**				

The current Ethiopia road network is presented in the following map:

Figure 8: Ethiopia Road Network



2.2.3 *Federal road network*

The Ethiopian Road Authority (ERA) is managing the federal road network, while the different Regional Road Authorities (RRAs), Woreda Road Authorities (WRAs) and municipalities are managing the secondary, tertiary and urban and local roads.

Following is the length of the federal road network, divided into ERA categories and their status. The total federal road network extension is 28,699 km (15,886 asphalted) and is composed by:

Table 8: Federal Road Network

	Asphalt	Gravel	Total
A - Trunk	5,626	16	5,642
B - Link	5,273	3,409	8,682
C - Main Access	2,431	3,639	6,070
D - Collector	845	2,714	3,559
E - Feeder	1,711	3,035	4,746
Grand Total	**15,338**	**13,361**	**28,699**

Source: ERA

Presently the trunk road network of Ethiopia is represented by five roads departing from Addis Ababa and then articulated into ten branches:

1. A1 - East from Addis Ababa 853 km via Adama and Awash to Galafi on Djibouti border;
2. A2 - North from Addis Ababa 1071 km via Dessie, Mekele and Adigrat to Axum;
3. A3 - North west from Addis Ababa across the Blue Nile (Dejen) and Bahir Dar east of Lake Tana 737 km to Gondar. Designated part of the Cairo-Cape Town Trans-African Highways 4 (TAH 4);
4. A4 - West from Addis Ababa 620 km via Nekemte to Gimbi and Asosa;

5. A5 – South-West from Addis Ababa 510 km via Jimma to Metu;
6. A6 - South west from Jimma 216 km to Mizan Teferi;
7. A7 - South from Mojo 432 km via Shashamane, Sodo to Arba Minch. Part of road between Mojo and Shashamane is designated part of the Cairo-Cape Town Trans-African Highways (TAH 4);
8. A8 - South from Shashamane 214 km via Hawassa to Hagere Mariam. Designated part of the Cairo-Cape Town Trans-African Highways 4 (TAH 4);
9. A9 - South from Adama 77 km to Asella;
10. A10 - East from Awash 572 km via Harar and Jijiga to Degehabur;

Following is the federal road network extension by region:

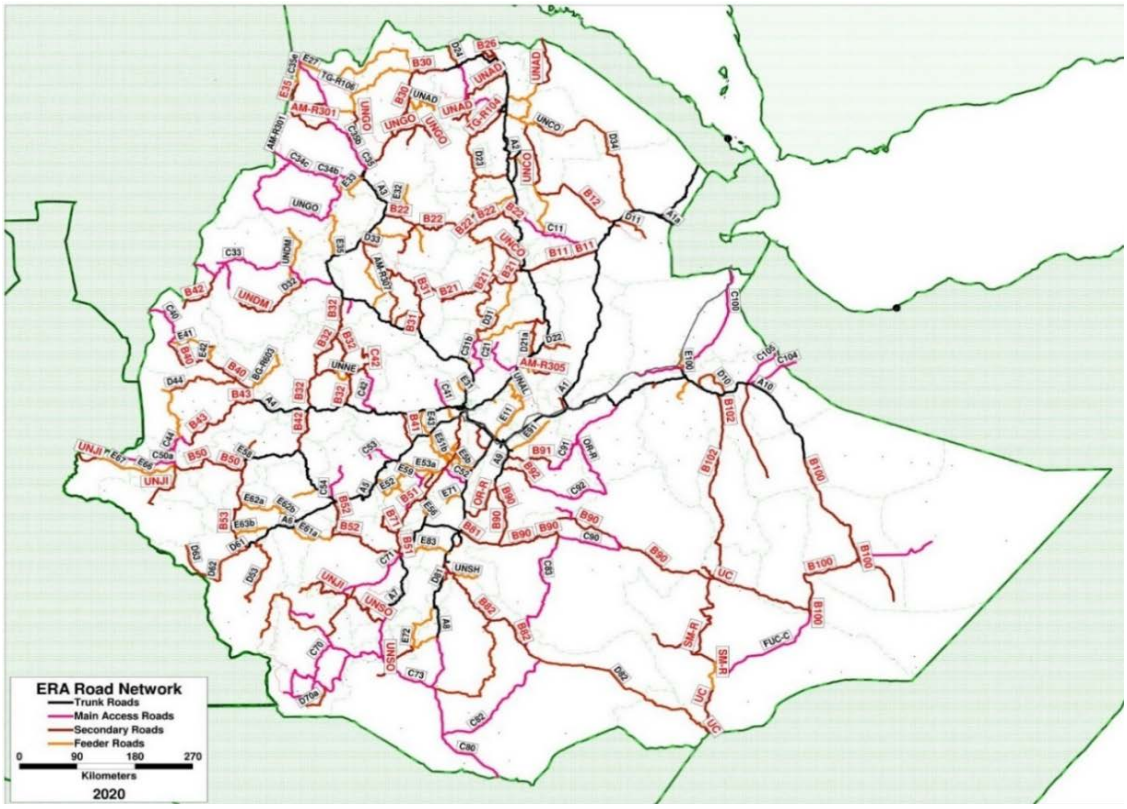
Table 9: Federal network by region

	Asphalt	Gravel	Total
Afar	1,551	366	1,916
Amhara	3,621	2,882	6,502
Benishangul Gumuz	264	471	735
Diredawa	27	18	45
Gambella	242	360	602
Harar	42	10	52
Oromia	4,517	4,564	9,081
Somali	896	1,690	2,586
South	2,588	2,004	4,592
Tigray	2,139	449	2,588
Grand Total	**15,338**	**12,361**	**28,699**

Source: ERA

ERA is undergoing important improvement studies, like the "ERA and Road Sector Modernization and Transformation Initiative" and "Road Functional Classification Study", together with the decentralization of the responsibilities with the Regional Roads authorities.

Figure 9: Federal Road Network



Source: https://vdocuments.mx/road-network-map-of-ethiopia.html

RSDP achievements

Since 1997, five Road Sector Development Programs (RSDPs) have been implemented, consisting of rehabilitation/upgrading of trunk and link roads, construction of new link roads, rural roads & district roads and maintenance of federal and regional roads, carried out by Ethiopian Roads Authority (ERA), Regional Roads Authorities (RRAs), Woreda Road offices (WRO) and the community and municipalities. Also, a series of policy and institutional reforms have been implemented in the sector, which have enhanced implementation capacity of road projects and effectiveness of Road Asset Management.

According with last RSDP assessment, in the twenty-two years, a total of 153,013.1 km of roads have been built and improved, excluding routine maintenance work and community roads works carried out. The total budget for these works amounted to ETB 437.2 billion and the amount disbursed in the same period was ETB 373.1 billion, reaching the 85% of implementation of the plan. In particular, because of this huge investment, the country's road network has increased from 26,550 km in 1997 to 144,027.8 km in 2019 (average growth of 8 percent) and the road density per 1000 sq. km has increased from 24.1 km in 1997 to 130.9 km in 2019. Also; substantial improvement has been registered in the condition of the country's road network, with the proportion of road network in good condition increased from 22% in 1997 to 71% in 2019.

During the last four years of RSDP V, a total of 34,460.1 km physical work has been carried out, of which 11,511 km by Federal Roads; 8036 km by Regional Roads and 14,914 km of roads were URRAP Roads. About ETB 154 billion was disbursed of which 118.8 billion was on Federal Roads and ETB 23.6 billion was on Regional Roads and 11.9 billion was on URRAP Roads.

With regard to the Federal Road Network, 1011.3 km of trunk roads were rehabilitated, 2338 km of trunk and link roads were upgraded, 3214 km of new link roads were constructed and 70.8 km of expressway roads were constructed in the four years of RSDPV. In parallel with these works, a total of 4876.7 km of heavy maintenance work was carried out on federal paved and gravel roads.

The overall physical and financial performance against plan during the four years of RSDP V was 37% and 61% respectively. The low physical performance is mostly attributed to the unrest and insecurity in the country in the fiscal year and low performance of Woreda roads.

Besides the increase of road efficiency (transport cost reduction) and rural accessibility, a major objective of RSDPs is also to develop the institutional capacity of road sector at central and regional level, like restructuring and modernization of ERA, restructuring of construction contract administration, restructuring of road asset management and ERA management system.

Table 10: Performance by Implementers (in %)

Program	Federal			Regional			Woreda/URRAP			Overall		
	Plan (km)	Actual (km)	%	Plan (km)	Actual (km)	%	Plan (km)	Actual (km)	%	Plan (km)	Actual (km)	%
RSDP I	3,777	2,709	72	5,131	6,000	117				8,908	8,709	98
RSDP II	5,375	7,483	139	2,877	4,106	143				8,252	11,589	140
RSDP III	8,956	7,996	89	5,730	4,399	77				14,686	12,395	84
RSDP IV	14,782	13,633	92	11,212	9,814	88	71,523	62,413	87	97,517	85,860	88
RSDP V (4 years)	12,336	11,511	93	6,600	8,036	122	74,187	14,914	20	93,122	34,460	37
Total RSDP	45,225	43,332	96	31,550	32,355	102.6	145,710	77,327	53	222,485	153,013	69

Source: ERA, "22 years assessment report"

Even if considerable results have been achieved by the road development programmes, Ethiopia remains below the average of other African countries, in terms of road density and road quality, as shown in the following table.

Table 11: Road Density Comparison

Indicator	World Average	Africa Average	Middle Income Countries Average	Sub Saharan Average	Ethiopia performance
Road Density per 1,000 sq.km	394	204	335	140	130.9
Road Density km per 1,000 people	6.7	-	7.0	3.3	1.41
Percentage of Road covered with Asphalt	60	25	57	25	11.9
Good Quality Road Percentage	-	75	82	70	20.1

Following is the regional road density:

Table 12: Regional Road Density

Region	Capital	Area (km²)	Population 2020	Road Network	Road Density / 1000 sq km	Road Density / 1000 pop
Addis Ababa	Addis Ababa	2.360	3.774.000	7.613	3.226	2,02
Afar	Asayita	72.053	1.940.000	3.394	47	1,75
Amhara	Bahir Dar	154.709	22.292.000	26.593	172	1,19
Benishangul-Gumuz	Asosa	50.699	1.157.000	2.345	46	2,03
Dire Dawa	Dire Dawa	1.559	507.000	866	555	1,71
Gambela	Gambela	29.783	478.000	2.795	94	5,85
Harari	Harer	334	264.000	752	2.251	2,85
Oromia	Addis Ababa	284.538	38.170.000	61.239	215	1,60
Somali	Jijiga	279.252	6.203.000	6.306	23	1,02
Tigray	Mekele	84.722	5.542.000	7.651	90	1,38
SNNPR	Awasa	105.476	20.502.000	28.389	269	1,38
Total		**1.065.485**	**100.829.000**	**147.943**	**138,9**	**1,46**

According with the TYP, Ethiopia will have a substantial increase of all-weather road extension from 144,000 km (2019) to an estimated 225,000 km in 2029, serving all woreda capitals, while the length of the expressway network will pass from the present 212 km to 2,960 km covering all the trunk road system of the country and connecting with neighbouring countries.

2.2.4 Regional road Networks

Regional Road Authorities

Eleven Regional Road Authorities have been established, with different names: Addis Ababa (Road Authority), Afar (Road & Transport Bureau), Amhara (Road & Transport Bureau), Benishangul (Road & Transport Bureau), Diredawa (Road Authority), Gambela (Road Authority), Harari (Road Authority), Oromia (Road Authority), Somali (Road & Transport Bureau), SNNP (Road Authority), Tigray (Construction, Transport and Road Development Bureau).

All Regional Road Authorities (RRAs) appear to have different and diverse institutional organizational structures. In some regions the RRAs have extended mandates, hence there are issues as to the determinacy of institutional arrangements and streamlining of administrative and operational procedures and defining of decision-making responsibilities. The new regulations in the Federal Democratic Republic of Ethiopia (FDRE) will share the sovereignty between the federal government and the regional states. This means that the RRAs will get more influence on local matters but simultaneously an increase of responsibilities. The lack of a fixed institutional organizational model means that the road authority in certain regions is divided into different bureaus which causes difficulties for ERA to implement institutional arrangements since it has to be tailor made for each RRA.

Under the Technical Cooperation Program (TCP) for the Ethiopian Road Sector Development Program (V) (RSDP) to improve capacity by providing Institutional Capacity Building to the RRAs, the Government of Federal Democratic Republic of Ethiopia (FDRE) with support from Delegation of European Union to Ethiopia (EU) through Ethiopian Road Authority engaged a consultant to carry out an “Institutional Organizational Setup and Structure of RRAs”.

Regional Road Networks

Following is shown the regional road network, extension for each of the 11 Regions:

Table 13: Ethiopia Road Network by Regions

REGIONs	ROAD NETWORK CLASSIFICATION (km)							
	Expressways	Trunk	Primary	Secondary	Tertiary	Track	Unclassified	Total (km)
Addis ababa	9	83	395	232	95	93	307	**1,214**
Afar		397	707	207	553	2,123	1,100	**5,087**
Amhara		1,747	400	2,817	4,143	5,498	11,249	**25,854**
Benishangul-gum		152	333	241	1,115	778	2,151	**4,770**
Dire dawa	223		107	24	83	65	233	**735**
Gambella			179	141	388	380	464	**1,552**
Harari		18		29	75	59	105	**286**
Oromia	69	1,654	2,239	4,882	11,340	12,432	45,601	**78,217**
Somali reg		523	810	1,016	1,734	12,130	8,957	**25,169**
Southern reg		155	1,005	1,868	5,587	4,073	24,414	**37,102**
Tigray		705	442	1,573	2,071	1,803	3,674	**10,268**
Unclassified		388	758	759	1,798	988	2,870	**7,561**
Total (km)	**301**	**5,822**	**7,377**	**13,789**	**28,982**	**40,422**	**101,125**	**197,816**

Following each regional road network is reported:

ADDIS ABABA REGION

The total road network is equal to 1.214 km on an area of approximately 530 km2 (about 0,44 km/km2), composed by: 9 km Motorways, 83 km Trunk roads, 395 km Primary roads, 232 km Secondary roads, 95 km Tertiary roads, 93 km Tracks and 307 km Unclassified. ERA is presently managing 78 km of federal roads.

AFAR REGION

The total road network is equal to 5.087 km on an area of approximately 95.588 km2 (about 0,053 km/km2), composed by: 397 km Trunk roads, 707 km Primary roads, 207 km Secondary roads, 553 km Tertiary roads, 2.123 km Tracks and 1.110 km Unclassified. ERA is presently managing 1.916 km of federal roads.

AMHARA REGION

The total road network is equal to 25.854 km on an area of approximately 154.070 Km2 (about 0,16 km/Km2), composed by: 1.747 km Trunk roads, 400 km Primary roads, 2.817 km Secondary roads, 4.143 km Tertiary roads, 5.498 Tracks and 11.249 km Unclassified. ERA is presently managing 6.502 km of federal roads.

BENISHANGUL – GUM REGION

The total road network is equal to 4.770 km on an area of approximately 48.944 Km2 (about 0,097 km/Km2), composed by: 152 km Trunk roads, 333 km Primary roads, 241 km Secondary roads, 1.115 km Tertiary roads, 778 km Tracks and 2.151 km Unclassified. ERA is presently managing 735 km of federal roads.

DIRE DAWA

The total road network is equal to 735 km on an area of approximately 1510 Km2 (about 0,48 km/Km2), composed by: 223 km of Toll roads, 107 km Primary roads, 24 km Secondary roads, 83 km Tertiary roads, 65 km Tracks and 233 km Unclassified. ERA is presently managing 45 km of federal roads.

GAMBELLA

The total road network is equal to 1.552 km on an area of approximately 25599 Km2 (about 0,060 km/Km2), composed by: 179 km Primary roads, 141 km Secondary roads, 388 km Tertiary roads, 380 km Tracks and 464 km Unclassified. ERA is presently managing 602 km of federal roads.

HARARE

The total road network is equal to 268 km on an area of approximately 394 Km2 (about 0,72 km/Km2), composed by: 29 km Secondary roads, 75 km Tertiary roads, 59 km Tracks and 105 km Unclassified. ERA is presently managing 52 km of federal roads.

OROMIA

The total road network is equal to 78.217 km on an area of approximately 356.797 Km2 (about 0,21 km/Km2), composed by: 69 km Motorways, 1.654 km Trunk roads, 2.239 km Primary roads, 4.882 km Secondary roads, 11.340 km Tertiary roads, 12.432 km Tracks and 45.601 km Unclassified. ERA is presently managing 9.081 km of federal roads.

SOMALI

The total road network is equal to 25.169 km on an area of approximately 277.452 Km2 (about 0,90 km/Km2), composed by: 523 km Trunk roads, 810 km Primary roads, 1.016 km Secondary roads, 1.734 km Tertiary roads, 12.130 km Tracks and 8.957 km Unclassified. ERA is presently managing 2.586 km of federal roads.

SOUTHERN

The total road network is equal to 37.102 km on an area of approximately 117.642 Km2 (about 0,31 km/Km2), composed by: 155 km Trunk roads, 1.005 km Primary roads, 1.868 km Secondary roads, 5.587 km Tertiary roads, 4.073 km Tracks and 24.414 km Unclassified. ERA is presently managing 4.592 km of federal roads.

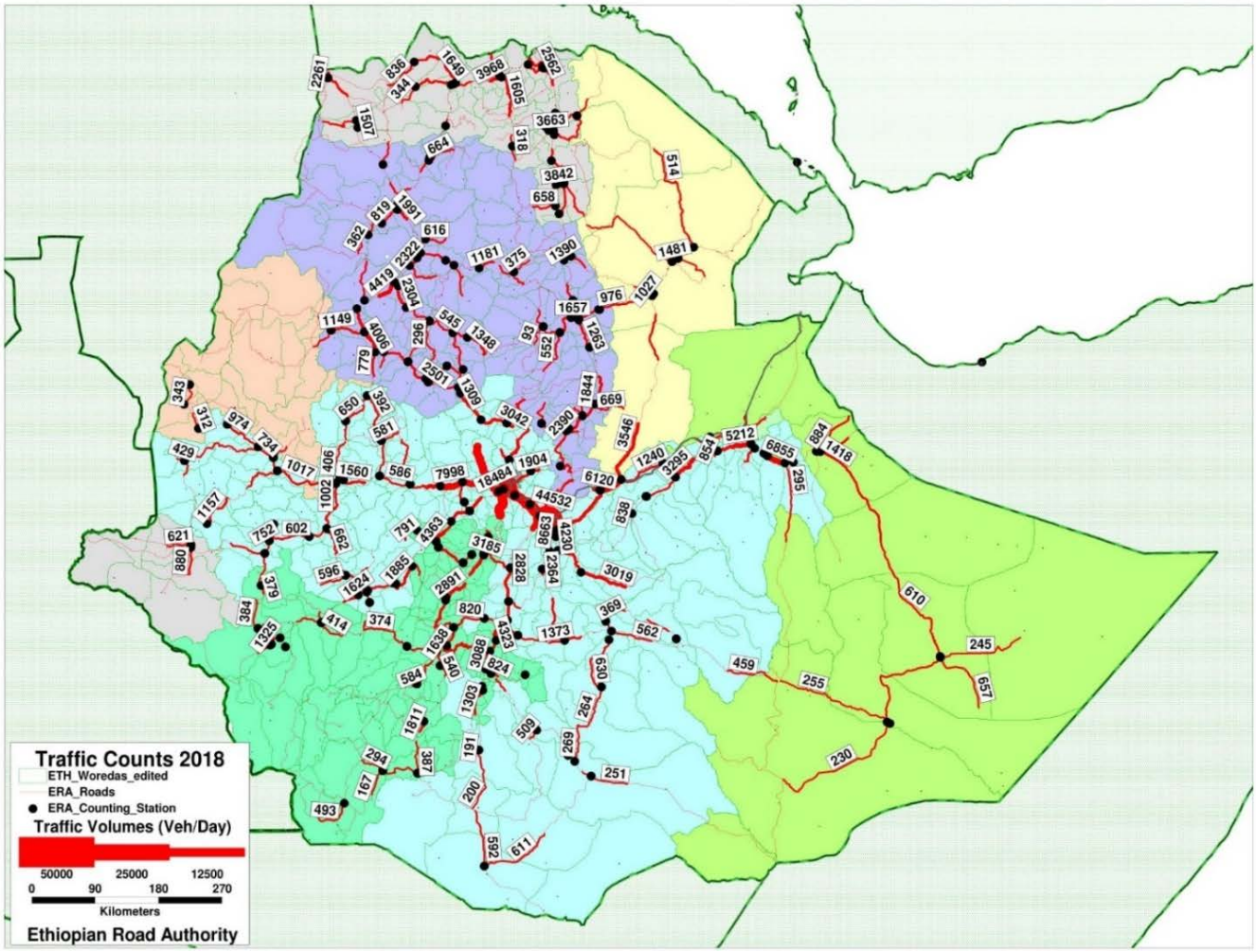
TIGRAY

The total road network is equal to 10.268 km on an area of approximately 56.686 Km2 (about 0,18 km/Km2), composed by: 705 km Trunk roads, 442 km Primary roads, 1.573 km Secondary roads, 2.071 km Tertiary roads, 1.803 km Tracks and 3.674 km Unclassified. ERA is presently managing 2.588 km of federal roads.

2.2.5 Road Traffic Demand

During 2018, ERA conducted traffic counts on 408 sites distributed throughout the federal road network managed by ERA, which are represented in the following figure.

Figure 10: 2018 ERA traffic counts



Following are the results of 2018 classified traffic counts by road and region:

Table 14: Locations of 2018 classified traffic counts by road and region

REGION	ROAD N.	LINK	Location	Light Vehicles & Pick-ups	Small Bus	Large Bus	Small Trucks	Medium Trucks	Heavy Trucks	Truck & Trailers	TOTAL
OROMIA Selection of Traffic Counts >= 4000	A1	Modjo-Nazreth	Nazreth (North)	10,161	6,529	5,225	5,495	5,501	5,539	6,082	**44,532**
	A5	Alemgena-Weliso	Alemgena	4,804	2,346	2,251	2,315	2,222	2,299	2,247	**18,484**
	A1	Addis-Modjo	Debre Zeit (Air Force)	2,409	3,629	571	1,754	2,743	3,586	2,912	**17,604**
	A1	Addis-Modjo	Akaki (South)	3,523	2,348	1,420	2,049	2,280	2,618	2,756	**16,994**
	A5	Alemgena-Weliso	Alemgena	4,013	2,228	1,877	2,138	2,111	1,955	1,892	**16,214**
	A4	Holeta-Ambo	Holeta (Muger Junc,)	3,846	2,485	622	1,756	2,155	2,442	2,756	**16,062**
	A1	Addis-Modjo	Akaki (South)	2,602	1,623	1,341	1,645	1,897	2,002	2,571	**13,681**
	B51	Alemgena-Butajira	Alemgena	3,383	1,786	1,679	1,768	1,606	1,643	1,488	**13,353**
	C41	Holeta-Muger	Holeta (Muger Junc,)	2,309	1,581	318	1,204	1,597	1,746	2,028	**10,783**
	A9	Nazareth-Asela	Melekasa	3,601	1,214	1,193	1,138	1,153	1,115	1,125	**10,539**
	A4	Holeta-Ambo	Holeta (Muger Junc,)	1,633	1,280	220	916	1,545	1,822	1,954	**9,370**
	A9	Melkasa-Sodore	Melekasa	2,132	1,132	1,127	1,139	1,078	1,047	1,113	**8,768**
	A9	Nazareth-Asela	Melekasa	2,067	1,140	1,118	1,016	1,075	1,065	1,182	**8,663**
	A4	Holeta-Ambo	Kachisa Junction	2,291	1,388	752	427	1,297	1,049	976	**8,180**
	A4	Holeta-Ambo	Kachisa Junction	2,269	1,400	713	434	1,198	1,037	947	**7,998**

REGION	ROAD N.	LINK	Location	Light Vehicles & Pick-ups	Small Bus	Large Bus	Small Trucks	Medium Trucks	Heavy Trucks	Truck & Trailers	TOTAL
	E11	Modjo-Ejere-Arerti-Kesem	Modjo	1,859	1,041	666	861	922	968	1,050	**7,367**
	A7	Modjo-Ziway	Modjo (South)	1,224	1,151	491	804	1,498	1,217	793	**7,178**
	A1	Nazareeh-Metehara	Metehara (West)	650	769	599	582	1,087	1,022	1,411	**6,120**
	A1	Metehara-Awash Junc,	Metehera (East)	933	647	584	601	912	788	1,388	**5,853**
	A10	Dengego(dire dawa)-Harar	Dengego	663	914	118	494	928	800	1,540	**5,457**
	A10	Kulubi-Dengego	Dengego	736	777	138	241	915	991	1,414	**5,212**
AMHARA Selection of Traffic Counts >= 1500	A3	Dangla-Bahirdar	Bahir Dar (South)	864	1,142	394	587	610	408	414	**4,419**
	A3	Bure-Dangla	Kossober	500	2,464	74	111	448	230	179	**4,006**
	B31	Adet -Bahirdar	Tis Isat Junction	546	772	364	159	420	547	98	**2,906**
	A3	Bure-Dangla	Dangila (South)	216	764	199	318	367	329	348	**2,541**
	A3	Dejen -D/Markos	D/Markose (Era Comp,)	344	520	312	241	366	457	261	**2,501**
	A2	Godobert-Debreberihan	Ankober Junction	396	431	123	338	424	358	320	**2,390**
	A3	Bahirdar -Wereta	Woreta (South)	541	729	148	141	295	254	214	**2,322**
	B31	Adet -Bahirdar	Tis Isat Junction	418	604	275	125	348	445	89	**2,304**
	A3	Bure-Dangla	Kossober	483	887	73	91	367	163	132	**2,196**
	A3	Meksegnet-Azezo Airport	Azezo Air Port	237	862	143	291	177	140	141	**1,991**
	A2	Ataye-Robit	Shewa Robit	389	485	79	268	280	229	114	**1,844**
	UNGO	Gonder-Gonder by Pass	Azezo	273	559	130	303	265	190	67	**1,787**
	A3	Wereta -Maksegnet	Woldyia Junction	211	741	166	120	130	194	157	**1,719**
	A2	Godobert-Debreberihan	Ankober Junction	290	303	108	228	283	246	223	**1,681**
	A2	Desse-Kombolcha	Gerado Jun	298	359	113	175	233	257	222	**1,657**
	A2	Addis- Debreberehan	Jihur Junction	253	459	86	205	304	224	98	**1,629**
	A2	Robit -Debre Sina	Shewa Robit	339	389	79	238	232	204	120	**1,601**
	A3	Debremarkos-Bure	D/Markos (A,M,C)	178	551	197	190	203	122	151	**1,592**
	A2	Desse-Kombolcha	Gerado Jun	276	338	113	176	237	231	206	**1,577**
	A2	Debre Sina-Gudo Beret	Tarmaber	260	327	114	216	294	210	114	**1,535**
AFAR	A1	Samera -Sardo	Assaita Junction	236	138	13	138	149	266	541	**1,481**
	A1	Mile-Samera	Semera	230	208	39	68	44	241	361	**1,191**
	A1	Samera -Sardo	Assaita Junction	148	92	10	93	106	229	468	**1,146**
	A1	Adaitu-Mille	Mille Junction	268	140	48	132	22	16	401	**1,027**
	A1	Hundufu -Adayitu	Mille Junction	277	106	44	131	27	29	406	**1,020**
	A1	Mile-Samera	Semera	170	156	22	39	24	239	354	**1,004**
	B11	Eliwuha-Weranso -Mille	Mille Junction	220	96	27	107	25	26	343	**844**
	C11	Mille -Wark River	Mille	74	37	9	79	77	83	272	**631**
	D34	Serdo-Afdera	Serdo	135	60	24	51	62	16	166	**514**
	D11	Aysaita Junction-Aysaita	Assaita Junction	90	49	8	40	38	40	42	**307**
	B12	Semera-DigDig Sala-Yalo	Semera	63	52	18	30	21	7	10	**201**
BENISH ANGU	C40	Assosa-Kurmuk	Sherkole	51	110	30	67	21	24	40	**343**
	B40	Bambasi-Assosa	Bambashi	57	68	4	55	36	54	38	**312**
	B40	Mendi-Bambasi	Bambashi	48	64	7	50	43	44	40	**296**
	C40	Assosa-Kurmuk	Assosa	42	52	3	52	54	54	3	**260**
DIRE DAWA		Diredawa-Hurso-Erer	Meleka Jebdu	397	339	76	341	280	306	67	**1,806**
	E100	Industry mender,DIRE DAWA-Shinile	Dire Dawa	77	19	0	25	63	119	634	**937**
	C100	Diredawa-Dewole	Deri Dawa	86	41	35	93	113	163	271	**802**
		Diredawa-Hurso-Erer	Meleka Jebdu	81	92	16	82	82	84	85	**522**
GAMBELLA	D51	Gambela-Abobo	Gambella	244	143	51	212	94	73	63	**880**
	C50a	Gambela-Itang	Gambella	151	132	24	130	77	72	35	**621**
HARARE	A10	Harar-Bombas	Harar	1,312	1,043	799	995	1,061	1,049	596	**6,855**
	D10	Harar-Jarso	Harar	397	447	174	323	305	235	165	**2,046**
SOMALI	A10	Jijiga-Degehabour	Jijiga (West)	390	224	183	189	186	173	166	**1,511**
	A10	Jijiga-Degehabour	Jijiga (East)	112	139	177	178	303	258	251	**1,418**
	C104	Jijiga-Togochale	Jijiga (Togo Wuchale Junc	211	167	168	179	171	158	171	**1,225**
	C105	Jijiga-Teferi ber	Jijiga	208	118	103	117	125	119	94	**884**

REGION	ROAD N.	LINK	Location	Light Vehicles & Pick-ups	Small Bus	Large Bus	Small Trucks	Medium Trucks	Heavy Trucks	Truck & Trailers	TOTAL
	B100	Kebridar-Gode	Kebridehare	113	51	24	101	110	121	138	**658**
		Kebridar-Shilabo	Kebridehare	108	66	13	96	107	126	141	**657**
	B100	Degeha Bur-Kebri Dehar-Gode	Kebridehare	104	50	19	95	101	110	131	**610**
		Diredawa-Hurso-Erer	Herer	74	5	21	108	54	17	3	**282**
	UC	Gode to Imey	Gode	48	32	24	55	44	33	19	**255**
	FUC-C	Kebri Dehar-Warder	Kebridehare	46	22	2	44	39	44	48	**245**
	FUC-C	Hargele- Gode	Gode	41	20	3	54	41	50	21	**230**
SOUTHERN Selection of Traffic Counts >= 2500	A5	Giyon-Walkite	Endibir Junction	991	1,022	186	634	653	675	202	**4,363**
	A8	Awassa-Aposto	Tobaco Monopoly	888	775	500	607	688	601	264	**4,323**
	A8	Awassa-Aposto	Tobaco Monopoly	844	756	478	583	655	563	247	**4,126**
	A8	Shashemene-Awassa	Wondo Genet Junction	1,474	999	223	550	359	203	188	**3,996**
	E53b	Bojeber-Butajira	Bojeber Jun	667	544	369	450	468	479	208	**3,185**
	A8	Shashemene-Awassa	Wondo Genet Junction	1,150	863	163	411	265	170	145	**3,167**
	A8	Awassa-Aposto	Morocho	633	638	394	425	390	480	128	**3,088**
	C51a	Welkite-Mazoria	Gubria Junction	455	988	56	414	547	483	62	**3,005**
	B51	Butajira-Hossana	Bojeber Jun	660	500	377	412	409	389	201	**2,948**
	B51	Butajira-Hossana	Hosana (Era Comp,)	711	443	359	449	445	464	20	**2,891**
	B51	Alemgena-Butajira	Zeway Junction	447	353	353	365	393	406	364	**2,681**
TIGRAY Selection of Traffic Counts >= 2000	A2	Adiabun-Axum	Adi Abun (West)	783	805	547	527	457	419	430	**3,968**
	A2	Mehoni -Maychew	Mehoni	715	683	247	790	729	473	205	**3,842**
	A2	Adigudom-Mekele	Quiha	613	771	59	586	614	483	537	**3,663**
	A2	Adigudom-Mekele	Quiha	543	665	55	586	578	549	506	**3,482**
	A2	Adigudom-Mekele	Mekele	635	593	211	529	370	367	334	**3,039**
	B20	Adigrat-Zalanbesa	Adigrat (North)	981	780	91	251	369	43	47	**2,562**
	C35e	Dansha-Humera	Raweyan Jun	266	619	49	434	420	280	193	**2,261**
	A2	Waja-Maychew	Maichew (South)	367	278	201	304	295	281	301	**2,027**

As can be seen from the table above, more than 51% of traffic volumes remains below 1,000 Vehicles/day, about 43% register volumes between 1,000 and 5,000 and only 5% have traffic volumes over 5,000 Vehicles/day.

Table 15: ADT Ranges

Average Daily Traffic Ranges (Vehicles/Day)			Number of counting sites
	ADT	> 10,000	10
10,000 <	ADT	< =5,000	12
5,000 <	ADT	< =2,000	65
2,000 <	ADT	< =1,000	113
1,000 <	ADT	< =500	106
500 <	ADT	< =0	102

At the regional level, the traffic counting sites were: 154 in Oromia region, 104 in Amhara region, 77 in Southern Region 39 in Tigray Region, 11 in Somali Region, 11 in Afar Region, 4 in Benishangul Region, 4 in Dire Dawa Region, 2 in Gambella Region, 2 in Harare Region.

OROMIA REGION

High traffic volumes over 10,000 Vehicles/day were recorded near the capital city Addis Ababa at the roads **A1** Addis - Modjo – Nazreth (44,532 Vehicles/day), **A5** Alemgena – Weliso (18,848 Vehicles/day), **A4** Holeta-Ambo (16062 Vehicles/day) , **B5** Alemgena – Butajira (13,353 Vehicles/day) , **C4** Holeta – Muger (10,783 Vehicles/day), **A9** Nazareth - Asela (10,539 Vehicles/day), in the Oromia region. Always in the Oromia region, in addition, to the roads A1 and the A4 A9 and A10 were recorded medium-high traffic volumes between 10,000 and 5,000 Vehicles /day.

AMHARA REGION

In the Amhara region, high traffic volumes of approximately 4,500 to 2,500 were recorded at the A3 Dangla - Bahirdar (4,419 Vehicles /day), B31 Adet -Bahirdar (2,903 Vehicles /day) and A2 Godobert-Debreberihan (2,390 Vehicles/day) roads.

SOUTHERN REGION

In Southern region, high traffic volumes of approximately 4,500 to 3,000, were recorded in the A5 Giyon - Walkite (4,363 Vehicles/day), A8 Awassa - Aposto (4,323Vehicles/day), E53 Bojeber - Butajir (3,185 Vehicles/day), C51 Welkite – Mazoria (3,005 Vehicles/day), and B51 Butajira – Hossana (2,948 Vehicles/day).

TIGRAY REGION

In Tigray region medium traffic volumes of approximately 4,000 to 2,000, were recorded in the A2 Adiabun-Axum (3,968 Vehicles /day), B20 Adigrat - Zalanbesa (2,562 Vehicles/day) and C35 Dansha - Humera (2,261 Vehicles/day) roads.

SOMALI REGION

In Somali region medium-low traffic volumes of approximately 1,500 to 900, were recorded in the A10 Jijiga-Degehabour (1,511 Vehicles /day) and C104 Jijiga -Togochale (884 Vehicles /day) roads.

DIRE DAWA REGION

In Dire Dawa region medium-low traffic volumes of approximately 1,800 to 900, were recorded in the Diredawa-Hurso-Erer road (1,806 Vehicles/day), E100 Industry Mender,Dire Dawa -Shinile (937 Vehicles/day) and C100 Diredawa-Dewole (802 Vehicles/day) roads.

HARERE REGION

In Harare region high-medium traffic volumes of approximately 7,000 were recorded in the A10 Harar-Bombas (6,855 Vehicles/day) road. Medium traffic volumes were recorded in D10 Harar-Jarso (2,046 Vehicles /day) road.

AFAR REGION

In Afar region medium-low traffic volumes of approximately 1,500 to 900, were recorded in the A1 Samera -Sardo (1,481 Vehicles /day) and B11 Eliwuha-Weranso -Mille (844 Vehicles /day) roads.

GAMBELLA REGION

In Gambella region medium-low traffic volumes of approximately 900 to 600, were recorded in the D51 Gambela-Abobo (880 Vehicles /day) and C50 Gambela-Itang (621 Vehicles /day) roads.

BENISHANGUL REGION

In Benishangul-Gum region low traffic volumes of approximately 350 to 300, were recorded in the C40 Assosa-Kurmuk (343 Vehicles /day) and B40 Mendi-Bambasi-Assosa (312 Vehicles /day) roads.

2.2.6 Road Transport Organization

In Ethiopia, it is estimated that 90% of freight transportation both in the import and export sectors and 95% of the public transportation services are provided by the road transport. As reports from the Federal Transport Authority indicate, the annual rate of increase in the number of vehicles is below 20%, with only 831,265 vehicles for 2017. Compared to the other African countries, the number of motor vehicles in Ethiopia is very low.

Currently (2020) the total number of vehicles registered in Ethiopia including motor bicycles and the locally assembled are 1,2 million. Over half of the total registered are in the capital Addis Ababa (630,440), followed by Oromia region with 204,026 vehicles, 118,424 registered in Southern region, 106,434 registered in Amhara region, 60,800 in Tigray, 24,510 in Dire Dawa, 19,579 in Somali region, 10,728 in Harar, 10,655 in Benishangul Gumz, 8,277 in Afar and 6,237 in Gambella region.

In the following table the number of registered vehicle types are shown by regions:

Region	Addis Ababa	Amhara	Afar	Ben & Gumuz	Dire Dawa	Somali	Tigray	Gambela	Harari	SNNPR	Oromia	Total
No of vehicles	**630440**	**106434**	**8277**	**10655**	**24510**	**19579**	**60800**	**6237**	**10728**	**118424**	**204026**	**1200110**
- Heavy	255358	12615	1180	688	8028	4919	13382	0	56	6974	13389	316589
- Bus	46139	23150	1171	842	2442	1850	10129	2984	3080	22917	59604	174308
- Light	49140	1835	453	215	513	1193	1469	330	304	207	3475	59134
-Automobile	222683	1786	83	53	2360	648	1994	322	1303	98	5258	236588
- Others	57120	67048	5390	8857	11167	10969	33826	2601	5985	88228	122300	413491
Percentage	**52.5**	**8.9**	**0.7**	**0.9**	**2.04**	**1.63**	**5.07**	**0.5**	**0.89**	**9.87**	**17**	**100**

Recently Ethiopia entered in the automotive industry, with South Korea's Hyundai Motor Company opened a 10,000-a-year vehicle capacity assembly plant in the Ethiopian capital Addis Ababa in February 2019. The total number of vehicles Ethiopia has imported and registered last year (the fiscal year ended July 7, 2019) has surpassed the amount the country imported the previous year by 30,834 vehicles.

The Federal Transport Authority (FTA) regulates transport services (both freight and passenger) throughout the country, while Drivers' Licenses and Vehicle Registrations are managed and issued by the nine regions and two chartered cities, Regional Transport Bureaus. Although there are common procedures, standards and criteria for the issuance of licenses and permits, no means to effectively enforce them within regions, and particularly across regional boundaries.

The Federal Road Transport Authority has its head office in Addis Ababa near Legahar. It has the Drivers and Mechanics Training Center in Kaliti, vehicle maintenance service in the former Ethos Campus. In Megenagna it has a branch office which determines the vehicle weight and size, number of passengers and load of vehicles using the road. It has also an office in Addis Ababa Bus Terminal to determine and ensure the provision of passenger transport services. Its check point in Mille is establish for facilitation of the Djibouti corridor transport. Outside Ethiopia is has a branch office in Djibouti to give support for import and export goods transportation.

A recent study concluded that the current Ethiopian legislation in road transport is generally compliant and comprehensive in terms of the rules of the road and minor changes needs to be made in order to be fully compliant with the requirements of the Vienna Convention, but the main problem is on ensuring that the rules legislated are complied with, through both law enforcement, training of drivers and the general public, and the implementation of quality systems. In fact:

a) The current **vehicle registration process** complies with the requirements of the Convention but the vehicle registration certificate is non-compliant and will need to be amended;
b) Annual **vehicle inspection** is legislated but no legislation dictates the technical requirements of vehicles nor the pass requirements of the vehicle inspection.
c) The current Ethiopian legislation is generally compliant relating to obtaining **learner and driving licences** and regulating the issuing thereof, but the current driving licence card and categories are non-compliant and will need to be amended
d) The declaration to consider **mopeds as motorcycles** should either be applied to all parts of the legislation and a notification made to the UN upon accession, or the unique requirements applicable to mopeds must be legislated

Commercial Road Transport

Commercial road transport is composed by public passenger transport (urban or rural) and freight transport.

Regarding **passenger transport**, Ethiopia can presently count on 16 regional bus terminals, 13 urban centres with mass-transport services, 224 regular extra-urban bus routes and a total of 772 million annual flow of passenger on public transport.

Following are the bus companies and fleet operating for extra-urban passenger services:

Table 16: Bus companies and fleet

Name of company Level of service Regional town to regional town City to city	Number of Vehicles		Destinations
Alem Public Transport Company	235		To All Destinations
Andinet Public Transport Company	192		To All Destinations
Abay Public Transport Company	155		To All Destinations
Fikir Public Transport Company	156		To All Destinations
Zemen Public Transport Company	125		To All Destinations
Habesha Public Transport Company	84		To All Destinations
Hedase Public Transport Company	111		To All Destinations
Elshaday Public Transport Company	79		To All Destinations
Hibret Public Transport Company	49		To All Destinations
Yebirhan Fana Public Transport Company	65		To All Destinations
Abisinya Public Transport Company	56		To All Destinations
Aybex Public Transport Company	72		To All Destinations
Fetan Public Transport Company	26		To All Destinations
Ethio-Africa Public Transport Company	8		To All Destinations
Gts Public Transport Company	8		To All Destinations
Tsegaye Public Transport Company	2	Not active currently	
Abrar Public Transport Company	2	Not active currently	

And the special bus lines destinations, companies and length of service:

Table 17: Bus Lines Destinations

No	Regional Town	Km	Fare	Name of private bus company														Remark
				SELAM	LIMALIMO	GOLDEN	ABAY	ETHIO	FALCON COACH	GEDA	HEBASHA	ZEMEN	YEGNA	ODA	GHION	WALIA	AIR BUS	
1.	Debremarkos	300					√245										√	
2.	Fnote Selam	387					√300											
3.	Bure	411					√310											
4.	Koso Ber	447					√330											
5.	Bahir Dar	563				√	√400				√	√400	√			√	√	
6.	Gondar	738			√500	√		√			√		√			√		
7.	Debretabor	666		-	√450			√										
8.	Dese	401						√			√310							
9.	Woldya	521						√								√		
10.	Kombolcha	376						√										
11.	Mekele	783		√610			√610				√	√	√		√	√		Through Awash
12.	Shere	1087		√														
13.	Adigrat	898		√														
14.	Harer	526		√			√			√	√			√				
15.	Diredawa	515		√				√		√	√	√		√				
16.	Jig Jiga	628						√	√494									
17.	Asosa	675				√				√								
18.	Gambella	766				√					√							
19.	Hawassa	273		√				√200			√	√	√	√	√			
20.	Arba Minch	454		√								√320						
21.	Jimma	346		√		√				√				√			√	
22.	Mizan Teferi	561		√							√						√	
23.	Dembi Dolo	652								√				√				
24.	Metu	600								√				√				
25.	Dila																	
26.	Hosaena																	
27.	Karthom,Sudan	1450																
	TOTAL			9	2	5	7	7	1	6	9	5	4	6	2	4	4	

Considering **freight transport**, the loading capacity, the number of vehicles with low and midlevel capacities is very limited. The Djibouti corridor has been the main focus of both import and export road freight operations, but the structure of Ethiopian imports has changed over time, from finished

and lightweight products to a combination of light finished products and project-bound bulky cargo. This structural change has not been accommodated by a change in the design of the logistics system. The upgrading of the road network needs to go hand in hand with the acquisition of trucks of the right length and quality. There are much fewer trucks, both private and state-owned, than the required weight of goods to be lifted. However, the existing trucks that are old and light in weight do not match the heavy and bulky cargo. As a consequence, the existing trucks are overloaded, which leads to the destruction of roads and bridges.

The GTP II planned to build 20 state public transport stations in different regions and improve urban public transportation in Addis Ababa and other major cities. The TYP plans by 2029:

- To increase passenger using public transport from 722 million to 1.5 billion;
- To increase public transport routes from 225 to 384;
- To increase bus annual coverage from 96,000 to 118,000 km;
- To introduce mass-transport services in 69 urban centres and increase public mobility share from 37% to 70%.

Like many low-middle-income countries, Ethiopia has an unacceptably large number of road traffic deaths, with approximately more than 25 people per every 100,000 people killed in road crashes. Although Ethiopia has extensive road safety legislation, enforcement is low and there is no application of vehicle standards promoting safety features. According with global Road Safety Partnership (GRSP) of World Health Organization, in 2016 in Ethiopian road network there were 9,636 fatalities and 409,890 serious injuries, with a total cost of 6.48 billion USD, which account for 9.6 fatalities per 100,000 population and 8,9% of national GDP.

2.3 RURAL ROAD ACCESSIBILITY

2.3.1 Framework methodology

The analysis of the present situation has considered geographical data that has been sourced through various well-established international organisations. GIS based analysis is used to define the level of accessibility at regional and local level following the most innovative international best practices and standards.

The Rural Accessibility Index (RAI) is the standard World Bank indicator for the investigation and comparison of accessibility levels in different regions. The latest RAI methodology was developed in 2016 by the World Bank contractor TRL. Such methodology involves the use of WorldPop data in combination with road data to define the rural population that is at least 2 km away (approximately 20 min walk) either from a road.

However, it is understood that the RAI itself cannot capture the complex context of accessibility at local level. It should be noted that a village more than 2 km away from a road near the capital would be classified the same way as a village in a remote area of the country. Therefore, alongside the RAI at Woreda level, travel times are also included in the analyses.

As research shows that crop production is maximum within four hours from markets within a city of 100,000 people or above, travel times to markets in cities of 20,000 and 100,000 people population are both considered.

While economical inclusion is key to provide access to the markets, access to basic services is also a crucial factor to promote social inclusion in remote areas. For this reason, an analysis of travel times to hospitals is also considered.

In the following paragraphs, results are presented for each region and for the different Woredas within each region. The Harari Region and the Dire Dawa Region are excluded from the following paragraphs as their entire population is considered urban, given their population density and high level of rural accessibility.

The GIS software QGIS is used to collect and analyse multiple data sources and the following

sources are used for the collection of data:

- OCHA repository provided the administrative boundaries at all levels
- Worldpop data has been used to define population at 100m grid definition (2020 data)
- Roads data was obtained from the World Food Programme repository (2019 data)
- Travel times to markets were obtained from HarvestChoice and International Food Policy Research Institute repository

Rural Accessibility Index (RAI)

The Ethiopia 2025 Plan aims at reaching the status of Low Middle-income country by 2025. Part of the effort will be targeted at improving the level of rural accessibility for the country.

The **RAI** (Rural Accessibility Index) is an indicator developed by the Word Bank to define and compare levels of accessibility at regional level. The RAI is a measurement of the percentage of rural population living at least 2 km away from major and minor roads. The distance of 2 km is considered as a threshold to define the population living within 20 min walking distance from any road and those living farther.

The latest World Bank RAI figures for low middle-income African countries show an average RAI of 42%, with the highest levels of accessibility being reached by Zambia and Zimbabwe both with a RAI of around 65%.

Table 18: RAI for low middle-income African countries. Source: World Bank.

	RAI
Angola	42%
Benin	32%
Cameroon	20%
Ghana	61%
Kenya	44%
Mauritania	31%
Nigeria - 8 states	37%
Senegal	29%
Tanzania	38%
Zambia	64%
Zimbabwe	65%
	42%

Travel times

Literature shows that the accessibility level has generally a good correlation with the level of poverty. Thus, providing a good level of accessibility is key to reduce poverty levels in rural areas. The aspects that influence accessibility are many, both social, such as the access to basic services, and economical, such as the access to markets. Although the RAI is the standard indicator to define a general level of accessibility, it does not provide a measurement of the effective time to reach markets and services. Thus, mapping travel times is also considered. In particular, travel times to 20,000 and 100,000 people markets from Climafrica 2016 are used in conjunction with the rural population distribution to define the weighted average travel times to markets for the rural population in each Woreda. A similar methodology has recently been adopted by the EU in the calculation of public transport accessibility across Europe (access to mobility services indicator).

Literature shows (Crop Production and Road Connectivity in Sub-Saharan Africa: A Spatial Analysis, World Bank, Sustainable Development Division) that the yield of crops is maximised if crops are produced within four hours travel time from markets, while it decreases considerably if travel times are above such threshold. Therefore, four hours are assumed as an acceptable travel time to markets.

Another indicator is developed to study travel times to hospitals. To do this, iso-distance maps are built using the location of hospitals and the major road network. A distance of 30 km is considered

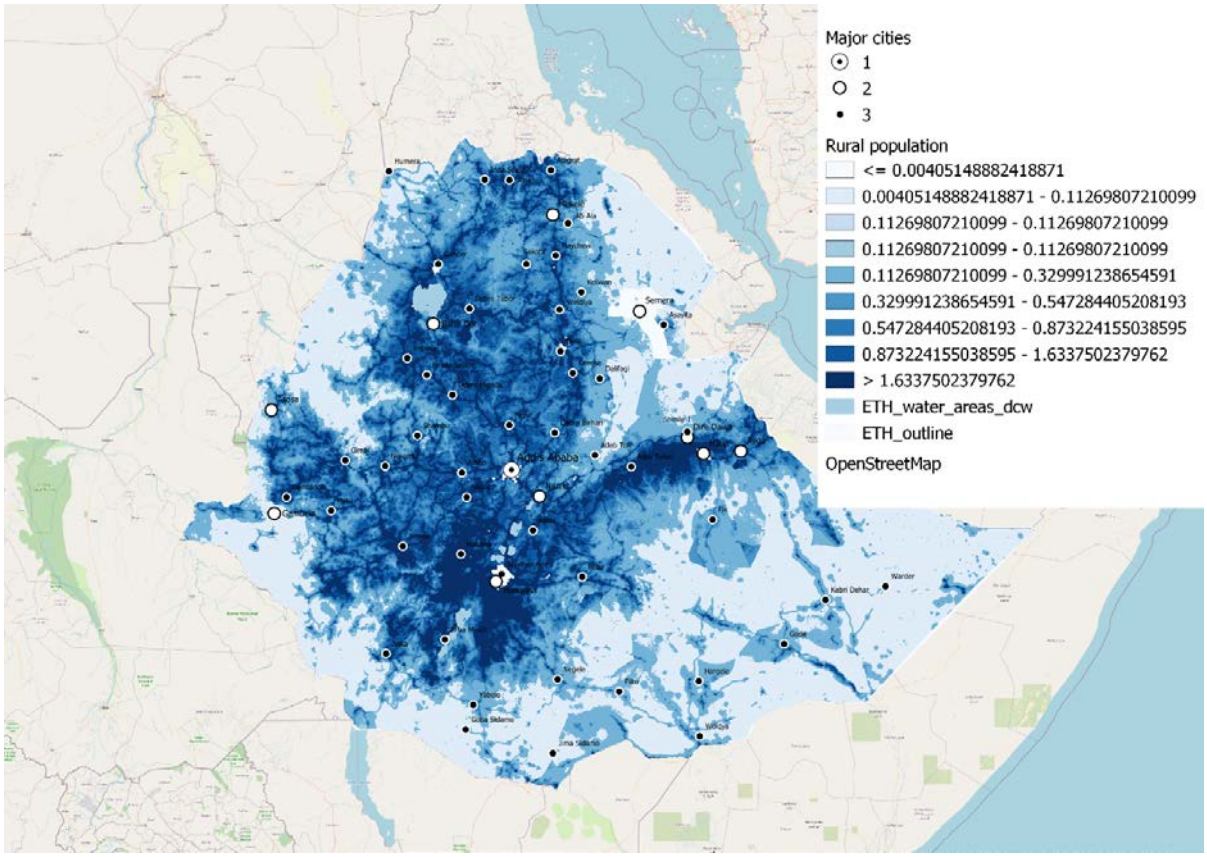
as a threshold. Assuming an average speed of 15 km/hour, people within such distance would be able to reach a hospital within two hours. Such methodology is on line with the one developed by the University of Oxford to study travel times in sub-Saharian Africa (Access to emergency hospital care provided by the public sector in sub-Saharan Africa in 2015: a geocoded inventory and spatial analysis). It should be noted that the WHO international standard requires nations to provide at least 80% of the population with health services with a maximum travel time of 2 hours. In this case the methodology is used to compare Woredas in terms of access to hospitals.

2.3.2 Methodology

Rural population

The rural population of the country is defined by removing the population of the urban Kebeles from the WorldPOP dataset. Google Earth satellite images are used to compare the extensions of urban areas in comparison with the Kebeles administrative boundaries and subtract the population of the urban population from the dataset.

Figure 11: Rural population extracted from WorldPOP – 2020 database



In addition, the entire regions of Addis Ababa, Harari and Dire Dawa are excluded from the analyses as their average density and accessibility levels are very high compared to the rest of the rural population considered.

The rural population considered in the following paragraphs is therefore of 93.8 million people million people, 94% of the WorldPop datset which shows a country's population of approximately 100 million people.

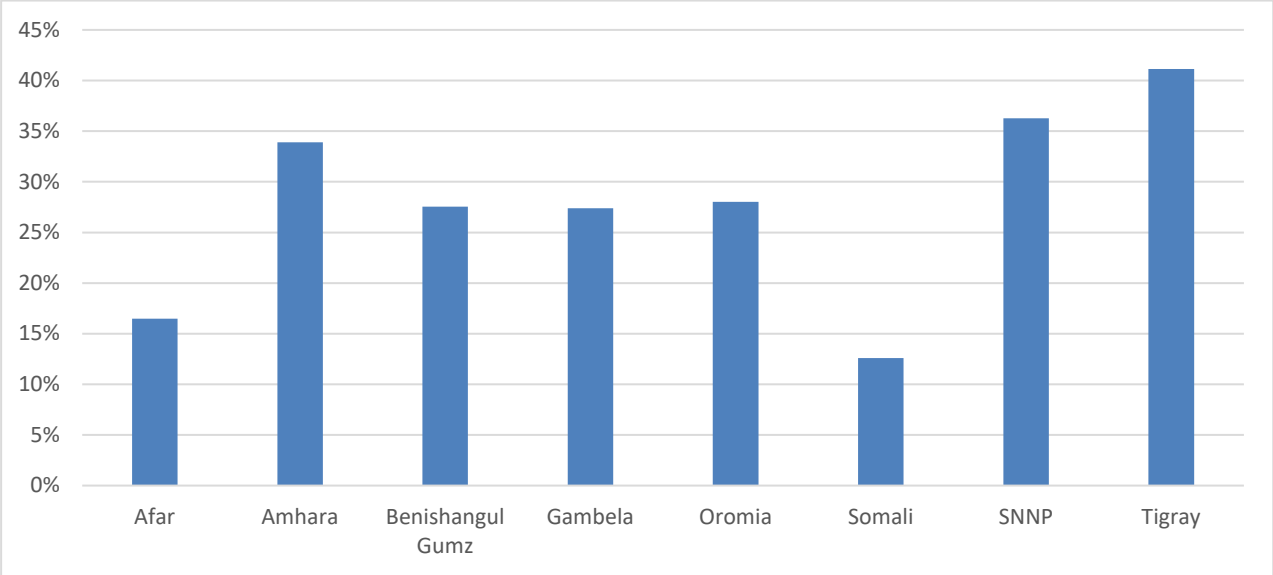
RAI with the use existing ERA database

The population living within 2 km from an all-weather road with the use of the ERA database is 28 million people. Following the proposed (2016 standard) methodology the RAI for the country is

estimated as 0.31. This methodology shows that Ethiopia performs worse than other low-middle income African countries in terms of RAI overall.

The regions of Somali and Afar perform worse than others with very low levels of accessibility to all weather roads.

Figure 12: Calculated RAI with the use of ERA database



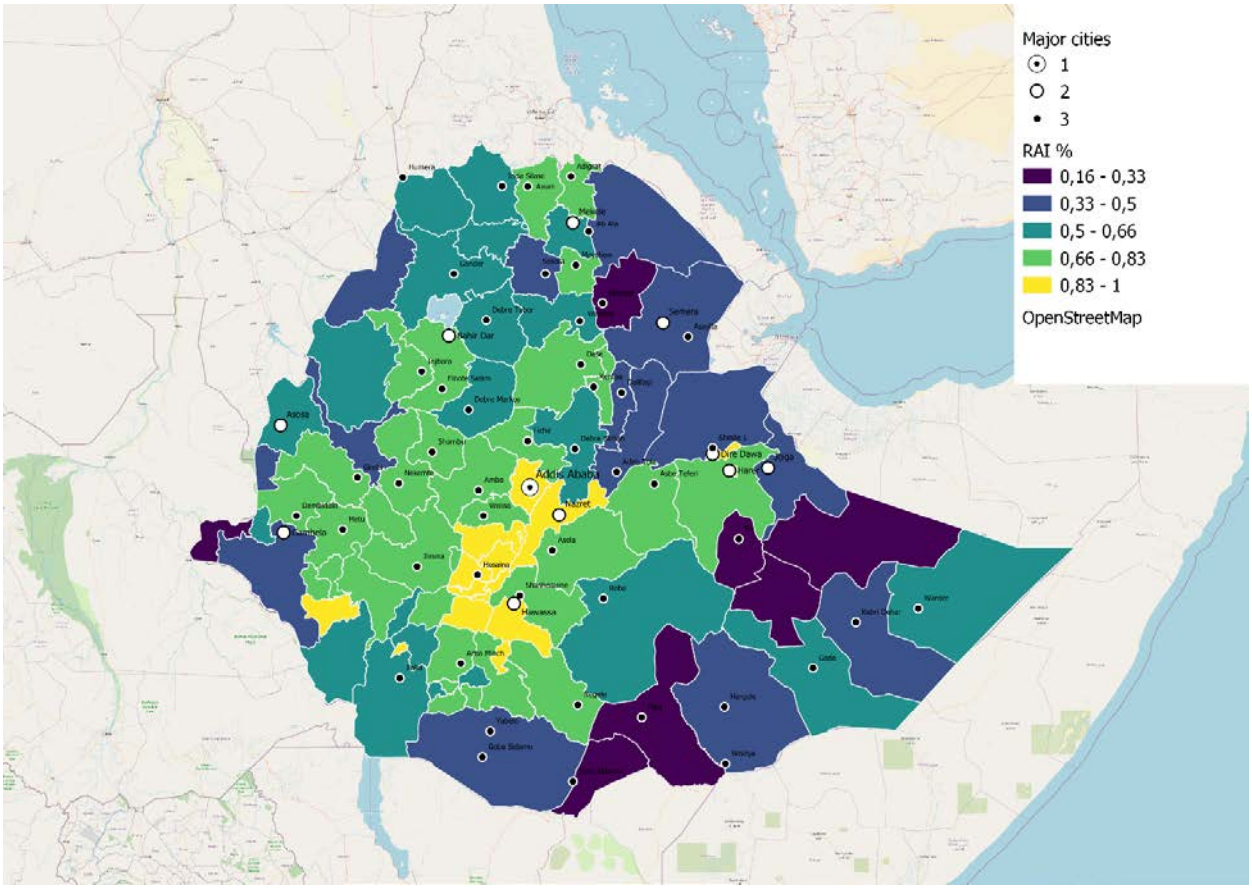
RAI with the use of database from satellite images

A review of the road network with the use of independent databases shows that there are numerous links and roads that are be left out from the ERA database. Although many of these roads are likely to be in poor state and cannot be defined as all weather, their presence signifies their importance to the rural communities. In addition, it should be noted that for gravel roads any work of upgrade and rehabilitation is expected to be considerably less expensive than constructing from scratch.

For this reason, it is proposed that these roads are included in the calculation of RAI for the purpose of defining disparities between Zones and planning for the upgrade and rehabilitation of roads at local level as well as identifying gaps that require construction of new roads.

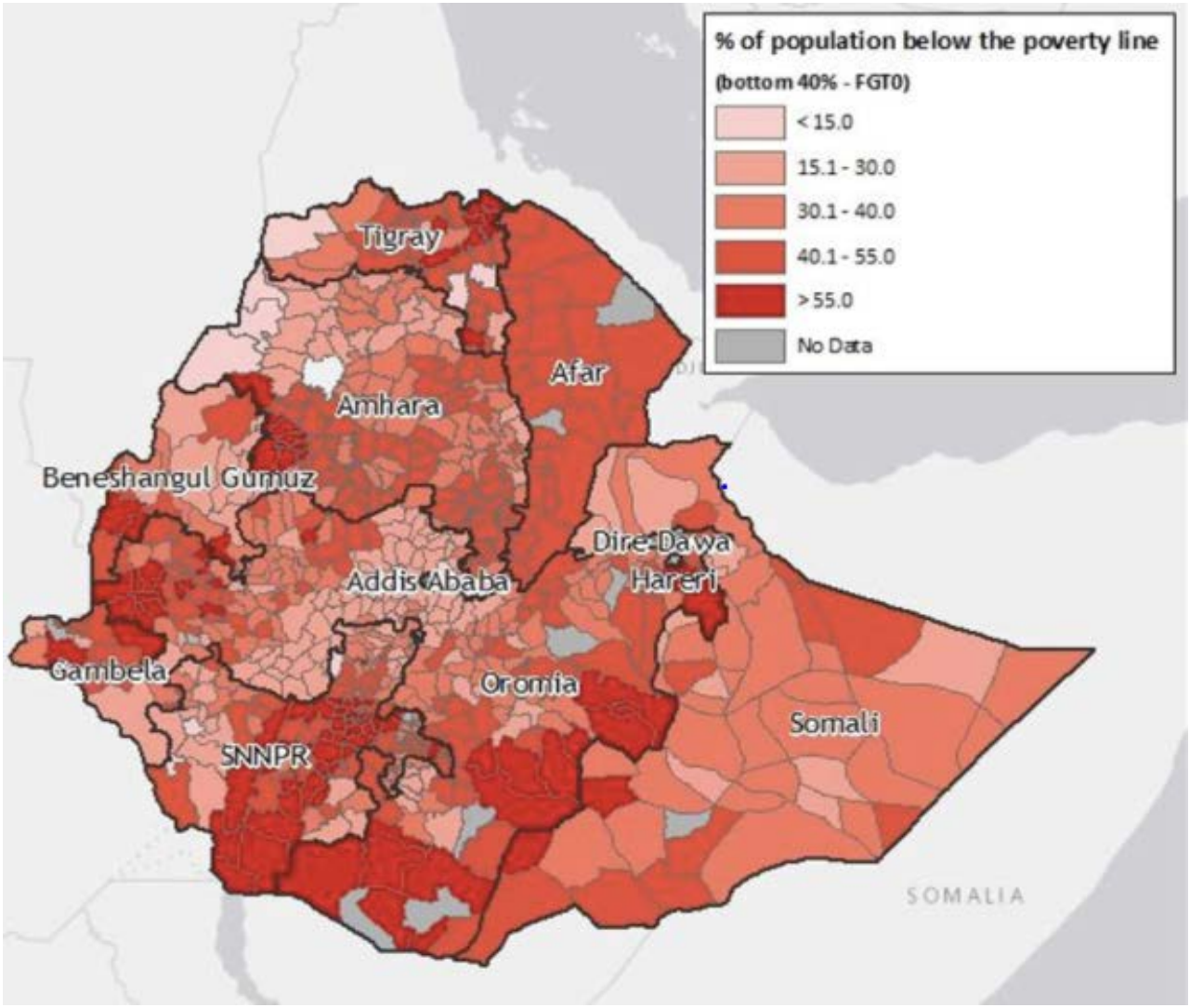
Following such methodology, the calculated RAI for each Zone is extremely varied (Figure 13). As mentioned before, the RAI calculation performed provides a preliminary estimation which does not consider a fully validated road dataset. Further discussion on this matter is provided in the following paragraphs where the importance of building and maintaining a unified and comprehensive database is highlighted.

Figure 13: Calculated RAI for all Zones



The RAI analyses undertaken show good correlation with analysis of travel times as well as showing a general correlation with crop production and poverty indices (Figure 14).

Figure 14 Population below poverty line by Zone/Woreda – source: World Bank

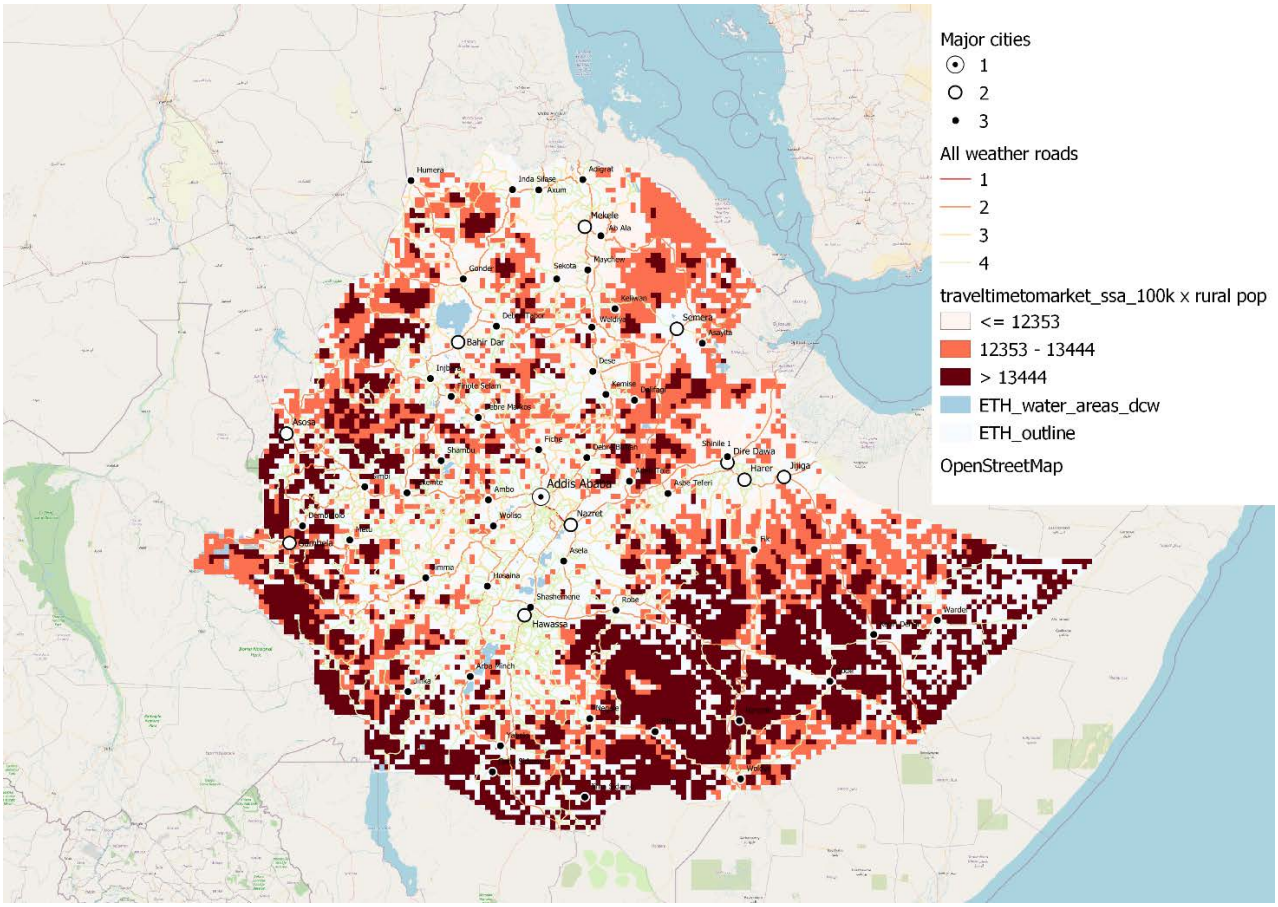


Travel times to markets

Travel times to markets are defined using the ClimAfrica 2016 repository from the International Food Policy Research Institute. The dataset consists of a raster of values showing travel times through a grid covering all sub-Saharan Africa.

Such values are blended with the population distribution to obtain a grid of weighted travel times by population. For this analysis, only the population that is away from all roads has been considered.

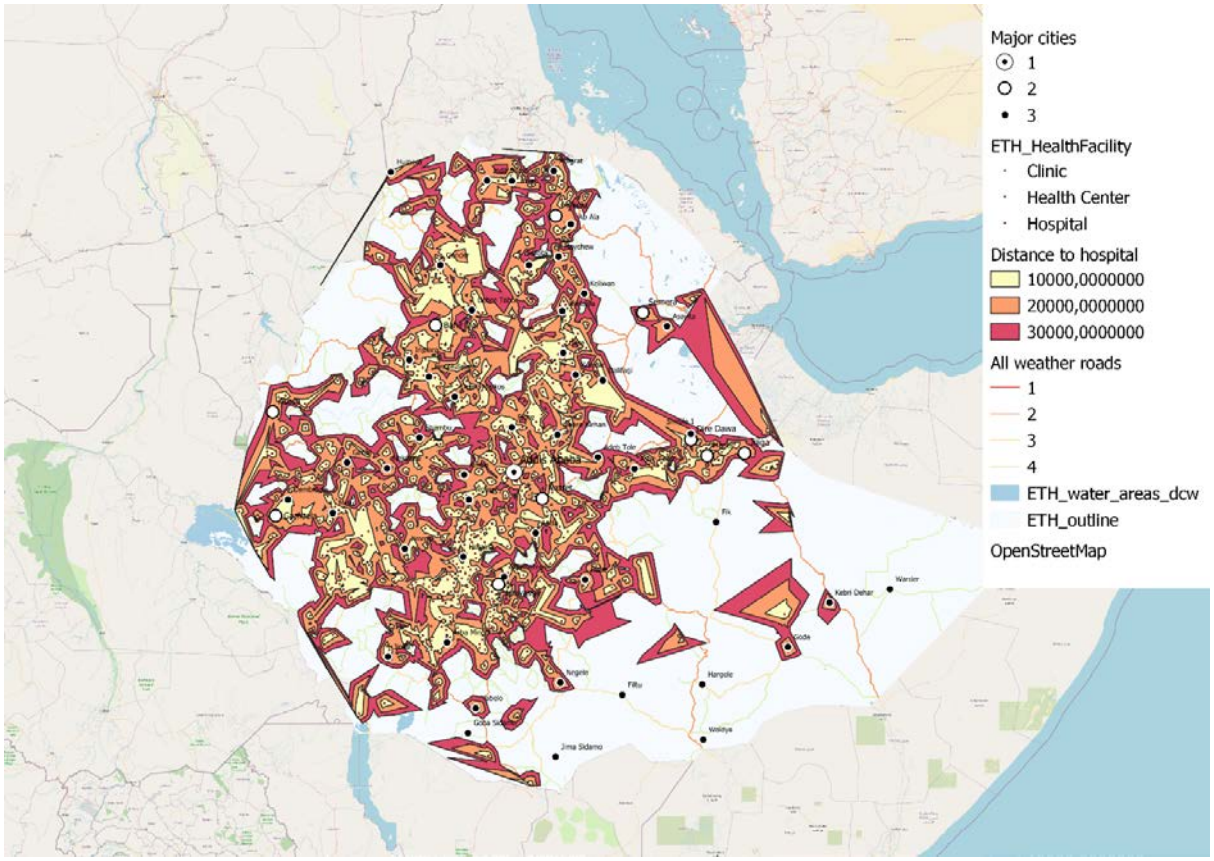
Figure 15: Travel times to 100,000 people population market multiplied by population.



Travel times to hospitals

Travel times to hospitals are obtained by using the location of hospitals and clinics as well as the major road network. The QNEAT3 plugin is used to create iso-distance polygons and map distance to hospitals up to 30 km. Assuming an average speed of 15 km/hour, this would mean a travel time of 2 hours, which is in line with WHO recommendations.

Figure 16: Polygons showing travel distances to hospital <30 km.



The population farther than 30km from hospitals is then computed for each Zone to compare the levels of health accessibility. In this case, the entire national population is considered.

2.3.3 RAI Results at Regional level

The average RAI for Ethiopia is 70%, which is above average if compared with low middle-income African nations. Results at regional level show a considerable variance in terms of rural population and RAI. Although less populous than others, Afar, Somali, Benishagul Gumz and Gambela show the lowest RAI, considerably below the national average, while other regions have RAI that are near or above average.

Figure 17: Rural population and RAI (ppl) by Region

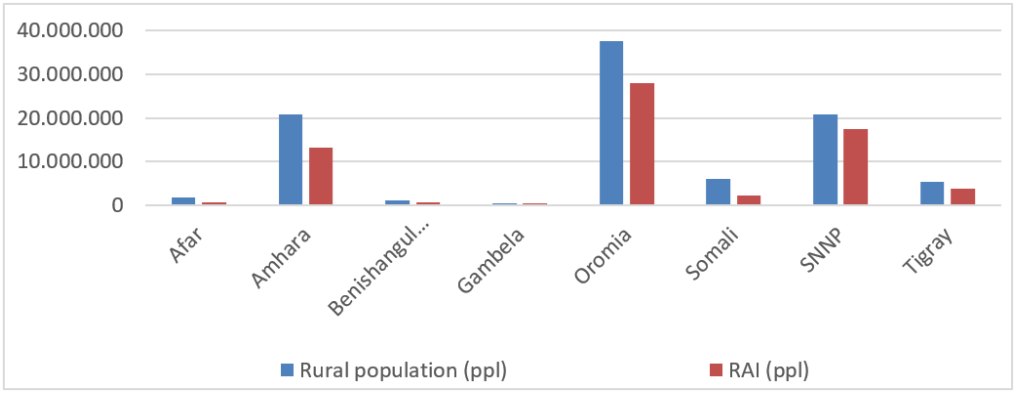
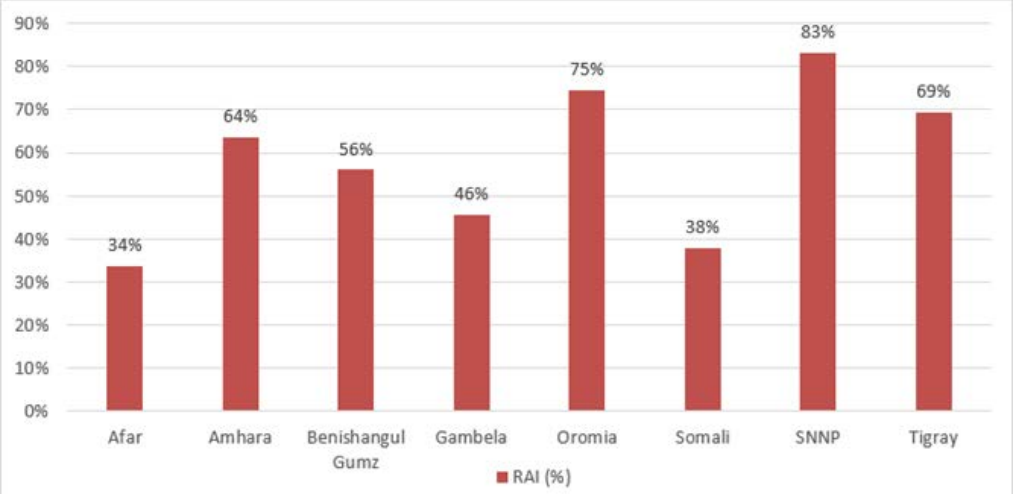
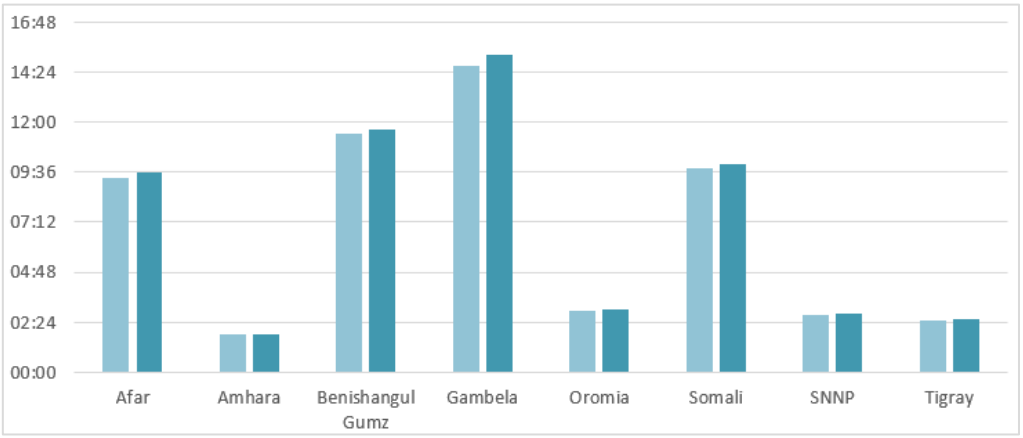


Figure 18: Calculated RAI for each Region (%)



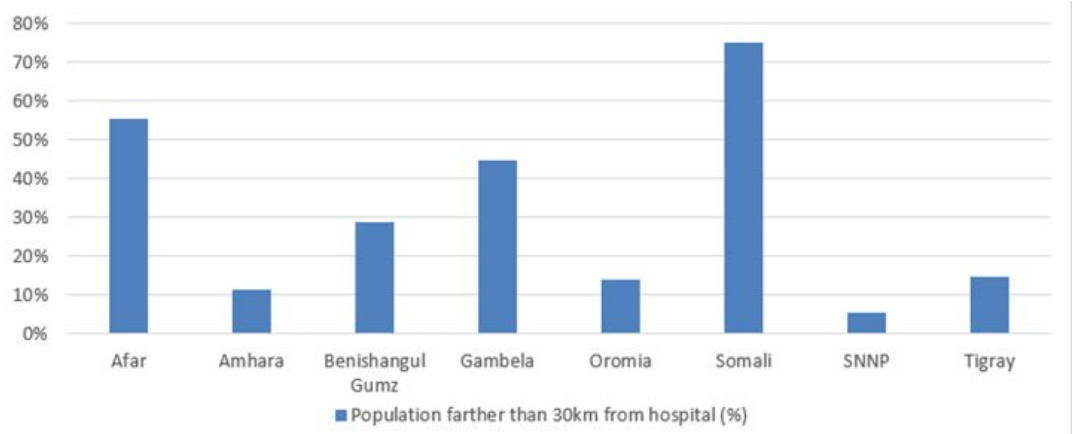
In terms of travel times to markets, Afar, Benishagul Gumz, Gambela and Somali all have travel times to markets above four hours.

Figure 19: Weighted average travel time by population



In terms of hospital accessibility, Afar, Benishagul Gumz, Gambela and Somali have more than 20% of their population farther than 30km from a hospital.

Figure 20: Population farther than 30km from any hospital by region.



2.3.4 Results for Zones in each region

Afar Region

Afar has five Zones, with a rural population of 1.7 million people. 78% of this population is at least 2 km away from major roads, while 65% is away from all roads, above the national average of 27%.

The calculated RAI for Afar is 34%, considerably below the national average of 70%.

In terms of individual Zones, all Zones show RAI below the national average, with a considerably low RAI in Zone 4 (Fantana Rasu).

Figure 21: Rural population and RAI (ppl) by Zone

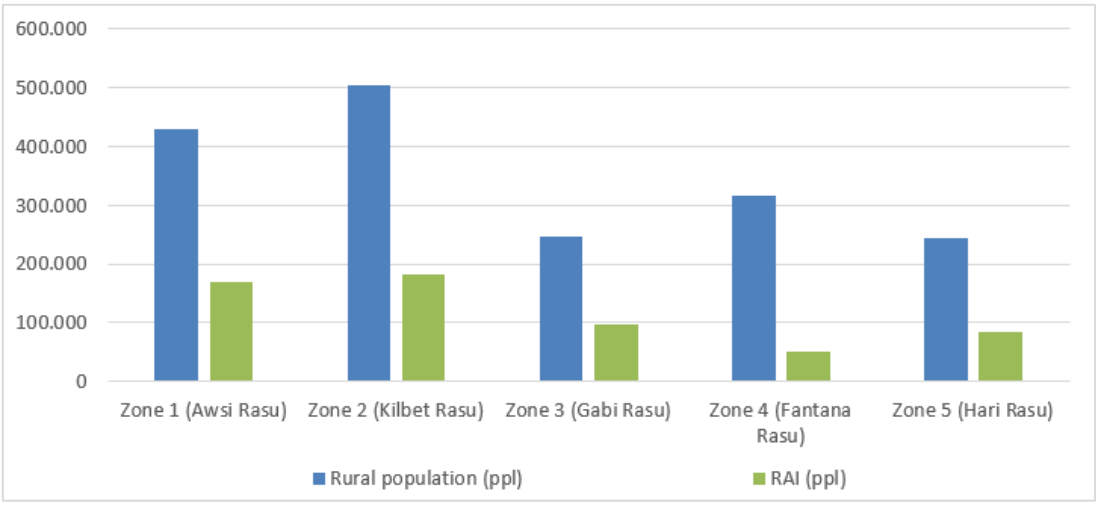
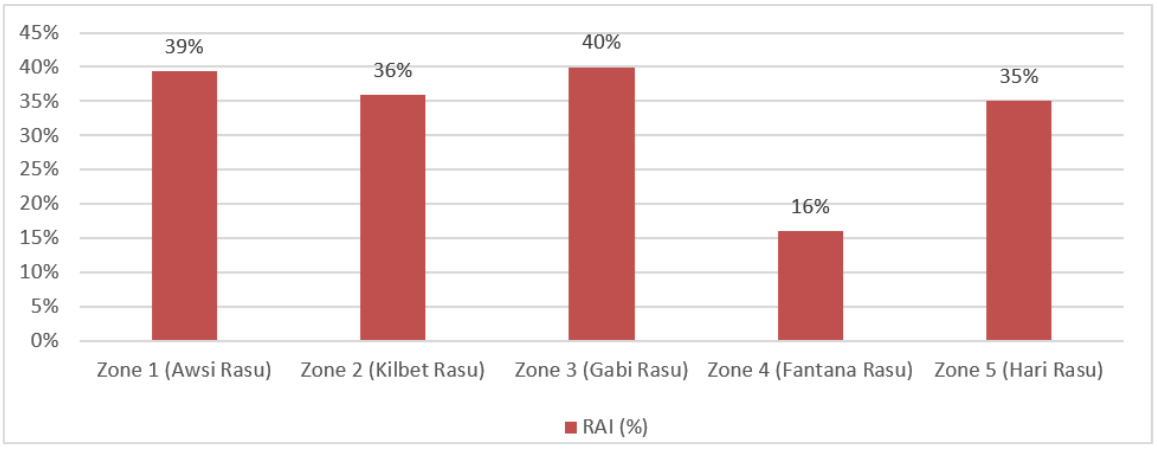
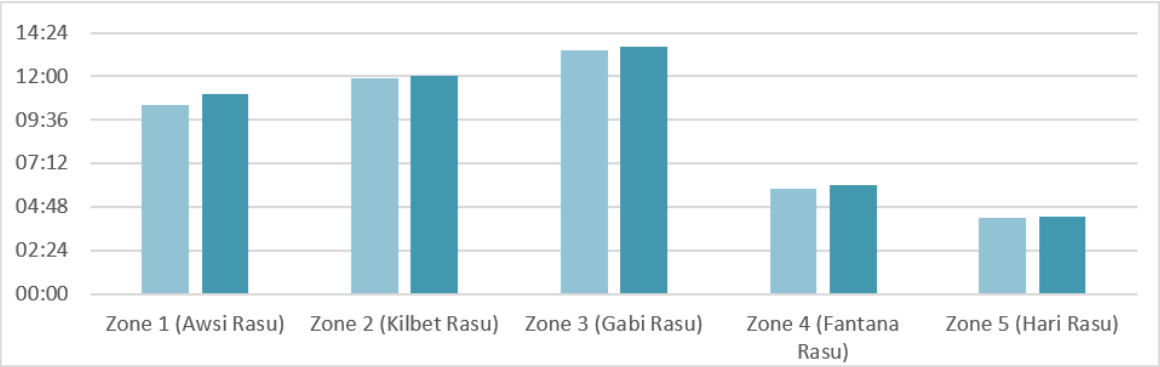


Figure 22: Calculated RAI for each Zone (%)



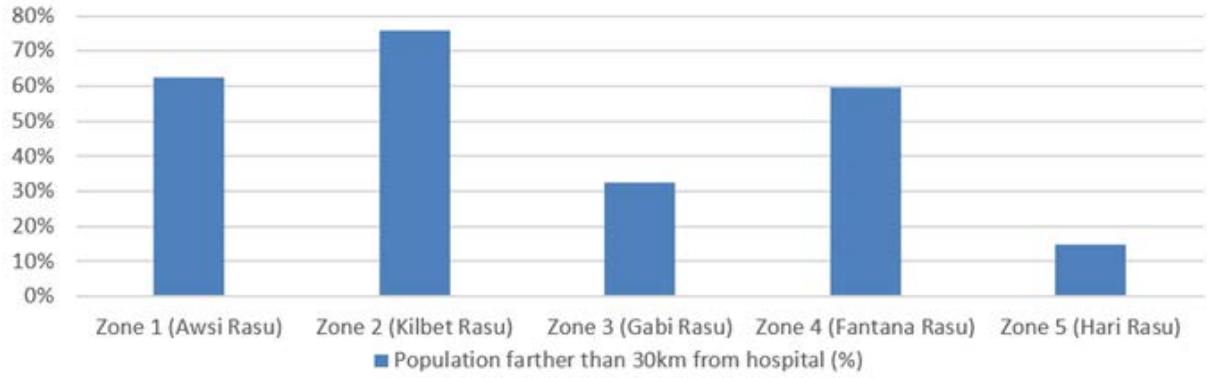
The weighted average travel time to market is considerably above the four hours for zones 1,2 and 3.

Figure 23: Weighted average travel time by population



In terms of hospital accessibility, Zone 1, Zone 2, Zone 3 and Zone 4 have more than 20% of their population farther than 30km from a hospital.

Figure 24: Population farther than 30km from any hospital by Zone



Amhara region

Amhara has 12 Zones, with a rural population of 22.4 million people. 58% of this population is at least 2 km away from major roads, while 34% is away from all roads, slightly above the national average of 27%.

The calculated RAI for Amhara is 64%, slightly below the national average of 70%.

In terms of individual Zones, the RAI is considerably below the national average for the following Woredas: Central Gondar, North Gondar, Wag Hamra and West Gondar.

Figure 25: Rural population and RAI (ppl) by Zone

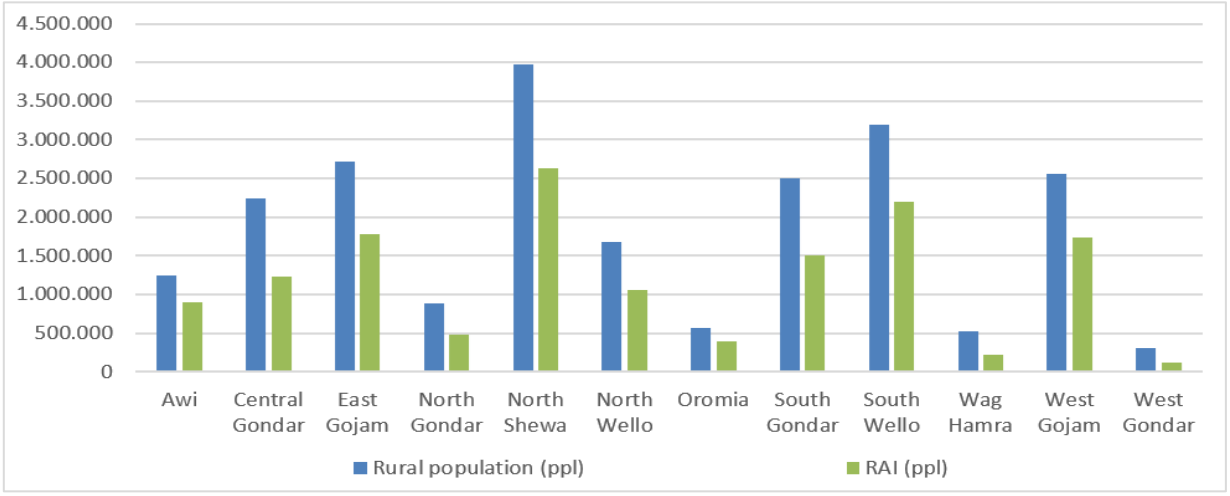
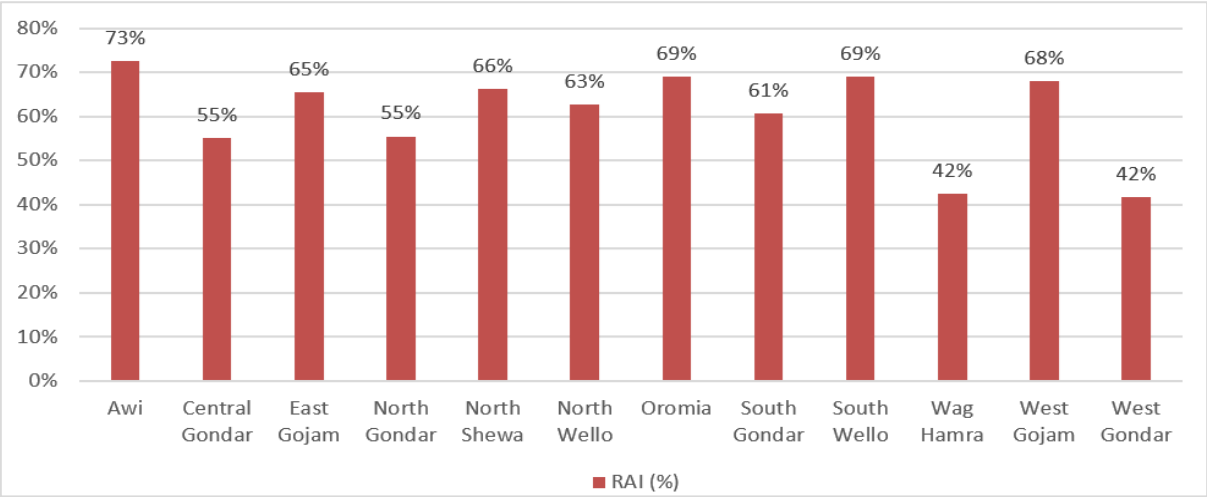
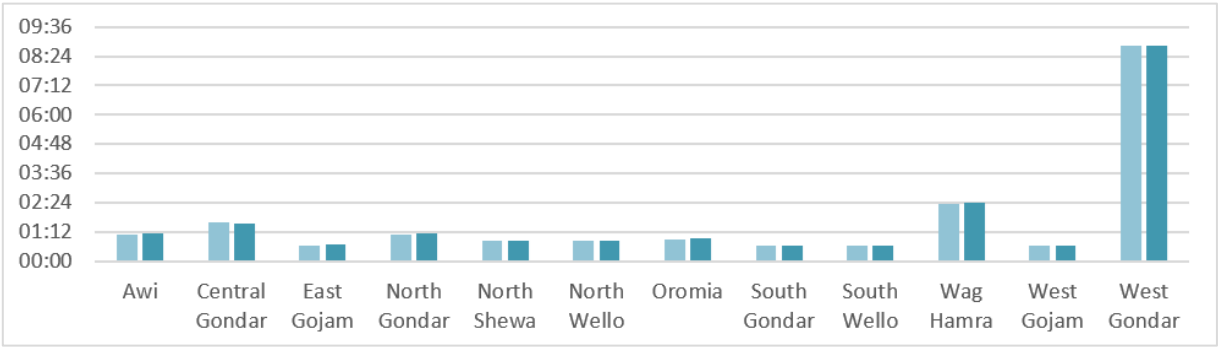


Figure 26: Calculated RAI for each Zone (%)



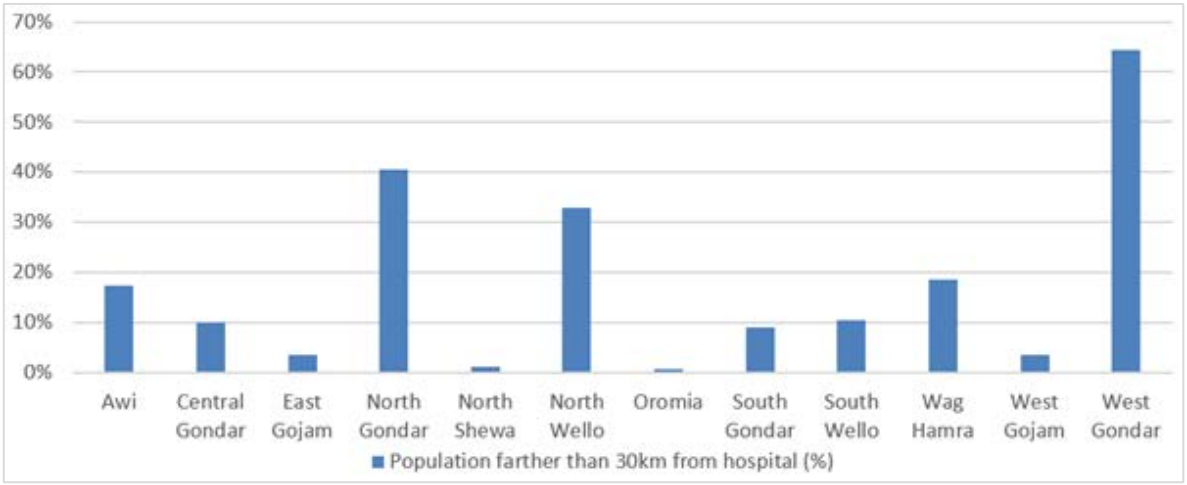
The weighted average travel time to market is considerably below the four hours for most Woredas, while West Gondar stands out with an average travel time to markets of above eight hours.

Figure 27: Weighted average travel time by population



In terms of hospital accessibility, North Gondar, North Wello and West Gondar have more than 20% of their population farther than 30km from a hospital.

Figure 28: Population farther than 30km from any hospital by Zone



Benishangul Gumz Region

Benishangul Gumz has four Zones, with a rural population of 1.1 million people. 60% of the population is at least 2 km away from major roads, while 42% is away from all roads, above the

national average of 27%.

The calculated RAI for Benishangul Gumz is 56%, below the national average of 70%.

In terms of individual Zones, the RAI is considerably below the national average for Kemashi, Mo Komo Special and Metekel.

Figure 29: Rural population and RAI (ppl) by Zone

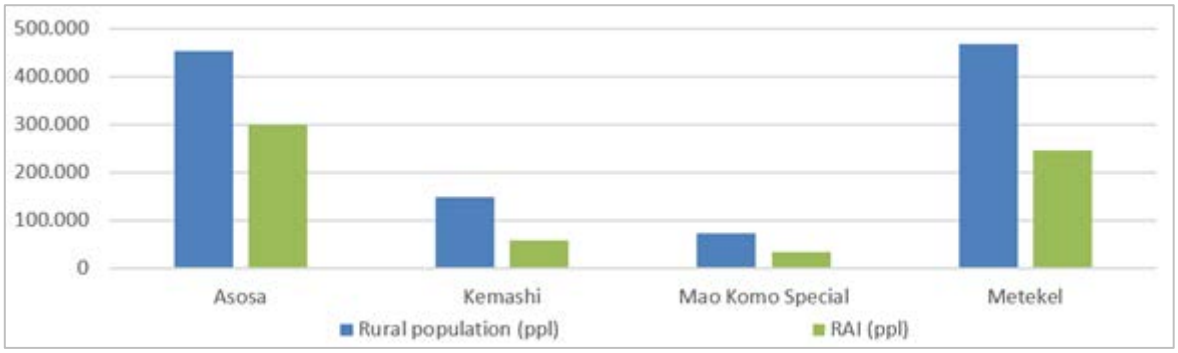
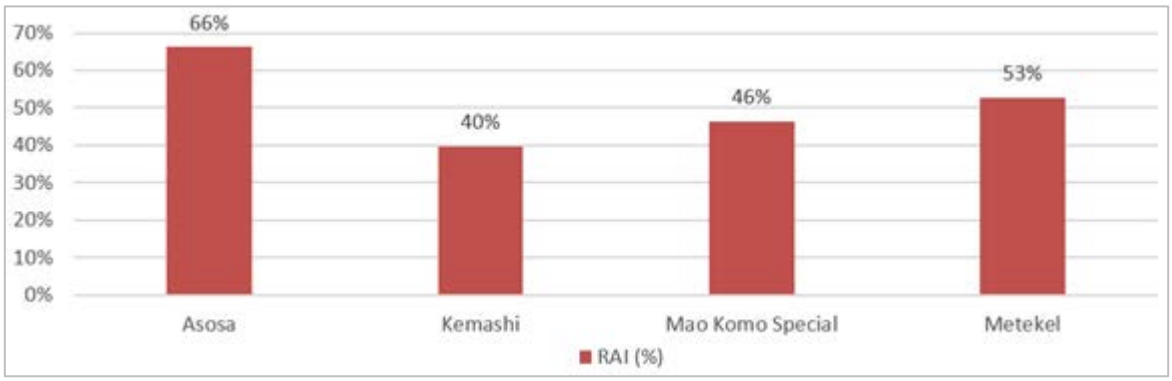
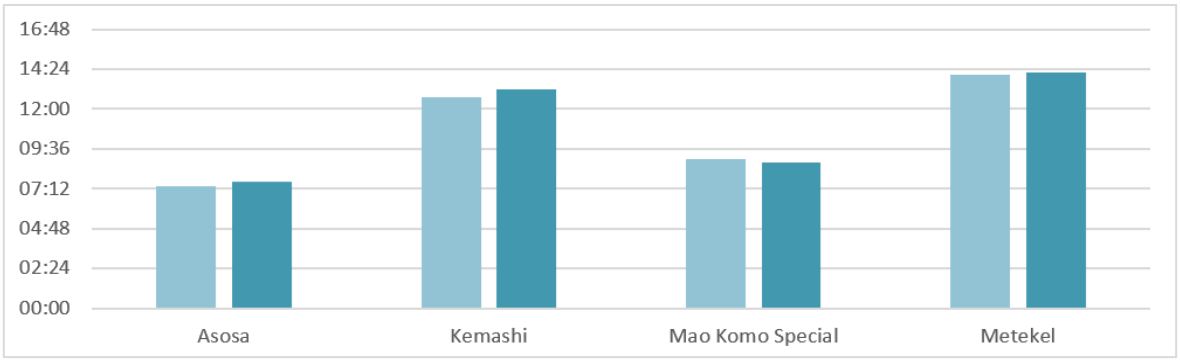


Figure 30: Calculated RAI for each Zone (%)



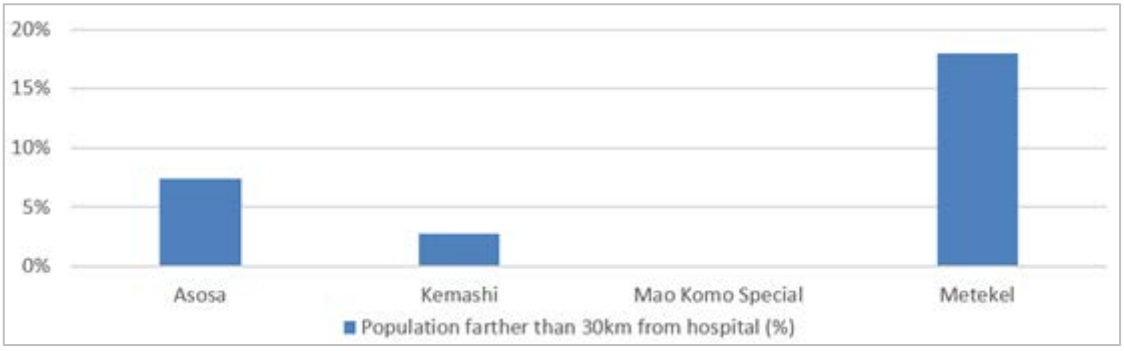
The weighted average travel time to market is considerably above the four hours for all Zones.

Figure 31: Weighted average travel time by population



In terms of hospital accessibility, all Zones have less than 20% of their population farther than 30 km from a hospital.

Figure 32: Population farther than 30km from any hospital by Zone



Gambela Region

Gambela has four Zones, with a rural population of 503 thousand people. 67% is at least 2 km away from major roads, while 53% is away from all roads, above the national average of 27%.

The calculated RAI for Gambela is 46%, below the national average of 70%.

In terms of individual Zones, the RAI is near the national average for Mejenger, while it is considerably below average for the others, especially Agnewak and Nuwer.

Figure 33: Rural population and RAI (ppl) by Zone

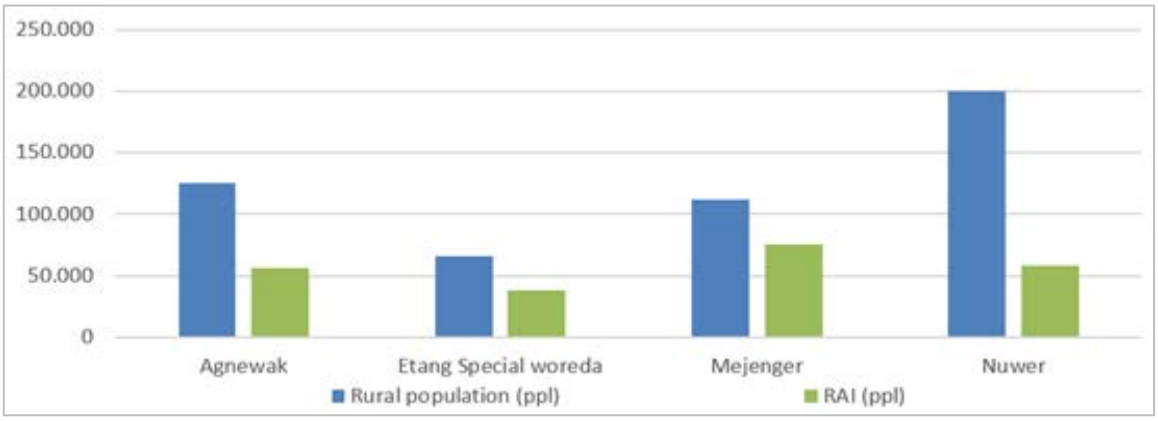
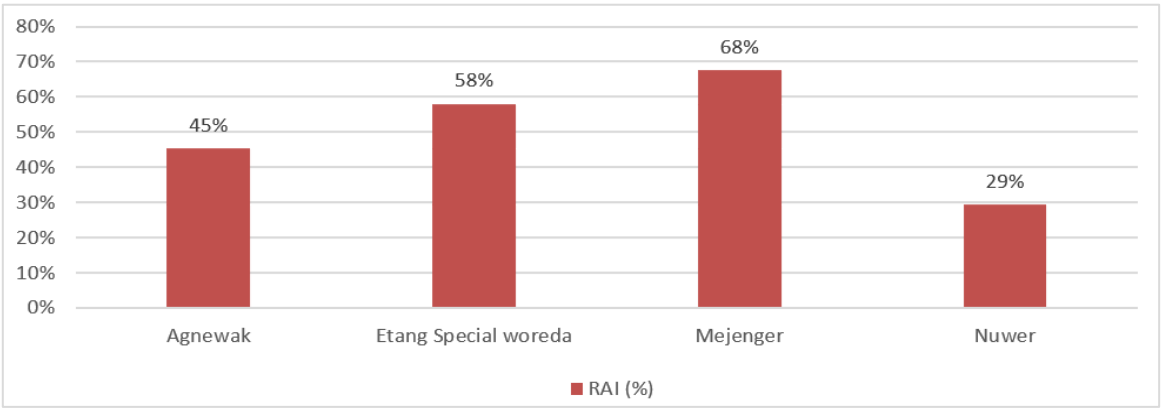


Figure 34: Calculated RAI for each Zone (%)



The weighted average travel time to market is near four hours for most Zones, while it is considerably above average for Agnewak.

Figure 35: Weighted average travel time by population

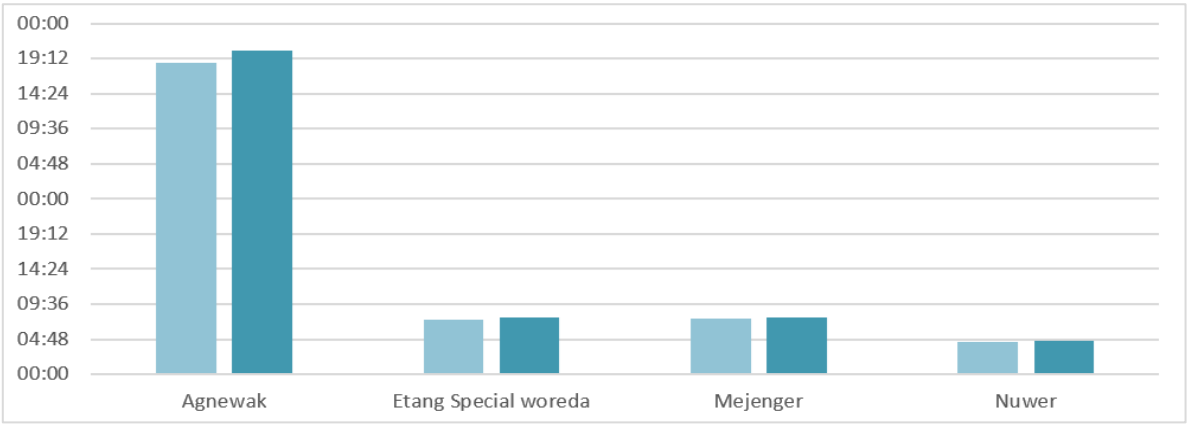
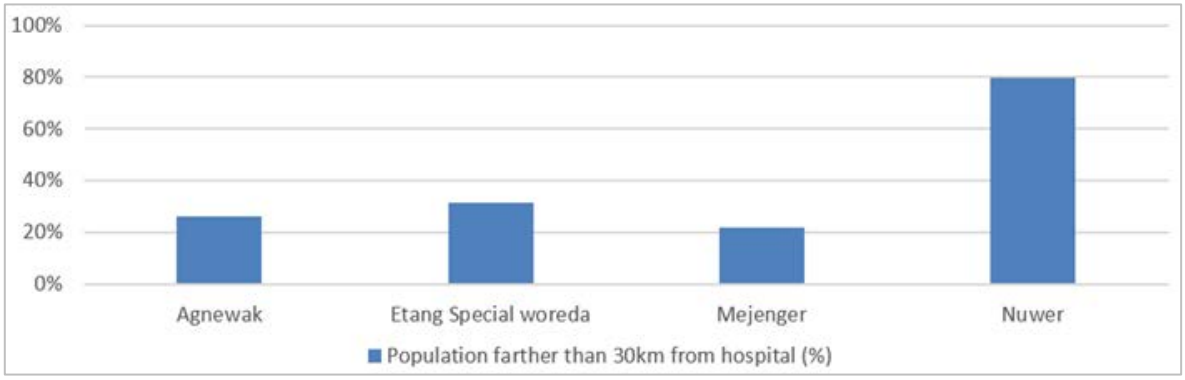


Figure 36: Population farther than 30km from any hospital by Zone



In terms of hospital accessibility, all Zones have more than 20% of their population farther than 30 km from a hospital, with Nuwer having approximately 80% of its population farther than 30 km from a hospital.

Oromia Region

Oromia has 20 Zones, with a rural population of 39.7 million people. 53% is at least 2 km away from major roads, while 23% is away from all roads, below the national average of 27%.

The calculated RAI for Oromia is 75%, slightly above the national average of 70%.

In terms of individual Zones, the RAI is near or above the national average for most Woreda, while it is considerably below average for Bale and Borena.

Figure 37: Rural population and RAI (ppl) by Zone

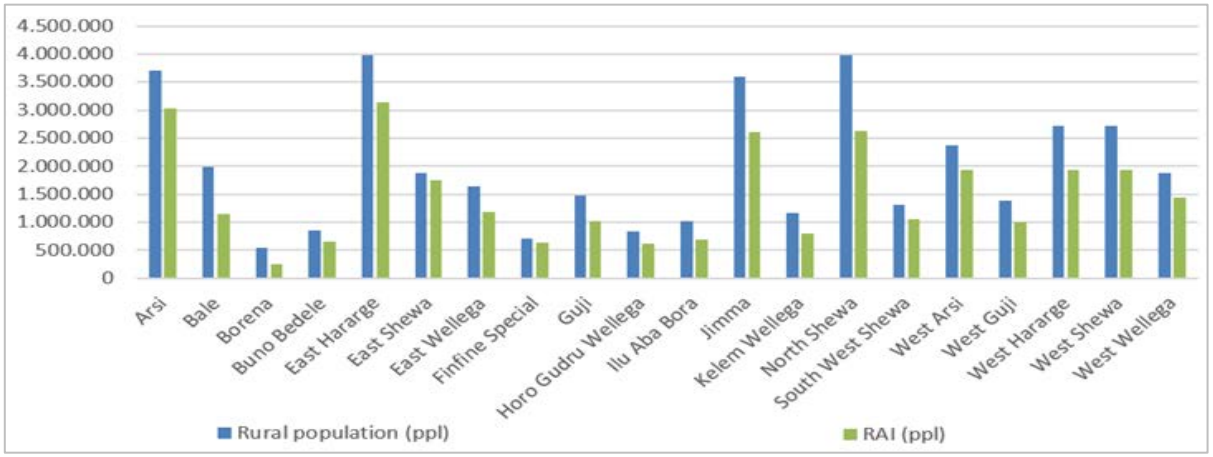
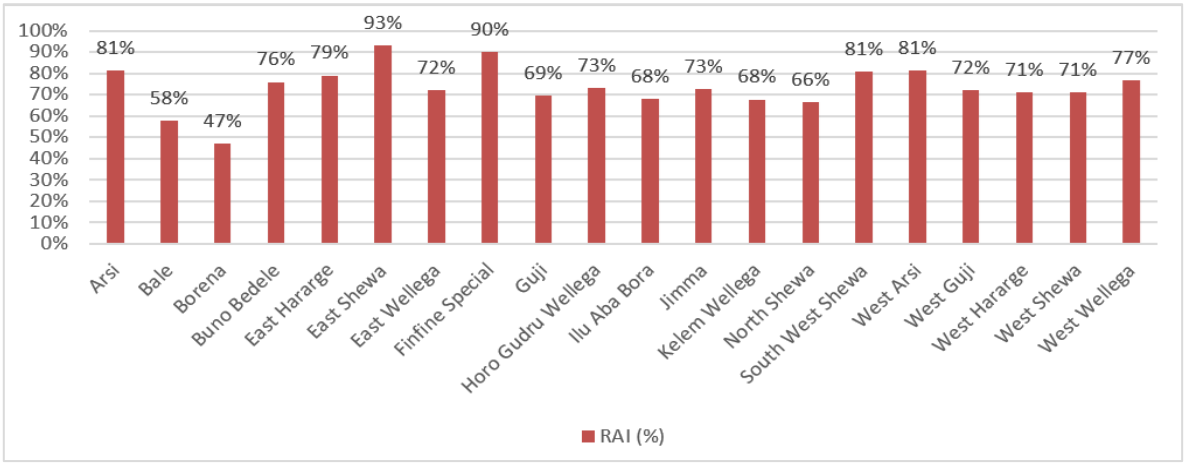
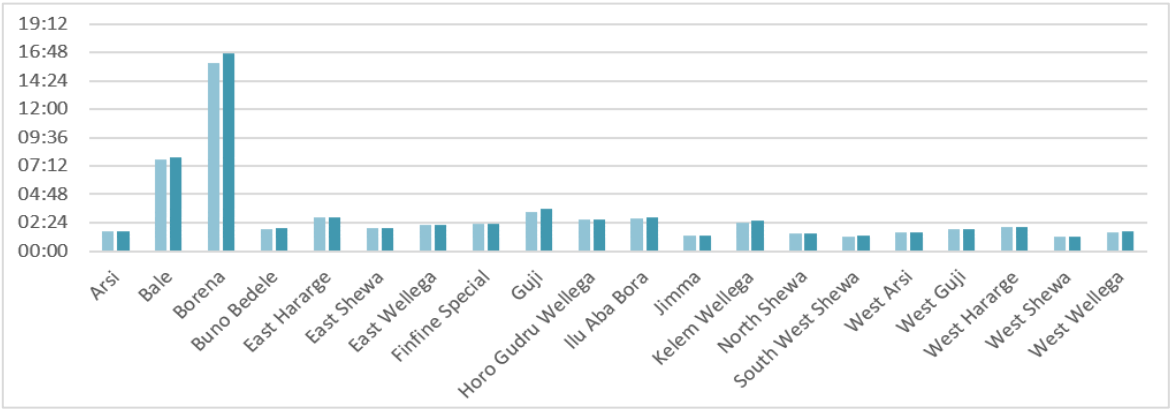


Figure 38: Calculated RAI for each Zone (%)



The weighted average travel time to market is below four hours for most Zones, while it is considerably above four hours for Bale and Borena.

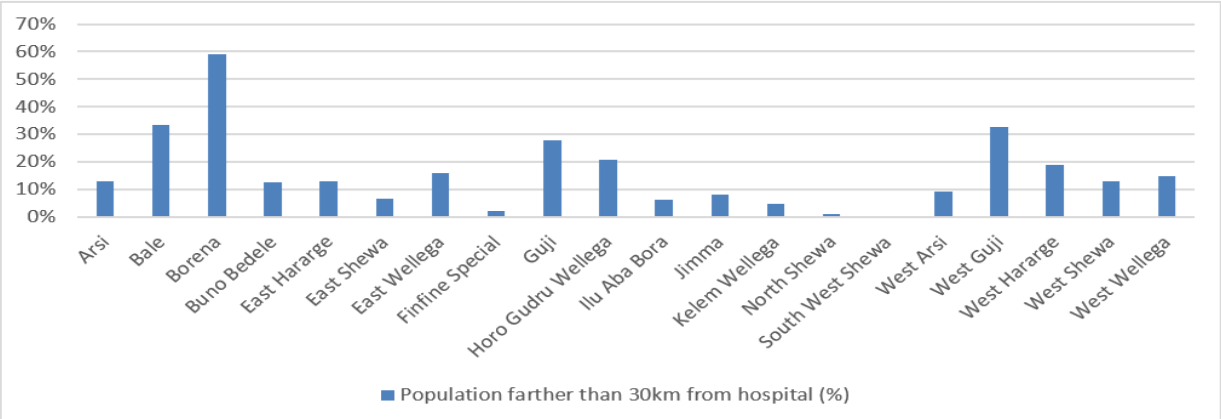
Figure 39: Weighted average travel time by population



In terms of hospital accessibility, the following have more than 20% of their population farther than 30km from a hospital:

- Bale,
- Borena
- Guji
- West Guji

Figure 40: Population farther than 30km from any hospital by Zone



Somali Region

Somali has 11 Zones, with a rural population of 6 million people. 83% is at least 2 km away from major roads, while 60% is away from all roads, considerably above the national average of 27%.

The calculated RAI for Somali is 38%, considerably below the national average of 70%.

In terms of individual Zones, the RAI is below the national average for all Zones.

Figure 41: Rural population and RAI (ppl) by Zone

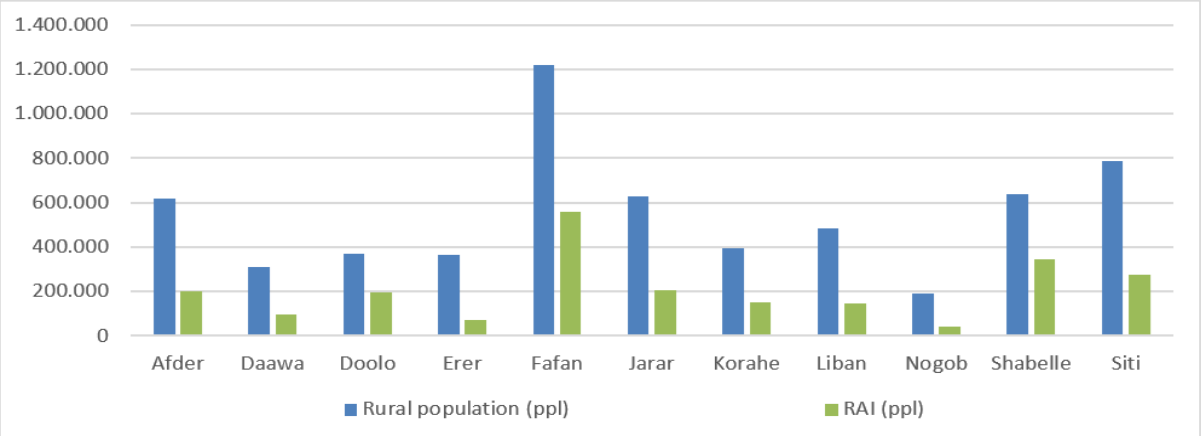
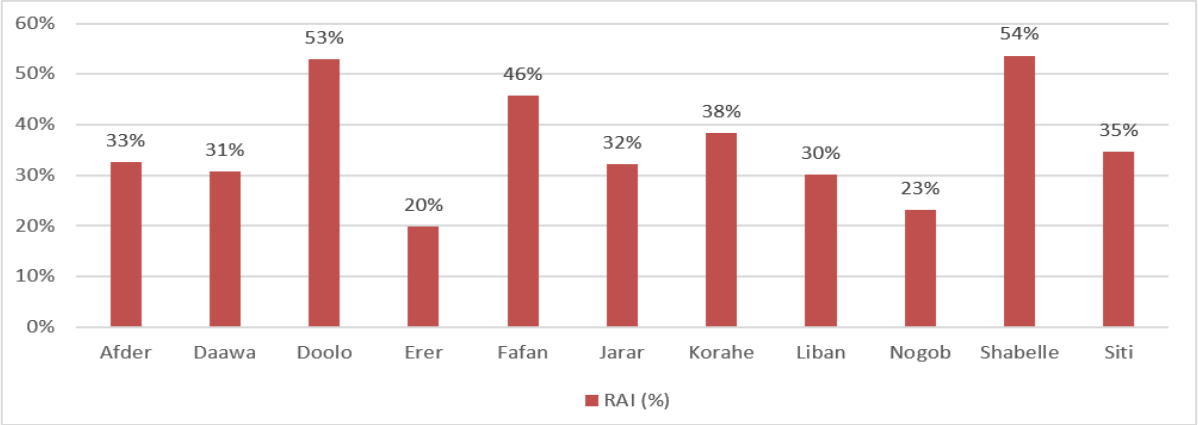
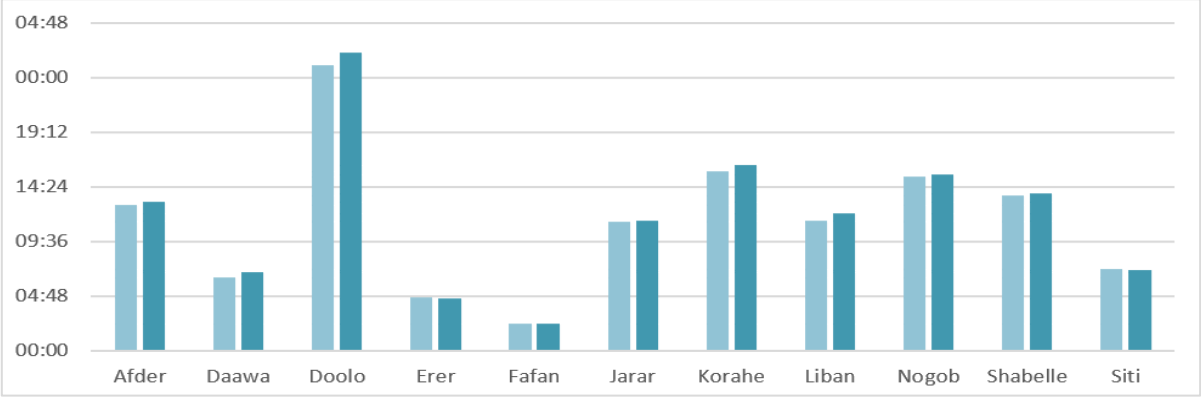


Figure 42: Calculated RAI for each Zone a (%)



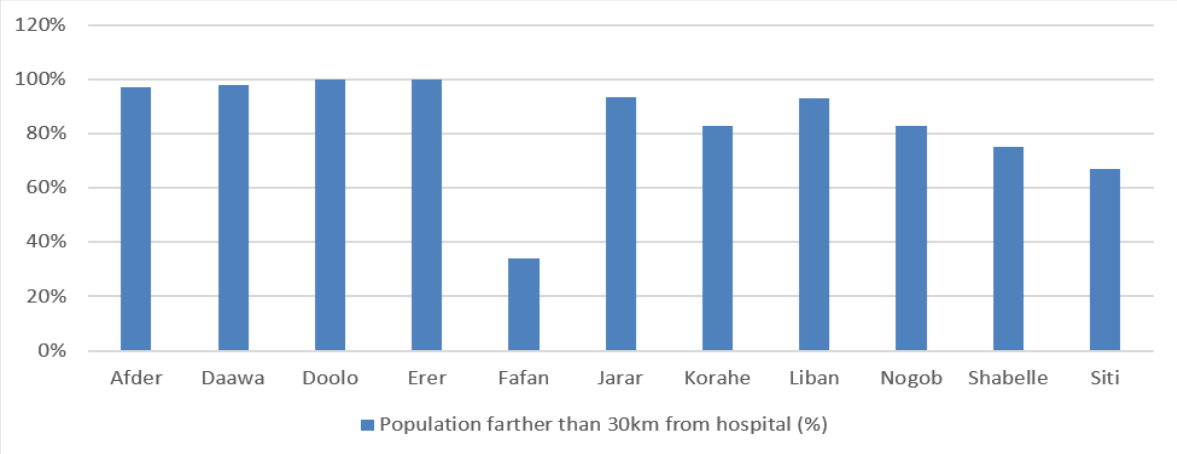
The weighted average travel time to market is near or below four hours for Daawa, Erer and Siti, while it is considerably above four hours for all others.

Figure 43: Weighted average travel time by population



In terms of hospital accessibility, all Zones have more than 20% of their population farther than 30 km from a hospital.

Figure 44: Population farther than 30km from any hospital by Zone



SNNP

SNNP has 24 Zones, with a rural population of 20.8 million people. 45% is at least 2 km away from major roads, while 14% is away from all roads, below the national average of 27%. The calculated RAI for SNNP is 83%, considerably above the national average of 70%. In terms of individual Zones, the RAI is considerably below the national average for:

- Alle,
- Amaro,
- Gofa,
- Konta Special
- Mirab Omo,
- South Omo.

Figure 45: Rural population and RAI (ppl) by Zone

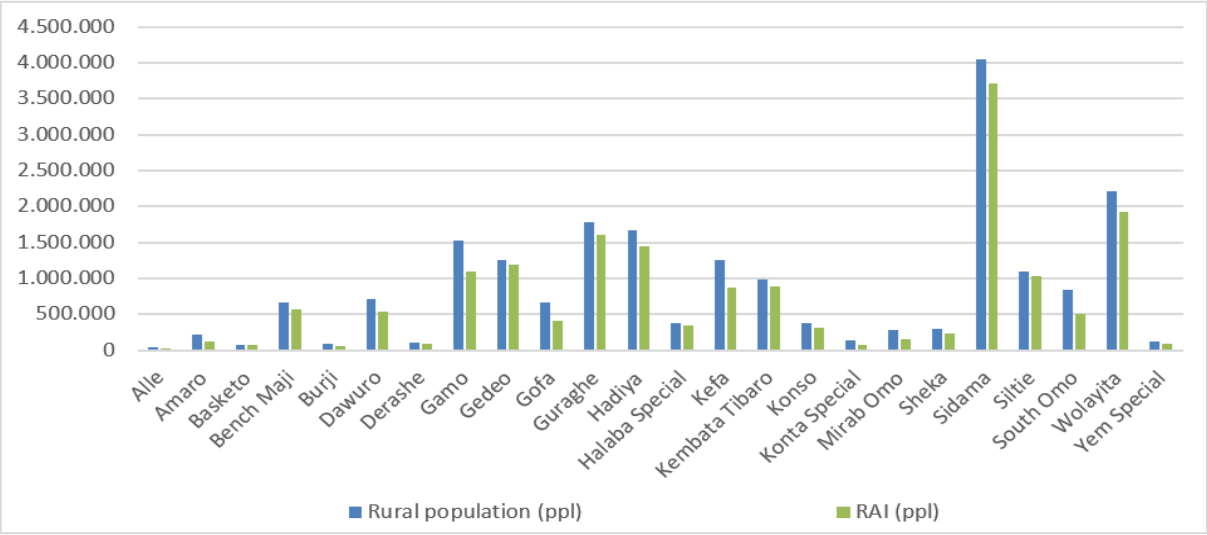
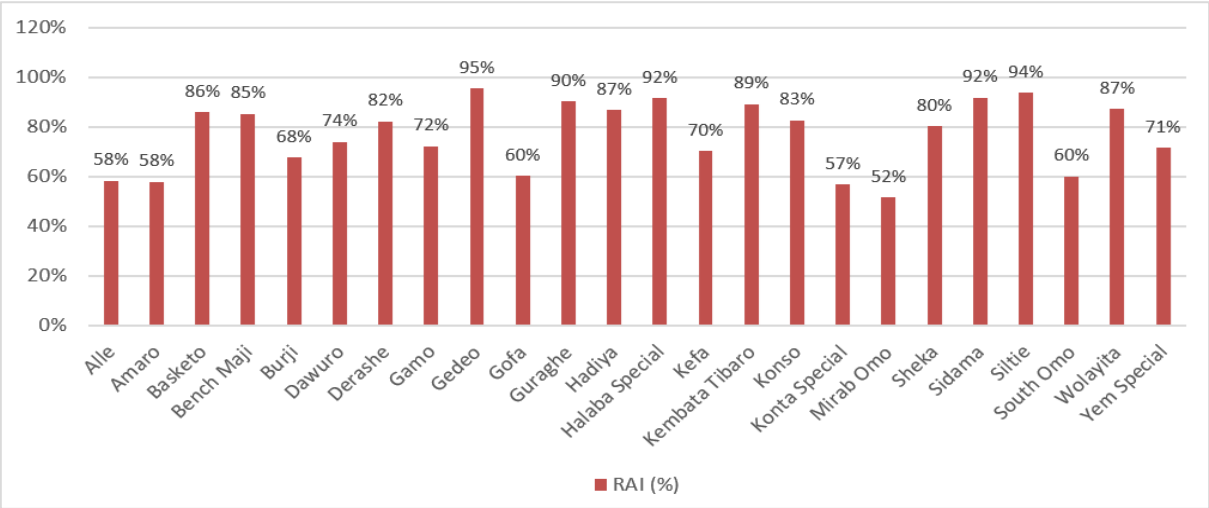
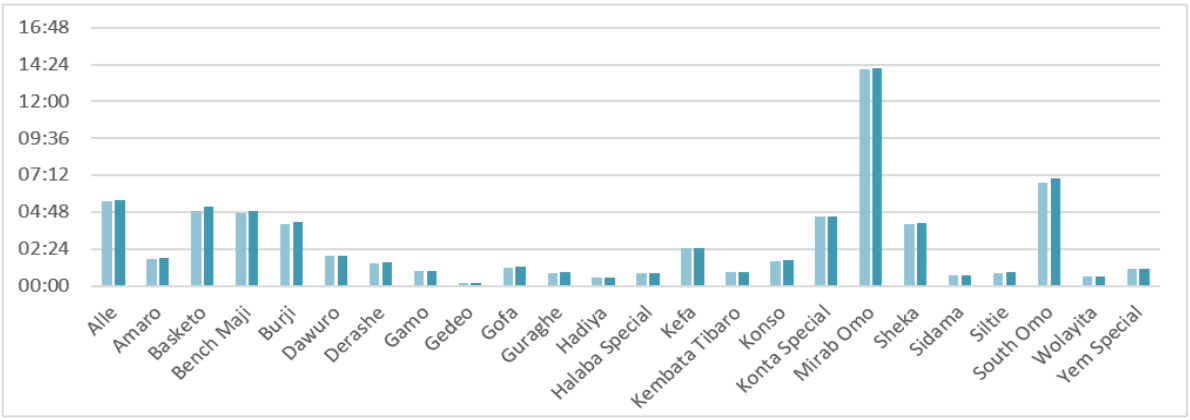


Figure 46: Calculated RAI for each Zone (%)



The weighted average travel time to market is generally good, with Mirab Omo and South Omo being the only Zones to significantly exceed 4 hours.

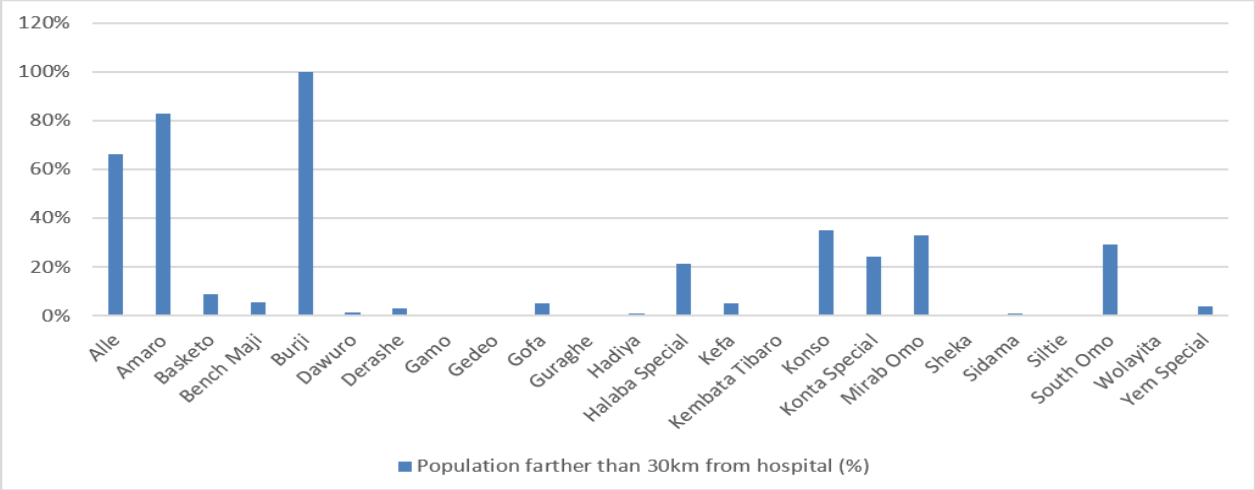
Figure 47: Weighted average travel time by population



In terms of hospital accessibility, the following have more than 20% of their population farther than 30km from a hospital:

- Alle,
- Amaro,
- Burji
- Halaba Special
- Konso
- Konta Special
- Mirab Omo
- South Omo

Figure 48: Population farther than 30km from any hospital by Zone



Tigray Region

Tigray has 7 Zones, with a rural population of 5.4 million people. 46% is at least 2 km away from major roads, while 29% is away from all roads, near the national average of 27%. The calculated RAI for Tigray is 69%, near the national average of 70%. In terms of individual Zones, the RAI is near or above the national average for most Zones, while it is considerably below average in Western Tigray.

Figure 49: Rural population and RAI (ppl) by Zone

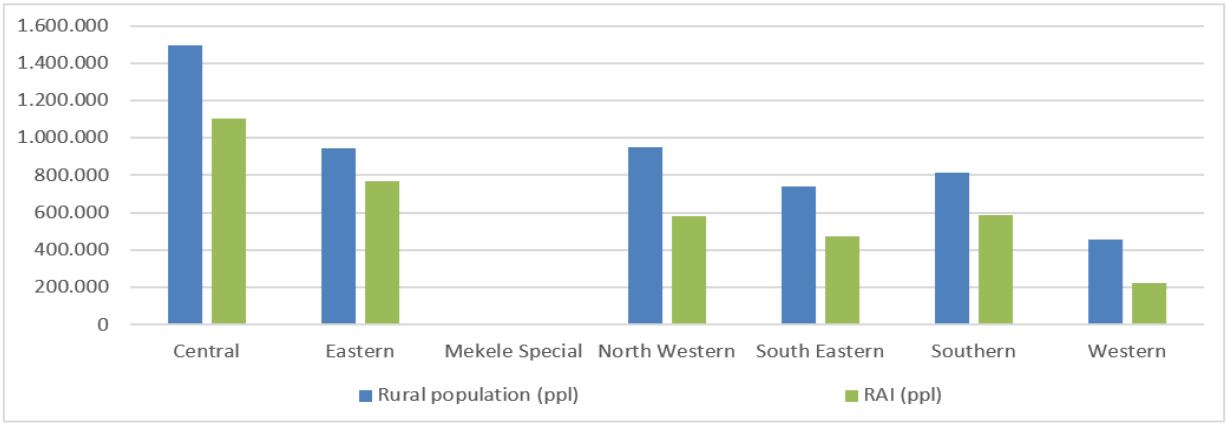
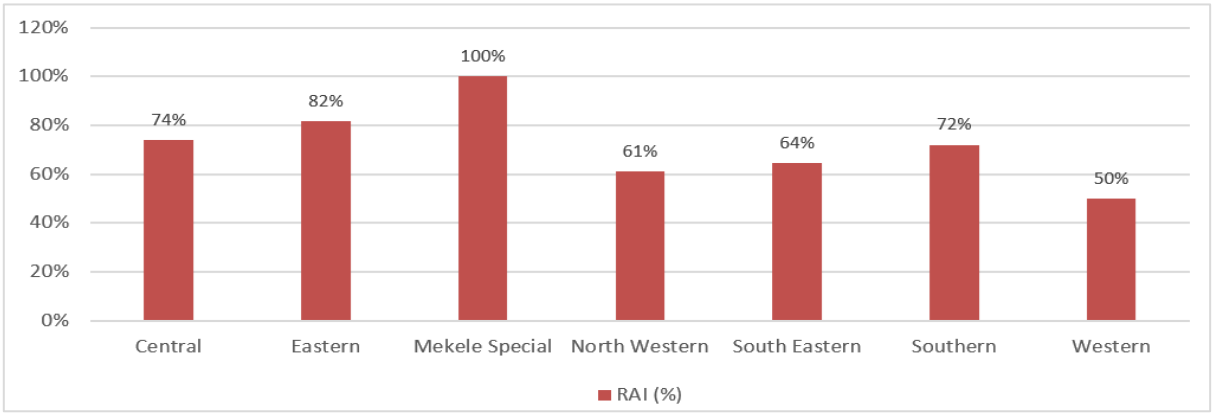


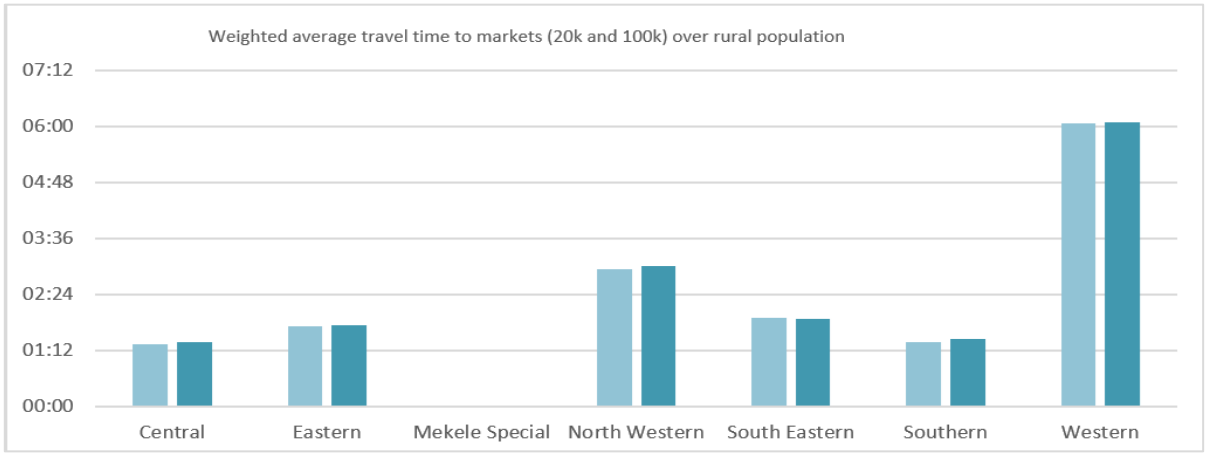
Figure 50: Calculated RAI for each Zone (%)



The weighted average travel time to market is generally good, with only Western Tigray being the

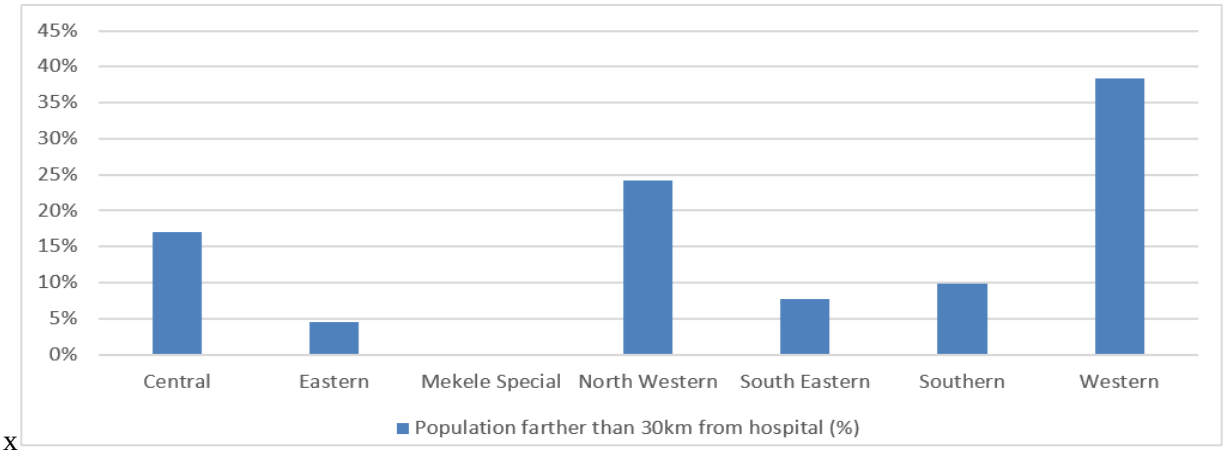
only Zone to significantly exceed 4 hours.

Figure 51: Weighted average travel time by population



In terms of hospital accessibility, North Western and Western Tigray have more than 20% of their population farther than 30 km from a hospital.

Figure 52: Population farther than 30km from any hospital by Zone



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2.3.5 Conclusions

The geospatial analyses undertaken show that the average accessibility in Ethiopia is below other low middle income African countries. Therefore, efforts should be made to reduce such gap.

The methodology proposed includes the use of database obtained from satellite images to identify gaps at local level and define links for potential upgrade and rehabilitation.

A more detailed analysis at regional and Zone level show considerable differences in rural accessibility within the Ethiopian regions.

For most regions only a few Zones show significantly low performances. For three regions, i.e., Afar, Gambela and Somali, the levels of accessibility are on average significantly lower than in the rest of the country.

It is also concluded that in some areas the lack of basic services is the driving factor rather than the lack of transport infrastructure.

The following sector report identifies

- **areas for improvement in the existing network,**
- **new links to be constructed,**
- **the type of roads that are more adequate in terms of benefits and costs**

- **a new public transport system at regional level**
- **an estimation of the costs and benefits**

areas that should be considered for the increase in provision of basic services such as schools and hospitals.

2.4 RAILWAY NETWORK

The railway sector is administered at the federal level. Although permitted by law, no private sector is currently involved in rail transport. In other words, there is no law monopoly for the operation of railways but a de facto monopoly. The main actors of the sector are all under the control of public powers: MoT, Ethiopian Railway Corporation (ERC), Ethio-Djibouti Standard Gauge Railway Share Company (EDR). The Chemin de Fer Djibouto-Éthiopien (CDE), the old metric gauge railway, it is hardly functional and it is on the edge of its dissolution.

Dealing with the railway construction, service, and regulation are under the Federal jurisdiction as per the Constitution. Railway Transport Administration Proclamation No. 1048/2017 is the principal law that governs and regulated the Railway Sector in Ethiopia. The Proclamation is also the legal foundation for future regulations and directives that may (and likely, will) be issued by the Council of Ministers (CoM) and by the Ministry of Transport (MoT) respectively.

Similar with other transport sectors, MoT is responsible for proposing policy, strategies and laws concerning railways as well as for preparing infrastructure master plans. In addition, MoT is given a responsibility of regulating the sector by providing licenses for all rail constructions carried out by private investors as well as registering the main actors of the sector – namely infrastructure mangers and railway undertakings. This approach allows the Ethiopian transport system to pave the road to a future openness of the market to private operators.

MoT has additional responsibilities because of the temporary absence of an independent government agency responsible for the safety of the sector. The Proclamation provides the “body authorized by law to administer railway transport” to have a power and duties to carry out all the regulatory functions for ensuring the railway transport is safe and reliable. Sub-Article 43 of Article 2 of the Proclamation defines the “body authorized by law to administer railway transport” as the Ministry of Transport or another government organ as may be determined by Council of Ministers. So far, no Council of Minister’s Regulation has been enacted to determine a government organ to exercise these responsibilities. Therefore, currently, MoT, through its Railway Infrastructure & Safety Regulatory Directorate, is the only regulator of the railway transport sector.

For regulating the sector and ensuring safety of the railway transport, the Proclamation provides the following requirements:

a) for locomotive and wagon – they shall be registered and have put in-service license to be used in Ethiopia.
b) for railway professionals: train master, maintenance manager, trainer, examiner, train dispatcher, assessor, and a safety management system manager shall register at the national registry, have Competency License which shall be renewed every three years.
c) for train masters: they need to have two licenses - train master competency license and supplementary train master certificate
d) for Infrastructure Managers: they shall get a Safety Authorization by meeting the requirements
e) for Railway Undertakings: they need to get a Safety Certificate by meeting the requirements
f) For training, maintenance, and assessment institutions – they shall get Accreditation Certificate to engage in railway sector:

The Proclamation also requires both the infrastructure manager and railway undertaking to submit their Safety Management System and get approval for it from the regulator. The minimum content and the form Safety Management System is provided by the Proclamation. Any Construction or development activity undertaken around railway infrastructures shall obtain prior permission from

the regulator. The MoT is also authorized to appoint audit and inspection officers who perform safety audits and inspection of the proper application of the relevant laws.

The Proclamation requires all persons, whether natural or legal, that involve in - construction, maintenance and management of railway infrastructure, providing railway transport services, providing training for railway professionals, manufacturing train and other equipment used for the construction/maintenance of railway infrastructure, providing consultancy service in the railway sector - to be registered, licensed, and/or accredited by “the regulator".

The two railway operators are currently focused on slightly different areas:

- ERC is focused on Plan & Execution of Railway line Infrastructure’s Construction; and providing of rail transport services. The latter activity is limited (operations and maintenance) to the operation of the Addis Ababa light railway line.
- EDR is responsible for the operations and maintenance of the Ethio-Djibuti standard gauge railway line and for the management of freight and passenger services between Addis Ababa and Djibouti.

The economic regulation of the sector is under the responsibility of the MoT. It has the power and duty to ensure the transport tariffs set for passengers and goods are competitive and fair. For achieving this objective, both the infrastructure manager and railway undertaking are required by law to submit to MoT their tariff proposal and the services condition for the approval. They shall not implement any tariff without a prior approval of Ministry. MoT has given a power to either approve or amend if it gets necessary.

Currently the MoT, with the new established Railway Infrastructure Development, Service and Safety Directorate is working with the support of international expertise to issue the railway regulatory framework. This framework includes, firstly, the design and organizational structure of the agency in charge of regulation and safety of railway sector, that is currently in charge to the Department itself.

The completion of the railway system's regulatory framework is a complex and time-consuming process. What has been implemented until now is the minimum level that allows a safe operational environment, while, as stated above the preparation of the acts establishing the new specialised agency is in the pipeline.

In terms of safety issues, the following items are needed to fill the gap:

- conditions under which activities undertaken around the railway infrastructure that endanger the safety of railway transport service shall be prohibited or restricted;
- conditions under which constructions and development activities undertaken around rail way infrastructures shall have permission issued by the authority;
- conditions on which authorization may be granted before undertaking other related development activities on lands adjacent to railway infrastructure or train stations;
- conditions on which construction of other infrastructures undertaken crossing or over passing or parallel to railway infrastructures;
- condition on which any excavation and construction that are undertaken near by the railway infrastructures;
- condition in which dangerous goods can be transported by train.

Further topics that need to be defined or biased belongs to different areas, like scope of the business, access to market economic regulation, training and accreditation system. The following items can be suggested:

- manner of provision of railway transport service by using a railway infrastructure of another person based on a contractual agreement entered with the infrastructure manager;
- other professions related with a railway transport to be qualified for registration in accordance with the Proclamation in force;
- determine, whether other infrastructures connected with railway infrastructure may also need a license before putting them into service
- set requirements that shall be fulfilled by to obtain accreditation certificate in the following

fields: i) maintenance institutions, ii) assessment institutions which assess railway work's professionals, iii) training centers, iv) assessment institutions in the field of technical and safety capacity level of trains or one or more than one railway infrastructure parts.

Coming to the status of rail safety, the table below describes the accidents occurred in the operating period 2018-2020 on the line from Addis Ababa to Djibouti managed by EDR.

Table 19: Railway accidents on the EDR infrastructure 2018-2020

Ethio-Djibouti S.G. Railway Safety and Security Accidents and Incidents Report												
SN	Item	2018				2019				2020		Total
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	
1	Animal Hits	166	126	113	131	129	36	41	35	50	18	845
2	Theft and Vandalism	60	224	226	202	28	25	47	39	31	48	930
3	Personal injuries	0	0	2	1	3	0	1	0	3	1	11
4	Personal death	0	2	7	2	3	1	1	4	4	1	25
5	Major Train Blocking incidents	NA	NA	26	10	44	14	16	14	10	13	147
6	Train Blocking Duration (Minute)	NA	NA	9030	2580	7380	6765	2671	2164	3551	1241	35382
7	Derailment	0	0	0	0	0	1	0	0	1	0	2

Source EDR

The data set on the Addis Ababa - Djibouti route is still not very robust to make a reliable diagnosis, especially taking into account two factors: i) the company is still in a start-up phase and, ii) the number of trains running is still low, below the potential of the line. In terms of trend, however, it can be observed that some events show a decreasing trend (Theft and vandalism, Animal hits, Duration of train blocking).

Furthermore, the safety field is evolving because of the ongoing completion of the regulatory framework (see below).

In addition to safety, other themes emerge from the analysis of the sector: the strategy for low emissions and rail accessibility. Many of these problems are closely linked and, in turn, connected with the current poor performance of the railway system (see chapter 4.3).

The poor performance of the railways in terms of services provided, both passenger and freight, does not allow to fully exploit the strengths of this mode of transport.

The design requirements for the Ethiopian railway network, before the electrification of the traction power, are fully in line with the country's strategic choice to be the leading country of the low-emission strategy in Africa, through the construction of the Grand Ethiopian Renaissance Dam and the its use by railway lines. A low rate of exploitation of the potential transport capacity of the railway system11, both for passenger and freight services, seems to weaken this perspective or at least sets the stage for a new discussion on the subject.

Another theme arising from the early years of operation period of the Addis Ababa - Djibouti link is again related to the issue of accessibility. As main passengers' stations are built in the suburb area, getting there and back to the cities represents a true challenge for railway users. Considering the scarcity of services currently provided, this makes the railway service less competitive compared with the road public transport even though fares are lower.

2.4.1 Current Status the railway service

Currently, the national railway infrastructure of Ethiopia can be listed as:

- Old Addis – Djibouti metric gauge railway line
- New Ethio-Djibouti electrified standard gauge railway line

The old railway Addis Ababa - Djibouti has been abandoned due several safety issues and for the inefficient transport provided and currently is operating a sporadic service for a cement factory.

[11] The management contract of the line has been set to a level of about 20 trains/day on average with a maximum capacity of the critical section of 15. The current timetable of the service is far below these limits as described in Chapter 4.3

In addition, the construction of the new line Addis Ababa – Djibouti causes additional interruptions to the old tracks.

Despite the stop to the operation, the company that own and manage the railways is still active to manage the asset still own by the company that have a big historical value. The railway corridor that includes the urban penetration in Addis Ababa and Dire Dawa is a valuable part of the asset and can be valorised if adequately exploited and linked with the new Ethio-Djibouti electrified standard gauge railway line.

The new Ethio-Djibouti electrified standard gauge railway line is mainly located in the mountain areas between the central plateaus of Ethiopia and Djiboutian plateau, the line starts westward from SEBETA (at southwest of Addis Ababa) runs eastward through Labu, Indode, Mojo, Adama, Metehara, Awash, Mieso, Afdem, Bike, Gota, Dire Dawa to Dewele, reaches Djibouti and finally ends at Nagad. The total length is about 750 km. the line is double track in the section Sebeta – Adama and single track in the other part. This because initially was forseen a suburban service between Adama and Sebeta. Currently this type of service is not provided. The line has been built according to Chinese standards and can be referred to National Railway Class III in China. Currently, for passenger service is operated 1 or 2 trains each day.

The active service is:

- 1 train /day: Labu – Nagad or Nagad – Labu
- 2 train /day: Labu – Dire Dawa and Nagad – Dire Dawa or Dire Dawa – Labu and Dire Dawa – Nagad

The travel time is

- about 15, 5 h between Labu and Nagad
- about 10,5 h between Labu and Dire Dawa
- about 5 h between Dire Dawa and Nagad

Addis Ababa-Djibouti railway has 19 stations, currently 5 are opened: Lebu, Adama, Dire Dawa, Ali Sabieh and Nagad for passengers' services. The other stations will be opened step by step to provide service to passengers. Passenger flow in the year 2019 has been 93,600 passengers/ year,

Freight Service has been operated during the Trial Operation: 3 pairs of trains between Mojo and Nagad. The travel time is about 20 h. Freight flows in 2019 has been 1.14 million ton/year

2.4.2 Company currently active in Ethiopia

Currently, three (3) companies are engaged in the Ethiopian railway sector in various missions:

- Old Narrow gauge Railway (Chemin de Fer Djibouto-Éthiopien (C.D.E.) ,
- Ethiopian Railways Corporation (ERC)
- Ethio-Djibouti Standard Gauge Railways (EDR)

Currently, C.D.E. operate the service basic related livelihoods and social services in 18 small stations from Dire Dawa to Gilile. The organization provide infrastructure management and transportation services in Ethiopia and Djibouti but the agreement between the two countries will end in 2023.

The Ethiopian Railways Corporation, established by the Council of Ministers Regulation No. 141/2000, is a state-owned enterprise owned by the Government of Ethiopia.

- To build rail transport infrastructure;
- To provide passenger and freight rail services and
- Perform related activities necessary to achieve the purpose for which it was established

The corporation has so far completed the construction of Sebeta-Dewale and put it into service. the Awash- Kombocha – Haragebeya line is under construction. In addition, the construction of Addis Ababa Light Rail Transit Service has been completed and is currently providing passengers services. In terms of operation, the corporation currently manages the Addis Ababa Light Rail Transit Service. For the Sebeta-Dewale railway line, the infrastructure management and rail transport services are being carried out by EDR.

Ethio-Djibouti Standard Gauge Railway Share Company (EDR) is an institution established to provide freight and passenger services on the new standard gauge line between Ethiopia and Djibouti.

Since its inception, the company has been providing passenger and freight services on the line through a Chinese management contractor.

All the companies work under the rules and regulation issued by the government of Ethiopia and in particularly by MOT which has establish a specific department acting as Safety Regulatory Agency.

2.4.3 Ongoing Project

Currently in Ethiopia, two railway line is under construction:

N.	Project	The owner of the project	The location of the project	Time to complete	The assigned capital [M ETB]	Current Status
1	Awash - Kombolcha – Haragebeya	Government	Amhara and Afar region	2021	7.084	under construction
2	Mekele – Haragebeya		Amhara Afar and Tigray	Not Defined, Expected about 2025	25.768	56% Constructed ceased due to budget

The two lines under construction will be standard gauge and electrified and will connect Kombolcha (one of the main logistic centre of the country) to the Addis – Djibouti corridor.

The Awash – Kombolcha line is equipped with European standard signalling system (ERTMS L1) and this may lead to interoperability challenges with the Sebeta – Dewale currently equipped witht Chinese standard signalling system.

The assigned capital reported in the above table is referred to the capital needed to complete the project and to to the overall expenditure.

2.4.4 Regulation of the sector

Railway Transport Administration Proclamation No. 1048/2017 is the principal law that governs and regulated the Railway Sector in Ethiopia. The Proclamation is also a foundation for future regulations and directives that may be issued by the Council of Ministers (CoM) and by the Ministry of Transport (MoT) respectively.

Similar with other transport sectors, MoT is responsible for proposing policy, strategies and laws concerning railway transport sector as well as for preparing national railway infrastructure master plans. In addition, MoT is given a responsibility of regulating the sector by providing licenses for all rail constructions carried out by private investors as well as registering the main actors of the sector – namely infrastructure mangers and railway undertakings.

MoT is also responsible for economic regulation: tariff for goods and fare for passenger are set by the board of directors where MoT is member of the board of directors. Vice versa, for the Addis Abeba LRT, MoT has directly approved the tariff. For achieving this objective, both the infrastructure manager and railway undertaking are required by law to submit their tariff proposal with the condition of their services for approval to MoT. They shall not implement any tariff without a prior approval of Mot. MoT has given a power to either approve or amend if it gets necessary.

MoT has additional responsibilities because of the absence of an independent government organ responsible for the safety of the railway transport sector. The Proclamation authorize the “body authorized by law to administer railway transport” to have a power and duties to carry out all the regulatory functions for ensuring the railway transport is safe and reliable. Sub-Article 43 of Article 2 of the Proclamation defines the “body authorized by law to administer railway transport” as the Ministry of Transport or another government organ as may be determined by Council of Ministers. So far, no Council of Minister’s Regulation has been enacted to determine a government organ to exercise these responsibilities. Therefore, currently, MoT is the only regulator of the railway transport sector.

For regulating the sector and ensuring safety of the railway transport, the Proclamation provides the following requirements:

- for locomotive and wagon – they shall be registered and have put in-service license to be used in Ethiopia.
- for railway professionals: train master, maintenance manager, trainer, examiner, train dispatcher, assessor, and a safety management system manager shall register at the national registry, have Competency License which shall be renewed every three years.
- for train masters: they need to have two licenses - train master competency license and supplementary train master certificate
- for Infrastructure Managers: they shall get a Safety Authorization by meeting the requirements
- for Railway Undertakings: they need to get a Safety Certificate by meeting the requirements
- For training, maintenance, and assessment institutions – they shall get Accreditation Certificate to engage in railway sector.

The Proclamation also requires both the infrastructure manager and railway undertaking to submit their Safety Management System and get approval for it from the regulator. The minimum content and the form Safety Management System is provided by the Proclamation. Any Construction or development activity undertaken around railway infrastructures shall obtain prior permission from the regulator. The MoT is also authorized to appoint audit and inspection officers who perform safety audits and inspection of the proper application of the relevant laws.

The Proclamation requires all persons, whether natural or legal, that involve in - construction, maintenance, and management of railway infrastructure, providing railway transport services, providing training for railway professionals, manufacturing train and other equipment used for the construction/maintenance of railway infrastructure, providing consultancy service in the railway sector - to be registered, licensed, and/or accredited by “the regulator.

Note: During the preparation of the Proclamation, the following Regulations and Directives to be issued by Council of Ministers and MoT respectively have been identified.

A - ISSUES NEED TO BE COVERED BY COUNCIL OF MINISTERS' REGULATIONS:

a. to determine other infrastructures connected with railway infrastructure those may also need a license before putting them into service;
b. to decide other professions related with a railway transport to be qualified for registration in accordance with this Proclamation;
c. manner of provision of railway transport service by using a railway infrastructure of another person based on a contractual agreement entered with the infrastructure manager;
d. the technical and quality standards required to be fulfilled by trains and railway infrastructures shall be determined by regulations;
e. the Ethiopian safety requirements, rules and working procedures be fulfilled by trains and railway infrastructures;
f. Conditions under which activities undertaken around the railway infrastructure that endanger the safety of railway transport service shall be prohibited or restricted
g. Conditions under which constructions and development activities undertaken around rail way infrastructures shall have permission issued by the authority
h. conditions on which authorization may be granted before undertaking other related development activities on lands adjacent to railway infrastructure or train stations;
i. conditions on which construction of other infrastructures undertaken crossing or over passing or parallel to railway infrastructures;
j. condition on which any excavation and construction that are undertaken near by the railway infrastructures;
k. condition in which dangerous goods can be transported by train;

B - ISSUES NEEDS TO BE COVERED BY DIRECTIVES ISSUED BY MOT

a. the detail requirements for issuance of competency license for every railway work shall be determined by a directive;
b. additional requirements to be met for railway infrastructure manger safety authorization;
c. without prejudice to the provisions of sub-article (6) of Article 14 of the Proclamation, if change is made on the railway infrastructure, the conditions under which safety authorization be re-issued as per the change made
d. without prejudice to sub-article (3) of Article 14 of the Proclamation the detail requirements that shall be fulfilled by the training institutes to obtain accreditation certificate;
e. the condition for acceptance of a training qualification document obtained from a foreign training institution;
f. the detail requirements that shall be fulfilled by maintenance institutions to obtain accreditation certificate;
g. the detailed requirements to issue accreditation certificate for assessment institutions which assess railway work's professionals;
h. the detail requirements that shall be fulfilled to obtain accreditation certificate pursuant to Article 22 of this Proclamation;
i. The detail requirements that shall be fulfilled to obtain accreditation certificate for training centers;
j. a condition in which any institution whose head office or branch offices are outside Ethiopia may assess and provide professional witness on the technical and safety capacity of a train or one or more than one railway infrastructure parts which will be put in service in Ethiopia;
k. the conditions of suspension or cancelation of the accreditation certificate;
l. detail condition relating to sub-article (1) of Article 24 of the Proclamation;

safety management system, conditions which oblige to make amendment on the safety management system and time, condition and form in which the performance of safety management system is reported;

2.5 LOGISTIC SYSTEM

2.5.1 Logistic system administration, regulation, safety

Regulating/administrating the Logistics and Maritime sector is under the responsibility of the Federal Government through Ethiopian Maritime Affairs Administration Authority (EMAA). MoT is, as all other transport sub-sectors, responsible for formulating policy, emanating legal framework, and supervising the performance of EMAA and FTA, which is responsible for regulating international as well as cross-country freight transport.

As a landlocked country, the importance of the sea connections for the Ethiopian trade flows is

huge. The logistics issue is, in turn, strictly linked with the collection and delivery of import/export flows and, for this reason, all the activities related to this are under the same administrative/regulation chain and have a unique public enterprise as the main market actor.

Among others, the main specific laws that governs the logistics process as a whole are: Carriage of Goods by Land (Proc No 547-2007), Multimodal Transport (Proc No 548-2007), Maritime Sector Administration (Proc No. 549/2007), Dry port (Proc. No 588/2008), Truck demurrage (Proc. No 811/2013).

Before the establishment of EMAA, the regulation and licensing functions were done both by a department under MoT and by the Federal Transport Authority. One of the missions given to EMAA by the Proclamation is to ensure the economic viability of transport flows both for import and export and to reduce the transit times. Moreover, EMAA is in charge to plan and coordinate such operations, also by the coordination of Government bodies involved and to implement the Country's rights and obligation under the international maritime conventions. The federal government is responsible for financing the regulatory functions of the sector by allocating annual budget.

Following an in-depth examination of the logistics sector, which resulted in the elaboration of a National Logistics Strategy, a high-level tool for coordinating national sector policies was recently established, the National Logistics Council (NLC). The Council is supported by a dedicated office, the Logistics Transformation Office (LTO).

The composition of the NLC is as follows:

- the Prime Minister Office,
- Ministry of Transport,
- Ministry of Trade and Industry,
- Ministry of Finance,
- Ministry of Agriculture,
- National Bank of Ethiopia,
- Ethiopia Maritime Affairs Authority,
- Ethiopia Investment Commission,
- Ethiopia Revenue and Customs Authority,
- Ethiopian Logistics Community of Practice.

The Council does not have the task of technical regulation or management of daily administrative processes, but to coordinate all the stakeholders active in the sector in order to develop intervention policies and strategies capable of rapidly advancing the national logistic sector.

The Ethiopian Shipping and Logistics Services Enterprise (ESLSE), established by the Regulation No 255-2011, is the public enterprise engaged in shipping, freight forwarding, and owning and administrating dry ports and sea vessels. Its areas of activity can be summarised as follows:

- Shipping operations and vessel ownership,
- Multimodal operations (transit services, freight forwarding, stevedoring, etc),
- Dry port operations and ownership,
- Road freight transport and truck ownership

The basic laws governing the entire logistic process were grounded in 2007 by three proclamations issued simultaneously: Carriage of goods by land, Multimodal Transport and Maritime Administration.

The first act defines, among other, the transport contract of goods by land and the consignment note, repealing the previous provisions of Title I of Book III of the Commercial Code of Ethiopia.

The second law aims at provide a legal framework regulating duties and liabilities of parties to a multimodal transport contract, setting the related basic definitions: International Multimodal Transport, Multimodal Transport Operator, Multimodal Transport Contract and Multimodal Transport Document.

The third law, establishing the administrative agency for maritime activities, reaffirms, among other

things, a definition of multimodal transport as an activity on international scale.

These basic definitions set a distinction between unimodal and multimodal transport. Given the material condition of the country and following the intentions of the Ethiopian lawmakers the multimodal transport is intrinsically an international event.

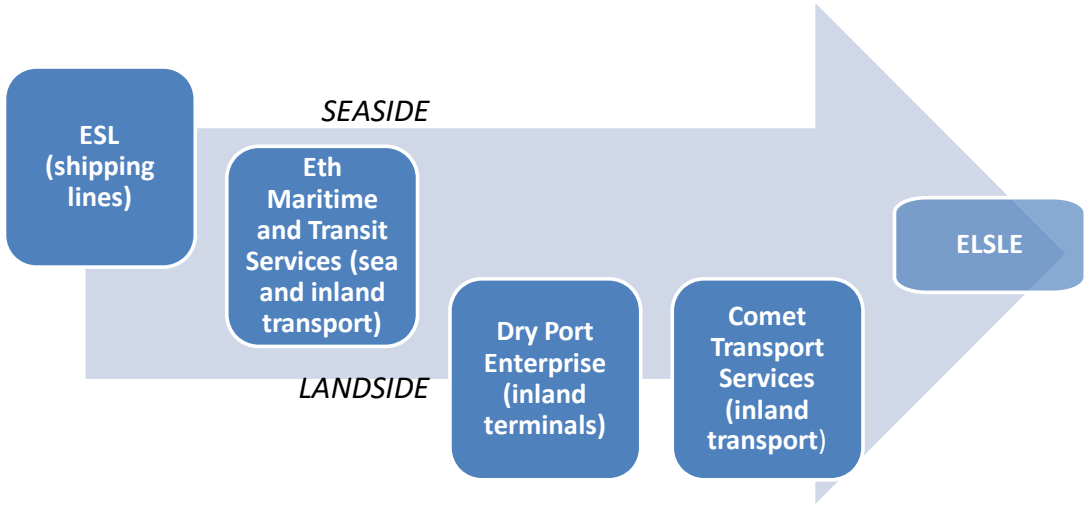
In case of unimodal transport, services can be provided both by private or public companies, subject to the compliance with authorisation and licensing regime in force for the Road sub-sector regulated by FTA and RTAs. A similar rule is in force for railway services.

Coming to multimodal transport, though no clear restriction provided by the specific proclamation (548-2007) does exists, until today no single private operator has been engaged in a multimodal transport service. Directives issued both by MoT and the National Bank of Ethiopia in 2008 and 2012, on one hand required all government institutions and private importers to use ESLSE's ships for their imports and, moreover, mandate all operators using multimodal transport to deliver their cargoes to dry ports or warehouses authorized by the former Customs Authority (now the Ministry of Revenues). These provisions, aiming both at control foreign currency and streamline shipments from Djibouti (avoiding the foreign currency fees related to the shipments) had the practical outcome to obstruct the access of the private operators to the market of multimodal services, apparently without intentions.

With the establishment of the NLC the lack of a focused commitment on the development of multimodal transport and, on a wider scale, on the sector should be come to an end. In fact, all the main logistics stakeholders are represented within the Council and the guidelines that will be issued should reflect the main interests of the Country.

The Regulation No 255-2011 established the public enterprise ESLSE and, at the same time, repealed the previous regulations concerning the former public companies in charge of service providing along the logistics chain, which were merged into the new enterprise. The current structure of the company is the outcome of many changes occurred during the last fifty years. Starting from the establishment of the national maritime company (Ethiopian Shipping Lines), the chosen approach has been similar to that of the aviation sub sector, with a reinforcement of the public control and a progressive widening of the scope of the company.

Figure 53:Evolution of the logistics and shipping business' structure



The path is depicted in the scheme above, with the company enlarging its scope from maritime to sea terminal services and then to inland forwarding, eventually becoming a totally state-owned enterprise acting along the most important logistic chains of the country. Presently the company is accountable to the Ministry of Finance through the PEHAA.

Regarding inland water transport, services are mainly provided on the western and southern part

of the country, with some river basins and lakes (mostly Lake Tana and Baro River) which group the present and potential services concerned.

According with the Maritime Proclamation (549-2007) the power to regulate the inland water transport is given to EMAA. However, in practice, EMAA give more attention into the maritime part of transportation and Regional Transport Bureaus are now fully regulating the sub-sector. Based on the opinions collected through the interviews, when the investment programs enhancing the inland waterway services will be completed, part of the responsibilities will be leaved to Regional states while the rest will remain at national level.

As far as transportation of dangerous goods is concerned, there is no specific law that rules this matter. Trucks involved in transporting import-export goods are licensed and regulated by Federal Transport Authority. There are three laws, namely, Radiation and Nuclear Protection Proclamation No. 1025-2017 and the aforementioned Carriage of Goods by Land, and Multimodal Transport that have provisions relevant to the transportation of dangerous goods.

The main objective of Proclamation No. 547-2007 is generally to govern contracts for the carriage of goods by motor vehicles, railway, and vehicles in internal water. For this objective, it provides definition for dangerous goods (Art. 2) as “goods which at classified as hazardous as well as Goods which are or may become of dangerous, inflammable, radioactive, noxious or damaging nature, and comprises all that are potentially hazardous for human beings and the environment.” As per the Proclamation, any sender of dangerous goods shall have an obligation to inform the carrier the exact nature of the danger and indicate the precautions needed to be taken. If the sender fails to do so, the carrier may at any time and place to unloaded, destroyed or rendered the dangerous goods harmless.

Following this provision, the Proclamation No 548-2007 states (Art. 30) that in case the shipper fails to inform the multimodal operator about the nature of (dangerous) goods, the shipper shall be liable for all the losses resulting from the shipment and/or the goods may unload, destroyed or rendered innocuous without payment of compensation.

Besides, Proclamation No. 1025-2017 prohibited transportation of any radioactive material “except in accordance with the requirements, established by the Authority”. Any transporter is also required to apply and get license in advance from the Authority to transport any radioactive material. Falling to do so is punishable by three to fifteen years imprisonment.

The vital role for the country of the Logistics and Maritime sector makes any inefficiency, lack of performance or failure directly impacting on factors that are crucial for the development but also for the day-by-day activities.

A deep assessment of the sector has been conducted by the Government and the results have been published in a focused document, the National Logistics Strategy12. The main outcomes concerning governance, administrative and regulations issues can be summarised as follows.

In terms of Transit and Customs procedures:

- the time required to deliver cargo at inland destinations (procedures of releasing cargo at seaport, inland haulage and clearance at inland customs) appear minimal on paper, but the process actually takes longer time due to complex customs procedures and related systems;
- there are many actors involved in this process (freight forwarders, shipping companies, port terminal operators, customs authorities of both Ethiopia and transit countries, border control and other related agencies). Each of them imposes his needs, standards and charges in an uncoordinated way. The total result are excessive and cumbersome procedures that hamper the process.

In terms of Quality, Competence and Capacity of Institutions and economic operators:

- there is poor quality/competence of personnel service providers, with training programs that

[12] FDRE - National Logistics Strategy, September 2019.

have failed to carry out adequate knowledge to trainees;
- all actors in the supply chain show inadequacy in institutional organization and in the ability to lead the sector with the relevant knowledge and skills
- the lack of qualified professionals in the logistics chain (both private and public side) and of national and port logistics service providers has been identified as one of the factors hindering the sector
- there is no legal basis for horizontal coordination between logistical institutions.

In terms of access to Market and role of private operators the assessment enlighten that the main part of the logistics chain is managed on a monopolistic basis, in fact:

- on Djibouti side, monopolistic operators act in container terminal management, bulk cargo operation terminal and oil terminal;
- on Ethiopia side, monopolistic role of ESLSE for import cargo (though not all the activities) multimodal operation and dry port services.

These services are not open to private operators and do not provide services on a quality basis. Accordingly, "this led to inefficient operations and a higher increase in service charges. The absence of proper controlling on the logistics service areas and absence of a competitive environment in the logistics service sector have become significant problems in the logistics system".

As stated above, the Investment Regulation No 474-2020 recently issued, changes the regulatory framework of the sector by introducing a partial openness of the market. In details is foreseen that Freight forwarding and Shipping agency services are opened to joint ventures with domestic operators owning shares not exceeding 49%. This new provision, while innovating the business lines opened to the contribution of private operators, on the other hands does not tackle with the main issue of the multimodal transport services, which remain - practically - restricted in favour of ESLSE.

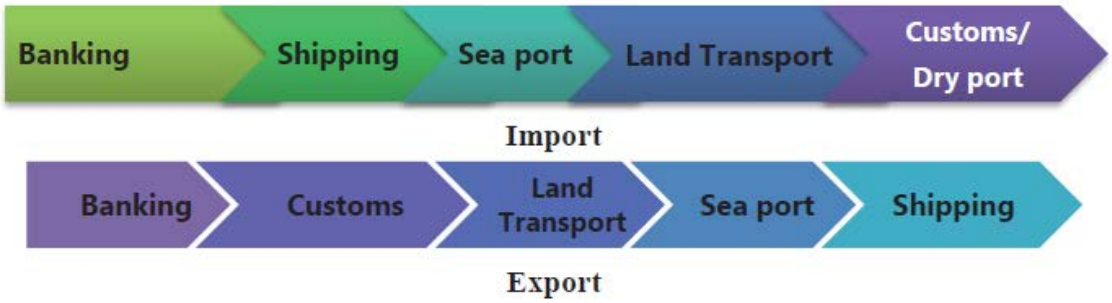
What seems to be missing here is an authorization process for multimodal transport services which set requirements to operate, as is requested for unimodal transport. In fact, the law gives to EMMA the power to issue license to multimodal transport operators and supervise them, accordingly, the authority is fully legitimated in providing detailed requirements and procedures for issuing licenses for operators different from ESLSE. A similar consideration applies also in case of dry port administration and services providing, though in this case the law (Proc 588-2008) defines, curiously, the dry port as "the enterprise rendering services of dry port within the place designated to render dry port services" (Art. 2)[13].

In recent years (2015 and 2017) at least two proposals have been drafted by EMMA to issue a directive that allows private forwarding and shipping agency service providers to be engaged in the multimodal transport services. However, because of the directives previously issued and of the strong opposition from ESLSE, these proposals did not enter in force.

To have a better understanding of this complex situation it is useful to come back to the import/export processes as described in the National Logistic Strategy issued by the MOT. The figure below describes all the components of the complex processes that are vital to ensure the country's freight flows: transport services (land and sea), terminal services and activities (dry ports, sea ports), administrative, financial and legal services (banking, customs, etc.).

[13] On these topics see, for example, T. Kassahun, Trade Facilitation in Ethiopia: The Role of WTO Accession in Domestic Reform, MIZAN LAW REVIEW, Vol. 8, No.1 September 2014.

Figure 54: The Logistics processes for Import and Export



Source: FDRE National Logistics Strategy - September 2019

The Logistics and Maritime sector is fully involved in ensuring the flows of goods needed to national consumptions and economic processes of the country. Besides, national security purposes arises when it comes to the topics of maritime fleet especially, but not only, in case of floods or food emergencies cases. Eventually, the foreign currency concerns for Ethiopia are always on the table, as also reaffirmed by the Economic Grown Reform Agenda. Banking, currency, customs, import supplies, international relationships, are all factors jointly involved in the sector's regulatory framework.

These considerations, summarising the impact on Ethiopia of its status of landlocked country enlighten the role of ESLSE within the logistics chain. In fact, the country has understandable motives for protecting its commercial ships: economic independence and political/national security issue. Commercial profitability is obviously a major criterion for almost all shipowners and if services to be provided to a given country are not enough profitable, the withdrawal or the reduction of the frequency of the service is highly probable. Given this general principle, Ethiopia decided to keep and develop its own shipping industry even if this part of the ESLSE's business is making losses.

The country also has a sound motive to keep (and even to further develop) its shipping industry for political and national security purpose. Since a national security requires adequate fleets for defense transport needs as well as for a secure supply from foreign countries, especially in times of hostility or emergency.

Nevertheless, such a coexistence of multiple objectives (sometimes divergent) imposes to ESLSE a mission and an economic burden which is not officially recognised and defined, forcing the company to adopt a conservative position to maintain its monopolistic role on the whole multimodal chain and finance its losses on maritime side.

As recognised above the monopolistic position of ESLSE, while backed by strategic motivation, seems to hamper the evolution of the whole logistics chain of the country. In fact, the company acts to defend its monopoly position that comes rather from an autarkic approach than from clear economic decision about the efficiency of the sector. To say it in a different way, the present ESLSE is the outcome of a strategic choose of policy makers that seems to been exhausted, becoming a sort of permanent shortcut that is no more coherent with the new needs of the country.

The issuing of the Home-Grown Economic Agenda and the following establishment of the NLC seem to signs that the development of the sector is addressed beyond of the locked situation described above. Licensing for private multimodal operators are in the pipeline and proposals for dry ports development by private operators have been submitted. A process of effective greater participation of private operators in the sector seems to have begun.

2.5.2 Ethiopia International Trade

In the last five years the Ethiopian trade has increased in quantity from 12.8 million tons (2015) to 16.3 million tons (2019) and in value from 25.6 billion USD (2015) to 27.6 billion USD (2019). There is a net prevalence of imports: In facts: in 2019 there were 14.2 million tons of import and 2.1 million tons of export, while 20.0 million USD value of import and 7.6 million value of export, as shown in the following table:

Table 20: Value and tons of Imports and Exports of Ethiopia from 2015 to 2019

Year	Unit	Import	Export	Total
2015	Million ETB	393,189	121,532	514,721
	Million USD	19,566	6,048	25,614
	Tons	11,402,752	1,465,762	12,868,514
2016	Million ETB	424,750	122,501	547,251
	Million USD	20,125	5,804	25,929
	Tons	14,776,656	1,664,477	16,441,133
2017	Million ETB	430,233	139,830	570,063
	Million USD	19,195	6,239	25,434
	Tons	12,126,182	1,767,963	13,894,145
2018	Million ETB	502,215	184,209	686,424
	Million USD	19,236	7,056	26,292
	Tons	13,553,528	1,909,400	15,462,928
2019	Million ETB	561,512	213,437	774,949
	Million USD	20,015	7,608	27,623
	Tons	14,266,322	2,062,152	16,328,474

Source: WB/Trade International Statistics (International Trade Centre)

2.5.3 International trade by kind and origin/destination

The analysis of Ethiopia trade by kind and origin/destination is based on 2017 import/export data, year for which the complete ERCA data have been obtained by the Consultant.

Ethiopia imports are mainly manufacturing products like chemicals, machinery and transport equipment, pharmaceutical products, vehicles and accessories, refined petroleum, palm oil, iron and steel, mixed minerals and chemical fertilizers, while **Ethiopia export** goods comprise low-value unprocessed and semi-processed agricultural products like coffee (which currently represents 16,5 percent of the total export of the country), cut flowers (11 percent), dried legumes, fruit & vegetables, oil seeds (mainly sesame), pulses, spices, natural gum, livestock, leather and tanned sheep hides, mineral products (gold, tantalum, opal and marble products), khat (with huge quantities exported mainly in Somalia), Notably, the share of manufactured products remains minimal.

Table 21: Main destinations of Ethiopian exports in 2017

	Country of destination	Value (Million USD)	% of total Ethiopian exports
1	China	288,2	10,1
2	Somalia	243,6	8,5
3	United States	227,3	7,9
4	Saudi Arabia	206,2	7,2
5	Germany	195,1	6,8
6	Netherlands	188,9	6,6
7	United Arab Emirates	127,6	4,5
8	Switzerland	111,6	3,9
9	Japan	101,1	3,5
10	Djibouti	96	3,4
11	Belgium	95	3,3
12	Israel	79,9	2,8
13	Vietnam	70,1	2,5
14	Kenya	67,7	2,4
15	Italy	61,3	2,1

Data from ERCA (Ethiopian Revenue and Customs Authority) concerning years 2015-2017 and the first six months of 2018, allow a reconstruction of the yearly volume of Ethiopia import/export trade, Data can be disaggregated for office of presentation of customs declarations, transit routes, origin and destination of international trade, types, value and quantity of goods. The data indicate that Ethiopia trade is characterized by a general unbalance in terms of tons (8/1) and values (6/1). Customs offices where goods are declared for import, with their points of entry, are listed in

alphabetic order in the following table,

Table 22: List of Customs Offices with points of entry of imported goods

Office Code	Office Name	Point of entry
AAA	A,A Air Port Customs	Air shipment
AAAPE	A,A Airport Personal Effect Office	Air shipment
AAGC	Addis Ababa Gerji Cargo	Djibouti port
AAHQ	Headquarter	Djibouti port
AAK	Aa Kality (Aak)	Djibouti port
AAL	Aa Lagar (Aal)	Djibouti port
AAP	A,A, Parcel Post Customs	Djibouti port
AAPE	Aa Airport Personal Effects (Aaape)	Air shipment
AAPX	ADDIS ABABA Airport Passenger Section	Air transport
ALX	Aa Lagar Export & Others (Alx)	Djibouti port
GLN	A,A Kality Gelan Sub-Branch	Djibouti port
EIP	Eastern Industrial Park (Eip)	Djibouti port
NAZ	Nazareth Customs Office	Djibouti port
MOJ	Mojo Dry Port (Moj)	Djibouti port
BLP	Bole Lemy Industrial Park (Blp)	Djibouti port
AWA	Awash Customs Office	Djibouti port
DDA	D,D Airport Customs	Air transport
DDL	D,D La Gare Customs Office	Djibouti port
JIJ	Jijiga Customs Office	Berbera port
TWECH	Togowechale Customs Office	Berbera port
DEW	Dewele Customs Office	Djibouti port
GAL	Galafi (Gal)	Djibouti port
MIL	Mile Customs Check Point Office	Djibouti port
SEM	Semera Dry Port	Djibouti port
COM	Combolcha Customs Office	Djibouti port
MEK	Mekele Customs Office	Port Sudan
MET	Metema Customs Office	Djibouti port
METY	Metema Yohannes Branch	Djibouti port
HUM	Humera (Hum)	Port Sudan
GON	Gonder Customs Office	Djibouti port
BAH	Bahirdar Customs Office	Djibouti port
BHA	Bahirdar Airport Customs	Air transport
GAM	Gambella (Gam)	Djibouti port
HAW	Awassa Erca Branch	Djibouti port
MOY	Moyale Customs Office	Mombasa port

The analysis on where customs declarations are submitted, allows the identification of the following border crossings points, with the countries where goods have passed in transit,

Table 23: Transit Country

Border Crossing point	Transit Country
Buuhoodle	Somalia
Khatumo State	Somalia
Togo Wuchalle	Somalia
Dewele	Djibouti
Galafi	Djibouti
Gallabat	Sudan
Metemma	Sudan
Humera	Eritrea
Qaysān, QēssanKormuk	Sudan
Moyale	Kenya
Doolow	Somalia

Main origins and destinations of Ethiopian trade are shown in the following table. China, Kuwait, Djibouti and South Africa are the main countries of origin, and China, Somalia, United States and Saudi Arabia the main destinations:

Table 24: Main Origin & Destination

Country of origin	2015	2016	2017	Total 3 years Wt (TONs)	Country of destination	2015	2016	2017	Total 3 years Wt, (Tons)
China	1,916,147	2,265,288	2,235,574	6,417,009	China	186,234	296,722	216,237	699,193
Kuwait	1,542,907	2,027,790	2,029,502	5,600,199	Somalia	213,445	197,208	195,482	606,134
Djibouti	767,542	847,977	1,373,287	2,988,806	United States	46,774	53,098	54,407	154,280
South Africa	782,220	800,453	1,126,992	2,709,664	Saudi Arabia	68,711	61,843	60,851	191,405
Saudi Arabia	752,369	798,471	1,128,878	2,679,718	Germany	49,480	46,262	55,181	150,923
United States	520,459	741,129	708,289	1,969,877	Netherlands	48,980	48,126	47,322	144,428
Romania	81,579	1,108,582	569,681	1,759,842	Switzerland	854	896	496	2,246
Morocco	331,674	403,850	973,412	1,708,937	United Arab Emirates	31,448	37,617	72,638	141,703
India	497,643	764,125	444,889	1,706,657	Djibouti	134,455	212,689	250,009	597,153
Turkey	440,035	527,233	489,109	1,456,377	Japan	21,618	25,846	34,382	81,847
UAE	487,045	480,153	397,832	1,365,030	Israel	56,757	56,274	62,168	175,200
Ukraine	510,215	489,638	219,754	1,219,607	Belgium	18,444	18,878	24,454	61,775
Indonesia	356,069	250,226	236,100	842,395	Sudan	84,134	49,658	58,184	191,977
Somalia	289,338	268,071	241,430	798,840	India	71,072	97,018	56,337	224,427
Bahrain	109,204	594,532	79,789	783,525	Italy	12,173	13,855	17,439	43,468
Sudan	136,395	205,299	388,945	730,639	Korea, Republic of	14,524	15,409	13,476	43,409
Russian Federation	152,086	394,380	121,037	667,503	United Kingdom	11,710	13,205	16,450	41,366
Malaysia	110,585	181,824	272,216	564,624	Kenya	108,033	80,289	173,716	362,038
Germany	172,402	199,183	33,969	405,553	Pakistan	67,467	87,635	32,026	187,128
Italy	88,237	124,902	183,317	396,456	Viet Nam	6,656	44,655	79,634	130,945
Bulgaria	189,587	67,190	139,158	395,935	Turkey	27,123	22,022	33,105	82,251
Belgium	91,377	134,779	117,250	343,405	France	10,470	13,344	11,163	34,977
Egypt	70,107	76,849	98,170	245,125	Indonesia	15,314	23,286	28,763	67,363
Singapore	37,581	83,932	82,570	204,083	Yemen	18,637	19,455	26,689	64,781
Korea, Republic of	78,474	67,470	57,284	203,228	Other 138 Countries	141,247	129,185	147,007	417,439
Japan	50,174	69,469	73,373	193,016					
Other 152 Countries	841.302	803.862	1,001,101	2,250,327					
Total	**11,402,752**	**14,776,656**	**14,822,906**	**41,002,314**	**Total**	**1,465,762**	**1,664,477**	**1,767,615**	**4,897,854**

According with the location of customs offices and Border crossings, as shown in Table 37, the main points of entry/exit of Ethiopian imports and exports, are:

Table 25: Main Import/Export Transit Corridors

Point of entry/exit	Total Trade 2015-2017			% Total Trade 2015-2017		
	Net Wt, (Ton)	FOB Value (Mil, ETB)	FOB Value (Mil,USD)	Net Wt, (Ton)	FOB Value (Mil, ETB)	FOB Value (Mil,USD)
Djibouti port	42,835,259	1,039,980	59,445	93,3	77,2	77,2
Port Sudan	1,341,559	45,418	2,596	2,9	3,3	3,3
Berbera port	1,155,101	24,122	1,379	2,5	1,8	1,8
Air transport	355,387	232,385	13,283	0,8	17,2	17,2
Moyale	212,861	4,407	252	0,5	0,5	0,5
	45,900,168	1,346,312	76,955	100	100	100

2.5.4 International trade corridors

As a landlocked country, maintaining high performing trade corridors is critical to Ethiopia's trade competitiveness. Protections provided by such legal instruments as the African Maritime Transport Charter of 2010 are essential in protecting the right to use ports and land corridors in other countries, including multimodal transit systems. In keeping with this Charter Ethiopia has signed Port Utilization Agreements with Djibouti and Sudan. In addition to guaranteeing right of access, these

agreements stipulate operating procedures and sets performance targets. Ethiopian shippers can choose among 4 alternative ports.

Djibouti Corridor

Presently, 95% of Ethiopia's traffic uses the Port of Djibouti. Between 2008 and 2012, Ethiopian traffic doubled to 791,363 TEUs. The Port Authority of Djibouti has currently embarked on port expansion through a series of specialized terminals now planned or under construction. The two countries have also made a major investment in a new, standard gauge railway between the port and Addis Ababa. When the railway is completed in 2016, it will transform the transport and logistics system of the country and further strengthen the mutual dependence of the two countries. The inland terminal will generate a logistics park to handle transfer of goods between the train and road transporters. Later regional rail lines will connect regional centres to Addis Ababa and thereafter to the port. A bilateral customs agreement seeks to reduce time and cost in releasing cargo from the port and in the transit across Djibouti.

Port Sudan Corridor:

The closest port to Northern Ethiopia is Port Sudan. It handles primarily exports such as sesame, which are grown and processed in northern cities, such as Gondar. Goods are transshipped at Gedaref in Sudan and carried by Sudanese trucks to the Port.

Addis Ababa – Nairobi – Mombasa Corridor:

Mombasa is the closest port for Southern Ethiopia. A new container terminal and other construction is underway to add capacity to Mombasa. Once the road construction in Kenya is complete, Ethiopian shippers will readily access the East African Community for trade as well as access to another major port with new terminal coming on line. It will also host Ethiopia's first One Stop Border Post.

Berbera Corridor:

This port is about the same distance as Djibouti, which makes it attractive to some shippers. The road on the Ethiopian side is in reasonable condition. The port is shallow and requires ships use "own gear".

2.5.5 Present logistic system

Ethiopia is putting efforts to increase the quality of its logistic system, implementing the National Logistic Policy & Strategy. In the last years Ethiopia has developed its logistic system, improving the main export/import corridors, building several dry ports, three cold logistic centres and having a fleet of 11 national ships. Presently the share of multimodal transport is 45%, with 52% rate of containerization and 95% use of road transport, but logistic performance of the country is rather low: average ship waiting time is 24 days, logistic costs represent 25% of GDP and the Logistic Performance Index (LPI) is 2.36, putting Ethiopia at the 126th place in the ranking of nations.

Dry Ports

With the recent building of Woreta dry port, Ethiopia can count on 8 working dry ports:

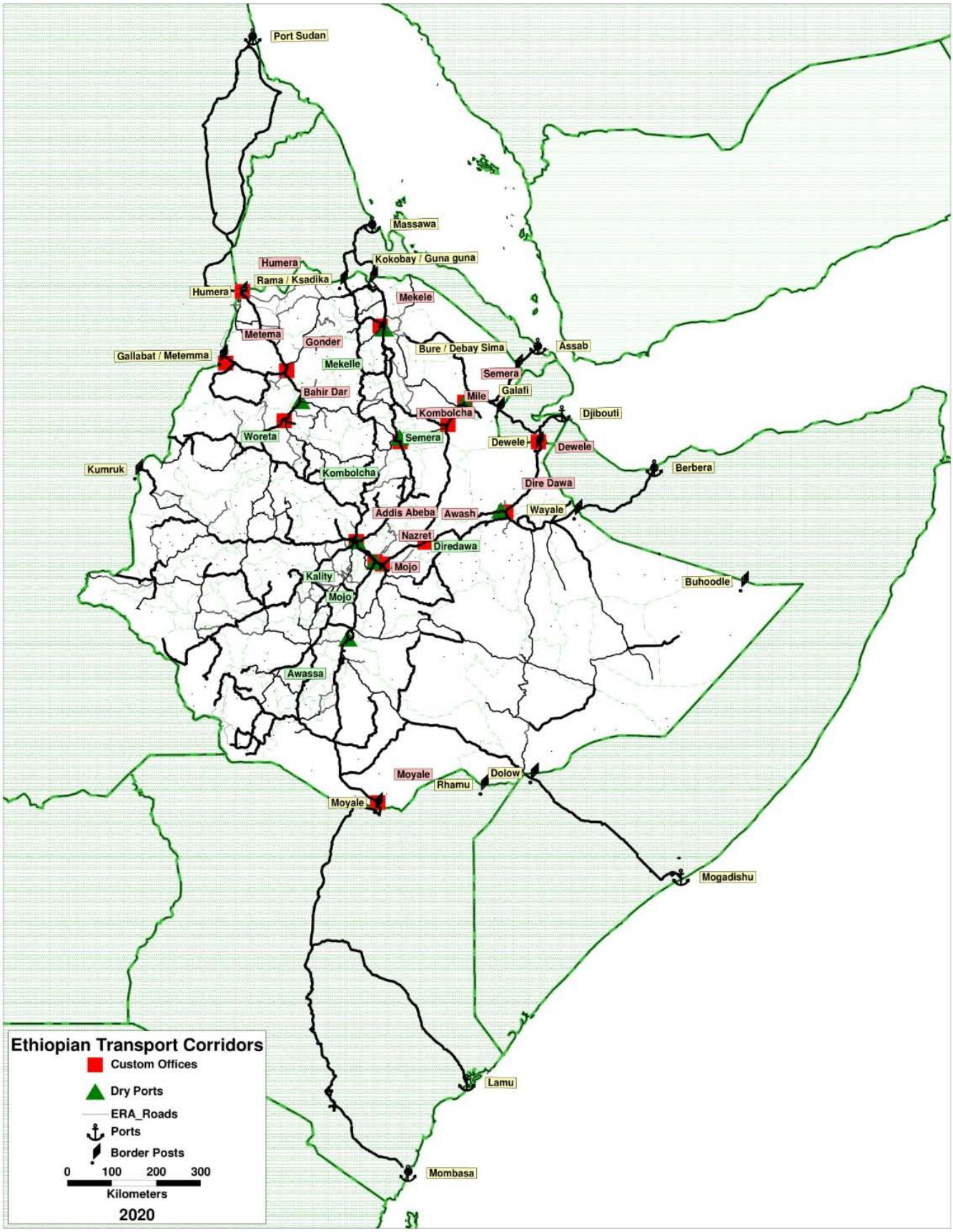
1) **Modjo** – Modjo dry port is the largest operational inland dry ports in the country, established in 2009. The dry port is located in Oromia National Regional State Lome woreda at Modjo town. The port occupies a total area of 150 hectare while 31.7-hectare land area is used for container terminal services. Modjo dry port is located 73 km from the capital and it is connected to the new Ethio – Djibouti Rail way line. As the largest port in the country, Modjo Dry Port handles more than 78 % of the nation's imports and has the capacity to accommodate 17,539 TEU containers at a time and its annual container handling capacity has reached up to 136,038 TEU.
2) **Kality** - Kality dry port was established in 2014. The port is located in Addis Ababa at Kality Sub City. The port occupies a total area of 37 hectare while 3-hectare land area is used for

container terminal services. The port has the capacity to accommodate 1241 TEU containers at a time and its annual container handling capacity has reached over 23,131 TEU.

3) **Gelan** - Gelan RoRo vehicles terminal was established in 2014. The dry port is located in Oromia National Regional State, 25 km from the capital. The port occupies a total area of 23 hectare while 4.5-hectare land area is used for Ro Ro/ Vehicles terminal services.
4) **Semara** - Semara dry port was established in 2010 and is located in Afar National Regional State at Semara city. Semara is located approximately 592 km from Addis Ababa and 270 km from Djibouti, which is the main import and export gate of Ethiopia. The port occupies a total area of 160 hectare while 2.5 hector land area is used for container terminal services. The port has the capacity to handle 1180 TEU containers at a time and its annual container handling capacity has reached up to 2378 TEU.
5) **Dire Dawa** - Dire Dawa dry port was established in 2013 and is located in Dire Dawa city administration. Dire Dawa city is located approximately 550 km from Addis Ababa. The port occupies a total area of 0.78 hectare used for container terminal services. The port has the capacity to accommodate 368 TEU containers at a time and its annual container handling capacity has reached up to 3852 TEU.
6) **Kombolcha** - Kombolcha dry port was established in 2013 and is located in Amhara National Regional State at Kombolcha town, which is approximately 380 km from Addis Ababa. The port occupies a total area of 15 hectare while 4-hectare land area used for container terminal services. The port has the capacity to handle 1888 TEU containers at a time and its annual handling capacity has reached up to 4891 TEU.
7) **Mekelle** - Mekelle dry port was established in 2013 and is located in Tigray National Regional State at Mekelle city, which is approximately 783 km from Addis Ababa. The port occupies a total area of 3 hectare used for container terminal services. The port has the capacity to handle 1440 TEU containers at a time and its annual container handling capacity has reached up to 7789 TEU.
8) **Woreta** - Woreta dry port was established in 2019 and is located in Amhara National Regional State at Woreta town, which is approximately 620 km from Addis Ababa. The port occupies a total area of 20 hectare while 3-hectare land area is used for container terminal services. The port has the capacity to handle 900 TEU containers at a time.

In the following figure the Ethiopia import/export corridors, dry ports and borders are shown:

Figure 55: Ethiopia import/export corridors



2.5.6 Ethiopian Shipping & Logistic Services Enterprise (ESLSE)

ESLSE is a fully state-owned enterprise--established by the Council of Ministers Regulation No 255/2011-- to provide end-to-end logistics services including costal and maritime transport services, freight forwarding, multimodal transport, warehousing and container terminal services. ESLSE was created through a merger of four defunct public enterprises, namely, Ethiopian Shipping Line (ESL) S.C, Ethiopian Maritime and Transit Services Enterprise (MMT), Ethiopian Dry Port Services Enterprise and Comet Transport S.C. The Enterprise is supervised by the PEHAA and has a board of directors comprised of eight senior officials from various ministries.

For nearly all goods that are shipped into Ethiopia, ESLSE has either organized logistics or has physically performed the transportation. The dominance of ESLSE in handling Ethiopian import trade is a function of regulatory choice. Under the so-called FOB Directive, the government requires all importers to use the ESLSE Bill of Lading, ensuring nearly all imported cargo to be booked through ESLSE. However, a waiver could be provided under exceptional circumstances to allow shippers to book on outside the ESLSE Bill of Lading. Currently the FOB Directive requires the use of ESLSE Bill of Lading on containerized import and roll on-roll off cargo (RoRo) up to 3000 tons.

The majority of ESLSE cargo (about 60 percent) is loaded on slot carriers while the remaining 40 percent is on own vessel. With a service feature that is heavily reliant on slot carriers such as MAERSK and CMA-CGM, the organization of ESLSE's shipping services appear to be more like a Non-Vessel Operating Common Carrier (NVOCC). ESLSE's involvement with respect to bulk cargo shipment like fertilizer, grain, sugar, coal and fuel is limited. The purchase is mostly transacted on cost and freight (C&F) basis and shipping is arranged by the sellers.

With more than five decades (since the 1950s as ESL) of dedicated maritime and logistics transport services, ESLSE is the most important logistics service provider in Ethiopia with regard to capital, physical facilities and equipment in Ethiopia. ESLSE has organized itself in four different departments: shipping service Sector, freight forwarding sector, port and terminal sector and corporate service sector with their own responsibilities. There are about 18 sub -departments and 7 branches under the 4 departments. ESLSE currently has about 3,134 employees. The enterprise envisages being a reputable and preferred logistics company in Africa in 2020 by providing competitive shipping and logistics services in the export and import trade.

Services Provided by ESLSE are:

- **Shipping Service Sector**. Sea transport services deploying own eleven vessels, nine of which are dry cargo ships with a total carrying capacity of about 400,000 tons at a time (that is, an average of 300 containers by each vessel), and the other two are oil tankers, each capable of transporting 42,000 metric tons of oil. Nine of these vessels are newly built. ESLSE also provides stevedoring, shore handling, and agency services at the Port of Djibouti.
- **Freight Forwarding Sector:** Multimodal and uni-modal transport, customs and port clearing, and trucking service with a total of 265 fleets. The fleet size is planned to grow to 480 trucks soon. Apart from operating its trucks, ESLSE leases the necessary trucks for direct or consolidated cargo delivery from private and public transport operators.
- **Port and Terminal Sector**: Receiving and delivering cargoes, cargo loading and unloading, stuffing and unstuffing of container goods, temporary storage for import and export cargo, container cleaning and maintaining, and weight bridge services.
- **Corporate Service Sector**: The Corporate Services Department combines various supporting functions such as Finance, human resource management, Procurement, Marketing and ICT.

ESLSE IMPORT/EXPORT CARGO

According to ESLSE Bulletin 2019, following is the import activity carried out by ESLSE in years 2011 – 2019 (EFY 2004-2012):

Table 26: Total Import cargo and ESLSE share

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total import	**6,264,168**	**5,066,832**	**5,391,234**	**10,444,594**	**14,643,341**	**12,307,133**	**12,665,579**	**12,272,904**	**16,052,400**
Import by ESLSE	4,929,119	4,394,336	4,412,338	3,690,335	4,966,265	4,538,722	4,065,569	4,338,437	6,698,200
ESLSE Share %	79	87	82	35	34	37	32	35	42

Source ERCA and ESLSE

The cargo imported by the enterprise from 2011 to 2019 shows an average of 6.7 million tons per year while the share passes from 79% in 2011 to 42% in 2019.

Ethiopian's main import goods include petroleum products, vehicles, spare parts, construction equipment, medical pharmaceutical products, industrial equipment and machinery, both agricultural and industrial chemicals, agricultural machinery, hybrid seed, fertilizers, irrigation equipment, and durable and non-durability consumer goods.

Table 27: Cargo type of ESLSE Imported Tonnes

Cargo Type	2011	2012	2013	2014	2015	2016	2017	2018	2019
Break bulk	449,206	347,129	295,259	576,675	441,792	485,272	273,045	328,664	373,287
Steel in tons	626,303	490,942	553,971	374,509	814,141	317,635	246,000	649,758	694,641
Vehicles	75,409	102,412	96,021	91,047	82,443	84,568	58,252	22,337	25,654
Container	2,113,849	2,078,615	1,821,801	2,297,856	2,855,300	2,899,445	2,347,290	2,564,904	2,436,393
Bulk Cargo	1,664,352	1,375,238	1,645,287	350,247	772,589	751,802	1,140,892	772,774	3,159,206
	4,929,119	**4,394,336**	**4,412,339**	**3,690,334**	**4,966,265**	**4,538,722**	**4,065,479**	**4,338,437**	**6,689,181**

Table 28: Cargoes type of ESLSE share

Cargo Type	Average 2011 - 2019
Break bulk	8,5%
Steel in tons	10,8%
Vehicles	1,5%
Container	**51,0%**
Bulk Cargo	27,7%

About 51% percent of the total imported cargoes handled by ESLSE during the last eight years is containerized cargo, 28 % Bulk Cargo, 8.5% Break Bulk, and 10,8 % steel while vehicles account only 1,5 % which shows that containerized cargo had a bigger share of the imported cargoes followed by break bulk, steel and vehicles,

Regarding export trade, the volume of ESLSE export has decreased from 49,200 tons and a share of 4% with respect the total volumes exported in the year 2011 (1.2 Mil. of tons), to 33,860 tons and a share of 2% in the year 2019 (1.7 Mil. of tons).

Table 29: Exported Cargo at country level & ESLSE share (Tons)

Years	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total export	**1,205,502**	**2,285,934**	**1,227,796**	**1,498,206**	**1,608,902**	**1,673,827**	**1,796,967**	**1,658,400**	**1,693,100**
Exported by ESLSE	49,200	108,200	135,100	1,070,600	73,400	23,600	1097,00	15,200	33,860
ESLSE Share %	0.04	0.05	0.11	0.71	0.05	0.014	0.06	0.01	0.02

Source ERCA and ESLSE

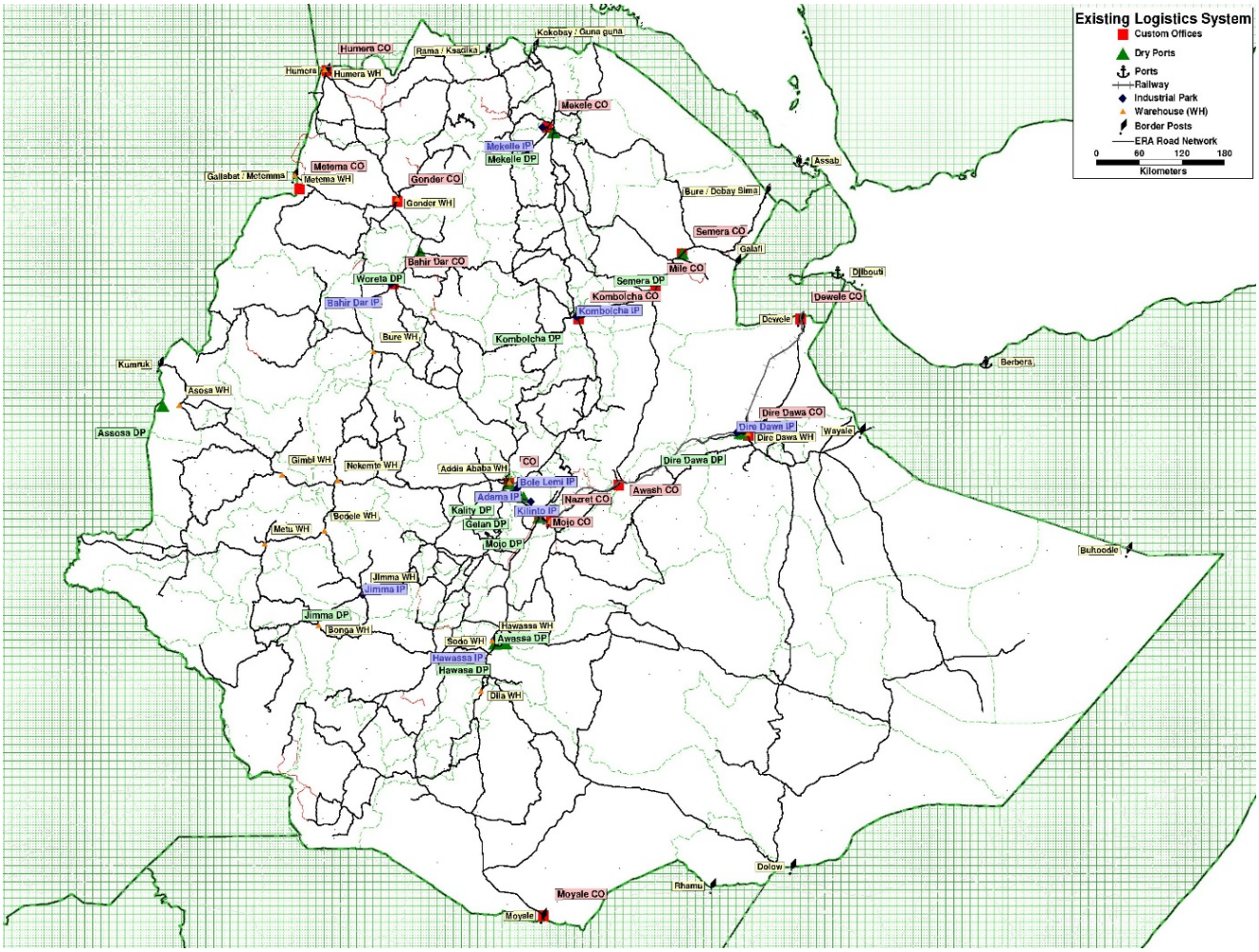
The main exported products consist of: Coffee, Flowers, Food, Textiles Material, Leather products and Live animals, Seed and Cement.

With respect to dry-port services, ESLSE manages 8 dry-ports located in different parts of the country, which are Modjo, Gelan, Mekelle, Kombolcha, Semera, Diredawa, Kality and Woreta dry Ports, with the following area and capacity.

Table 30: Dry Port Terminal Area and Carrying Capacity

Dry port	Year 2019	
	Area in hectares	Terminal Capacity (TEU)
Modjo	31.5	20,227
Gelan	4.5	1,697
Mekelle	3.5	1,440
Kombolcha	4	1,888
Semera	2.5	1,180
Diredawa	0.78	368
Kality/Comet	1.97	1,241
Woreta	3	900

Figure 56: Border posts, Custom offices & Dry ports



2.6 AVIATION SYSTEM

2.6.1 Aviation administration, regulation and safety

The Constitution of the Federal Democratic Republic of Ethiopia provides exclusive power to the Federal government pertaining the development, administration, and regulation of aviation sector. Under the Federal government, the Ministry of Transport (MoT) is responsible for formulating policies and initiating laws that govern the sector while the Ethiopian Civil Aviation Authority is responsible for administration and regulation of the sector. Ethiopian Aircraft Accident Investigation Bureau (EAAIB) is responsible for investigating aircraft accidents. Ethiopian Airlines Group (EAG) is responsible for both developing airports and providing air transport services.

Based on the power it gets from the Constitution, the Federal Government has enacted laws for the administration and regulation of the sector as well as established Ethiopian Civil Aviation Authority, Ethiopian Airlines Group, and Ethiopian Aircraft Accident Investigation Bureau, which are the main actors in the sector. MoT, as the Federal Government executive organ, has been given the power and duty to provide policy and legal framework for the sector as well as to oversight and supervise ECAA and EAAIB.

ECAA, which was re-established by Proclamation No. 616/2008 (as Amended), is responsible for regulating and administrating the aviation sector safety through safety oversight of air transport operators, airport operators, air navigation service provider and operators of sector. It is also responsible for issuing licenses, certificates, permits, approvals required by laws.

The Ethiopian Aircraft Accident Investigation Bureau (EAAIB) had been a department under the ECAA before being reorganized under the Ministry of Transport as per Ethiopian Aircraft Accident and Incident Investigation Proclamation No. 957/2016. The EAAIB has been established under the Ministry of Transport because the protocol of ICAO requires a country's aircraft accident investigation unit to be organized independently of the country's civil aviation authority. The Proclamation provides procedures of investigations and respective powers and duties of the Head of the EAAIB and MoT pertaining to aircraft accident investigations. Prior to the establishment of EAAIB, aircraft accidents and serious incidents had been investigating by a department organized under ECAA. One of the objectives of the Proclamation 957 is to implement the principle of independence and neutrality given by international safety standards and, accordingly, the task of the new body is “to conduct independent and impartial investigation on aircraft accident and serious incident occurrences".

Ethiopian Airlines Group (EAG), which was established by Council of Ministers’ Regulation No. 406/2017, is responsible for both development and management of airports and providing commercial air transport services. EAG was established by merging Ethiopian Airlines Enterprise (which was responsible for providing air transport services) and Ethiopian Airport Enterprise (which was responsible for development, administration, operating of Ethiopian Airports). Following the merger, EAG has become a sole public enterprise operated as both commercial air transport service and airport service provider, reinforcing its (de facto) monopolistic role in the aviation sector and enhancing its competitive positioning on international commercial services not only in the African continent but also worldwide. It is worth noting that this model of integrating both the air transport service provider and the aviation infrastructure manager organizations creating a monopolist is not the common model across international markets.

Ministry of Finance, through PEHAA, is the supervisory of EAG. It is also responsible to allocate budget for air navigation infrastructure development and for regulatory functions carried out by ECAA.

According with the Investment laws recently repealed, air transport services with a seating capacity more than fifty passengers used to be reserved to Government's investments or Joint Governments' Investment. As a result, EAG was in a monopolistic position in providing international air transport services, while domestic air services were opened limitedly to domestic investors.

However, the new Investment Proclamation No. 1180/2020 along with its new Regulation No. 474-

2020 has fully liberalized the domestic scheduled and non-scheduled air transport services for Ethiopian nationals and has lifted the seat capacity limitation of aircraft operated by private airlines. The new regulation also allows foreign investors to own up to 49% shares on private companies that operate domestic air transport services. Private investors, both national and foreign, can also invest jointly with the government to provide international air transport services.

The regulation of both the aviation infrastructure and services is under the responsibility of the Federal Government through the Ethiopian Civil Aviation Authority. ECAA powers and duties are extended to include regulating and licensing aviation personnel. ECAA is also delegated by the Investment Proclamation No. 1180/2020 to issue and renewal of air transport investment permits. Providing air traffic, navigation, aeronautical communication and information services is also a responsibility of ECAA.

Moreover, ECAA is also responsible for licensing and regulating operators of air service and general aviation services, determining the conditions under which passengers, goods and mail may be transported by air, prescribing air traffic rules and standards governing the flight of aircraft, ensuring air transport services are safe, expeditious and adequate, registering civil aircraft and any right relating thereto, issuing airworthiness certificates, specifying the type of service to which the aircraft is to be used; prescribing conditions for maintenance and repair of the aircraft.

In addition, Ethiopia is one of the first 52 signatory countries of the ICAO Chicago Convention in 1944. The Ethiopian Civil Aviation Authority has developed the Ethiopian Civil Aviation Authority Rules And Standards (ECARAS) based on ICAO principles.

MoT is also responsible for promoting safety and security standards of the aviation sector as well as monitoring the performance of ECAA. It is the case of the recent Proclamation 1179/2020 amending the aviation Proclamation No. 616/2008 in order to set the alignment of the national aviation safety system to the dynamic of the aviation industry and to the ICAO safety standards.

Financing the aviation infrastructure in Ethiopia is a responsibility of federal government through budget allocation. All airport infrastructure developments and air navigation services have been funded by the government, either from government treasury or external loans. All airlines are charged for the use of the national aviation infrastructure, fees are paid by users of the airports and the air navigation services. Analysis of the EAG annual report 2017-18 (English version) shows low revenue levels for the airport unit, therefore it is likely that fees are far below to cover the costs of developing and maintaining the infrastructures.

Differently, the aviation services are fully financed by the revenue generated from provision of the services. The main service provider, EAG is a 100% self-financed public enterprise. As stated above, financing aviation infrastructure is a government responsibility. However, following the acquiring of the Ethiopian Airport Enterprise by Ethiopian Airlines Enterprise, there is no clarity whether the government will continue to finance the development of airports or EAG will cover such costs by itself, as it does for the services. Some may suggest both government and EAG may jointly cover the finance needed for development of new airports or PPP may be used for future developments of airports.

So far, regional governments have not been authorized/delegated to build and operate Airports. The Somali Regional Government built and inaugurate in 2016 the Kebri Dahar airport by its own budget. However, the regional government has later transferred it to Ethiopian Airport Enterprise to be managed and administered by the latter.

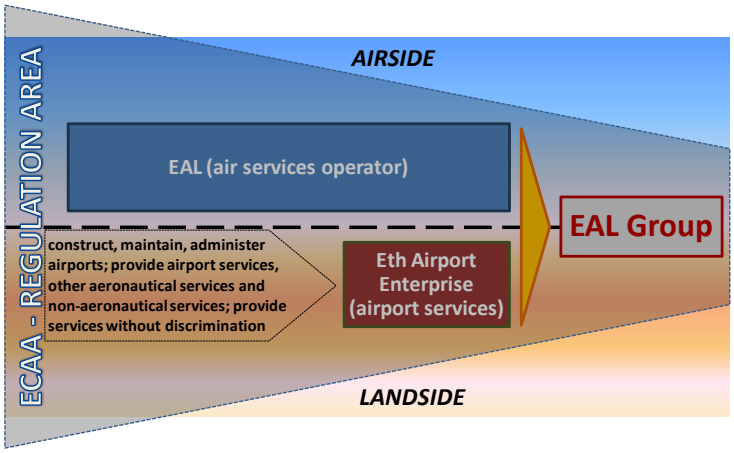
Ethiopia has no specific domestic law pertaining to govern/regulate safe transport of dangerous goods by air. Rather, it chooses to fully apply “Annex 18 of the Convention and the International Civil Aviation Organization Technical Instructions for the Safe Transport of Dangerous Goods by Air” and Article 36 of the Civil Aviation Proclamation No. 616/2008 (as Amended) authorizes the Civil Aviation Authority to monitor and enforce the provisions of the aforementioned Annex in Ethiopia.

Besides, the Proclamation provides powers and duties to ECAA to take measures to minimize “any

disturbance to the public and any adverse effect on the environment from noise, vibration, atmospheric pollution or any other cause attributable to the use of aircraft for the purpose of civil aviation."

The evolution of the Ethiopian aviation sector is for sure a success story, nevertheless, in this phase of planning the future path of the sector some elements that contributed to the success could act as hampers of further growth of the sector itself. The figure below describes the evolution of the commercial side of the aviation sector.

Figure 11: Evolution of EAL Group's scope of services



As stated above the widening of the scope of Ethiopian Airlines was part of the development strategy of the company. This strategy can be perceived as the pursuance of a development trajectory undertaken by the company over time and the further integration as a reaction to the competitive environment of the sector.

In fact, the development of the company began with a long-term partnership with the American company TWA (until 1975), followed by an autonomous growth path that led to the entry into Star Alliance network in 2011. Currently the company is one of the more dynamic provider of transport services, both for passengers and cargo, and, moreover, for maintenance services to other companies.

According to this point of view, two main issues seem to lead the integration between the provision of air services and airports management: i) the need to ensure adequate quality for passengers (directly managing the land side of the travel experience of customers) and ii) the need to increase efficiency and management flexibility of airports (overcoming the operational and administrative constraints that affects several companies, both public and private, like - for instance - the currency regulations).

In terms of fares, the air transport service is almost totally liberalized and market driven, although market access was blocked until the new investment regulation was approved. The only legal obligation that the air transport service providers have is to set effective tariffs covering the costs of providing service. This tariff shall be communicated with and registered by the ECAA before the service provider commences its service. The Authority may suspend only if it finds that the tariff is unfair, discriminatory or otherwise adverse to the public interest; there is no information found whether the Authority has suspended any operator's tariff so far. On the other hand, domestic fares reserved to Ethiopian citizens, lower that standard tariffs, are issued by EAG without any legal obligations but only as a result of a moral suasion by the public authorities. Pricing is discussed further in paragraph 2.6.6, however the current system for domestic scheduled flights offered by EAG seems to reflect the monopolistic position enjoyed by the aviation group. Current fares seem to be based on the residency of the traveller without applying more modern techniques currently in use by many international airlines. This situation may change either when effective competition will start, or via the introduction of a regulation on the rights of passengers.

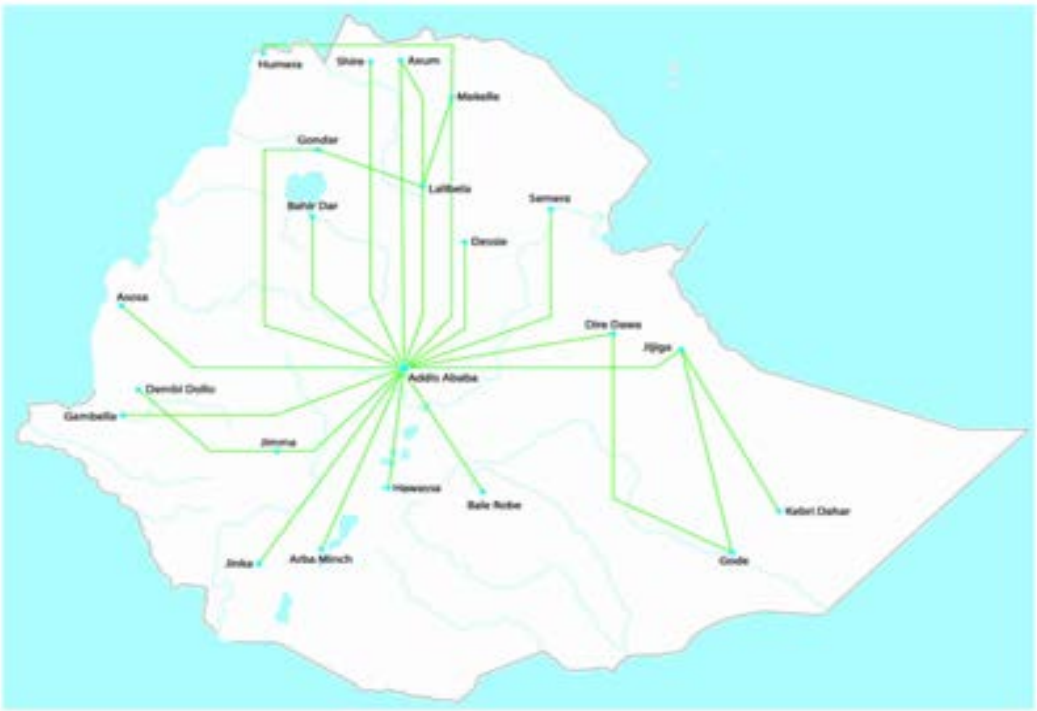
In terms of airlines services, with about 12 million of carried passengers, the international part of the traffic is about 83% while domestic is at 17%. The low development of domestic services is mainly due to the early stage of this kind of mobility which, in turns, has two explanation factors: the low level of per capita revenue and a lack of cultural habits in using air services to move across the country. Within this landscape the economic viability of domestic routes is rather variable but, beyond legal obligations, the role of sole (real) service provider in the country makes the company under the moral obligation to operate services on the domestic network so that, when a new airport is opened, the connection must be assured although the traffic flows / tariffs levels do not assure an economic equilibrium of the route.

The approval of the new investment regulation changes the rules of market access and depicts a new scenario which allows private operators to enter the market of domestic services. Under this perspective, the control on airports development (and management) set the company in a pivotal role to plan timeline and direction of the investments and, moreover, to protect its profit from an high growth of not profitable routes.

2.6.2 Offer Infrastructure

Ethiopia aviation infrastructure at mid of year 2020 is represented by a network of 23 airports used for passenger and cargo air transportation services. Scheduled passenger services are currently operated by Ethiopian Airlines only. These airports cover most of the urbanized territory of Ethiopia as illustrated in the following figure. In addition to civil airports, there are five military air bases in different locations which are close to civil air traffic airports, the primary military base is at Harar Meda Airport, in Debre Zeyit. Four additional smaller bases used by the air force are located in: Bahir Dar Airport, Aba Tenna Dejazmach Yilma, International Airport in Dire Dawa, Gode Airport, Alula Aba Nega Airport in Mekele. For the purposes of this work military air bases will not be considered. However, the fact that most of them are in locations where there are civil traffic airports may mean that in those airports the general infrastructure and navigation technology is better than in other airports.

Figure 57: Domestic Scheduled Services



Source: Ethiopian Airlines website

Addis Ababa Bole International Airport is the heart of aviation in Ethiopia, and possibly in the most important hub Africa. This also given the leading role played by Ethiopian Airlines (EAL) in the African continent and at intercontinental level with connections to over 62 cities and more than 127 international passenger and cargo destinations at global level14. The second airport with international status is Dire Dawa. From this airport it is possible to fly to Djibouti and to Mogadishu in Somalia. The Ministry of Transport (MOT) intention is to grow to four international airports. Some would be already able to take international traffic, although demand seems to be low at the moment, according to information provided by Ethiopian Civil Airport Authority (ECAA).

For domestic passenger air transportation services, EAL website15 shows a list of 23 served airports: Addis Ababa, Arba Minch, Assosa, Axum, Bahar Dar, Bale Robe, Dembidollo, Dire Dawa, Gambella, Gonder, Gode, Hawassa, Humera, Jijiga, Jimma, Jinka, Kabri Dar, Kombolcha, Lalibela, Mekelle, Semera, Shire, and Shilavo. For each airport a synthetic information is provided in Annex. The domestic network served by Ethiopian Airlines is illustrated in the previous image.

The Airport Classification Scheme issued by the Ethiopian Civil Aviation Authority at the end of 2018 also identifies 22 airports for domestic services, the difference with the list of 23 airports provided on EAL's website is the Shilavo airport.

The ECAA document shows that Addis Ababa International Bole Airport counts for 83% of passenger share and for 54,6% of aircraft movements. The second most important airport in Ethiopia is Mekelle which counts for 3,4% of passenger share and for some 21% of aircraft movements. All other airports have smaller shares of passengers and aircrafts movements.

As it has emerged during the interviews, the Ministry of Transport is aiming at significantly improving the domestic air transportation sector. The current level of service is, in fact, considered unsatisfactory for what the current needs of the country are perceived to be. This As it has emerged during the interviews, the Ministry of Transport is aiming at significantly improving the domestic air transportation sector. The current level of service is, in fact, considered unsatisfactory for what the current needs of the country are perceived to be. This situation can be considered a result of EAL focusing mainly on international growth while maintaining a strong monopoly position on the internal market. Such combination has prevented the development of private operators who, given the existing regulation, have experienced a number of difficulties in expanding their business in passenger air transportation. MOT intends to achieve better level of aviation services on the domestic market, and in order to achieve such result is open to invite foreign companies to Ethiopia in ways that will have to be defined in detail in the future.

As stated during the interviews, the two levels of interest from the MOT point of view are the domestic aviation services and also the regional services to neighboring countries with which Ethiopia has intense relationships that would justify the launch of air services to create stable daily connections. Such countries are Sudan, Somalia, Djibouti, and Eritrea. The private sector, especially the domestic operators, has expressed interest in growing and being allowed to offer services on a larger scale. However, the main limitation for such operators is that they are mostly small organizations with minimal fleet of aircrafts. This dimensional characteristic is partly due to the previous aviation regulation. Up to early 2020, in fact, the investment regulation of Ethiopia was limiting the seating capacity of privately owned aircrafts to 50 seats, and previously such limit was even smaller: 20 seats. Therefore, in the past, investments in passenger air transport for aircraft with more than 50 seats was among the areas reserved to the Government. A new

[14] Ethiopian Airlines, Ethiopian Factsheet, June 2020

[15] Ethiopian Airlines https://www.ethiopianairlines.com/aa/book/network/domestic

Investment Proclamation of April 2020, which was published on the Negarit Gazette at beginning of September 2020 as regulation N. 474/2020, has changed such situation and has lifted limitations allowing foreign investors to enter passenger air transport in joint venture with Ethiopian investors and operators. At the same time the limitation of the number of seats per aircraft has been lifted. In the new regulation framework, it will be possible to operate larger aircraft also for private operators, and potentially such organizations may grow in size to offer domestic services. This is significant change that lays the basis for liberalization in air passenger transportation in Ethiopian domestic market.

As it has emerged in the interview with Director General of ECAA, this is a very important step in creating the conditions to make the domestic air sector grow faster in the future. At the same time ECAA is investing to improve the status of smaller airports. In the next years the objective is to increase the number of control towers in provincial airports. And in the next ten years at least six towers will be built at domestic airports.

During interviews also was confirmed the program mentioned in the 10 years plan to increase the number of national airports from 20 to 25. At different sites, there is on-going work in place to improve all the internal airports. As mentioned above, Ethiopia has a network of 23 airports that serve over 100 destinations worldwide. The aim is to make the aviation system stronger and more competitive with other transport modes on the domestic market. This while consolidating the international role of Addis Ababa airport. At the same time, there is an effort in place to adopt all the ICAO principles both at institutional level and for what relates to the capacity of the workers.

All interviews within aviation and tourism industries confirmed that currently Ethiopians do not travel a lot within the country, therefore there is need to create a culture of travelling for leisure purposes at least for the emerging middle class. For domestic travel demand to start growing, some conditions have to be created with public policies from the Government. And aviation should be considered as a key transport mode also for such development. As well as for the consolidation of international tourism within the country which is rich in heritage and natural attractions that can be of strong interest for the international tourist demand.

Interviews have confirmed the plan to increase the airport number by the creation of 3 to 5 new ones in the next five years. At the same time existing airports will be improved thanks to the combined effort of EAL Group and ECAA. Improvements relate to runways, new passenger terminals, control towers and navigation equipment needed to enhance the general standards of such airports. A significant improvement has been the completion in the first half of 2020 of a new passenger terminal, already in operation at Addis Ababa Bole International Airport. While local institutions work on improving the existing domestic network, a plan to develop a new state of the art international airport in Addis Ababa, in addition to the existing Bole International, has been launched by EAG.

It has emerged from interviews a shared the opinion among stakeholders that a new airport is needed for different reasons. The existing Bole airport is considered already congested with current traffic which is mostly made of transit passengers who need space and services within terminals. Altitude is also considered a limitation for the current airport since it impacts the aircraft operations, lack of land for further expansion is an additional issue, etc. According to information provided by Ethiopian Airlines Group managers in direct interviews, the new airport will be located at some 40 km away from Addis Ababa. It will be built on larger land surface and will be able to accommodate the future needs of the EAL's traffic that is growing significantly. EAG aims at developing Addis Ababa as the main hub in African aviation with its extensive network of international destinations. Open sources[16] report that in August 2018 the Group CEO of the Ethiopian Airlines announced that the site selected for the new airport will be Abusera in Bishoftu, also know a Debre Zeit, 50 kilometers from Addis Ababa in the Oromia regional state.

[16] Article https://www.privacyshield.gov/article?id=Ethiopia-Aviation

Currently the Government seems to be in favor of the project for the development of a new international airport in addition to Bole International. Environmental studies and linked program have been launched already and the aim is to start the construction phase as soon as possible. From open sources we have found confirmation about the on-going plans for both the existing Addis Ababa airport. In fact, the French group Aeroport de Paris International (ADPI), through its subsidiary ADP Ingénierie, has been involved in two key projects in Ethiopia for Addis Ababa airports: consultancy and project contracting assistance services for the extending of the existing Addis Ababa Bole International Airport. According to ADP Ingénierie website, the company has been involved in supervising airport construction sites and in reviewing airport passenger terminal development which has extended the capacity to some 22 million passengers per year. The expansion is expected to increase tourist flows, facilitate the transport of passengers and goods through Addis Ababa while significantly increasing the current passenger capacity of the Addis Ababa Bole International Airport. The design was provided by the Singapore Changi Airport company and construction was awarded to China Communication Construction Company. The second important project of ADP is conducting a feasibility study for to identify the most suitable site for the new international airport of Addis Ababa, a mega hub located in the Oromia regional state able to absorb 120 million passenger per year.

The airport improvements will have a positive impact on international tourism flows to Ethiopia. Starting with the Addis Ababa Bole Airport Terminal expansion project now fully completed, the capital airport is increasingly becoming a hub for travel between the world and the rest of Africa, be it for business or leisure. The three largest sources of tourists visiting Ethiopia are the United States, United Kingdom, and China. There is a strong interest in strengthening the relationship between Ethiopia and China, and to make Addis Ababa the hub for Chinese travelers to Africa. EAL, in fact, already offers direct flights to Beijing, Shanghai and Guangzhou, the hub of the manufacturing-rich Pearl River Delta with a large population of African immigrant. To achieve such objective not only the Bole International Airport passengers' terminal expansion is a crucial project, but also the creation by EAL of a five-star hotel located very close to the airport and able to offer international standard accommodation to transit travellers who spend an overnight stay in Addis Ababa. The number of Chinese tourists travelling to Africa is growing, and Ethiopia recorded 190 million U.S. dollars in revenues from over 50 K Chinese tourists that visited the country in 2018. China is now positioned as the third largest source of tourists visiting Ethiopia after the United States and Britain. The intense business relationships with China, and its investments in Ethiopia, help explain this, and are forecasted to intensify in the future.

The existing Addis Ababa international airport and the new one which will be built in the near future seem to be crucial infrastructures for the strategy of international expansion of Ethiopian Airlines but also to be used as gateways to attract international travelers to Ethiopia in order to increase the total tourism flows and highly needed valuable foreign currency.

The challenge will be on the domestic side where it will be critical to deploy a timely implementation of the many investments planned. A network of better domestic airports will allow to spread the benefits of international tourism across Ethiopia to provincial areas that need more tourism to help local economy. Further tourism infrastructure will be needed as well with the ability to attract foreign direct investments to help accelerate such development.

The following table summarizes some of the key features of the main airports used by EAL for domestic traffic.

Table 31: synthesis of Ethiopian airports served by Ethiopian Airlines

	Airport name	IATA Code	Federal Region	Runway Length (m)	Surface	Air traffic control	Operated by	Dist (km) from AA
1	Addis Ababa International Bole	ADD		3700 (runway 1) and 3800 (runway 2)	Asphalt Concrete	Yes - Control tower	EAL Group	-
2	Arba Mich	AMH	SNNP	2500	Asphalt	Yes	EAL Group Airport BU	346
3	Assosa	ASO	Benishangul - Gumuz	2500	Asphalt Concrete	No	EAL Group Airport BU	480
4	Axum	AXU	Tigray	2400	Asphalt	Yes	EAL Group Airport BU	571
5	Bahir Dar Ginbot	BJR	Amhara	3000	Asphalt		EAL Group Airport BU	331
6	Dembidollo	DEM	Oromya				EAL Group Airport BU	431
7	Dire Dawa	DIR	Dire Dawa	2700	Asphalt Concrete	Yes - Control tower	EAL Group Airport BU	345
8	Gambella	GMB	Gambella	2520	Cement concrete	Yes	EAL Group Airport BU	474
9	Gode	GDE	Somali	2300	Asphalt Concrete	No	EAL Group Airport BU	633
10	Gondar	GDQ	Amhara	2780	Asphalt	No	EAL Group Airport BU	421
11	Hawasa	AWA	SNNP	2400	n/a	No	EAL Group Airport BU	
12	Humera	HUE		3000	Asphalt Concrete	No	EAL Group Airport BU	
13	Jijiga	JIJ	Somali	2500	Asphalt	No	EAL Group Airport BU	438
14	Jimma Aba Jifar	JIM	Oromya	3000	Asphalt Concrete	Yes	EAL Group Airport BU	260
15	Jinka	BCO	SNNP	2625	Asphalt	No	EAL Group Airport BU	433
16	Kabri Dehar	ABK	Somali		Concrete		EAL Group Airport BU	651
17	Kombolcha	DSE	Amhara	2000	Asphalt	Under construction	EAL Group Airport BU	
18	Lalibela	LLI	Amhara	2400	Asphalt	Yes	EAL Group Airport BU	339
19	Mekele	MQX	Tigray	3700	Asphalt Concrete	Yes – Control tower	EAL Group Airport BU	505
20	Robe Goba	GOB	Oromya	2350	Compacted volcanic ash	No	EAL Group Airport BU	
21	Semera	SZE	Afar	2400	Asphalt	No	EAL Group Airport BU	
22	Shilabo	HIL	Somali				EAL Group Airport BU	732
23	Shire	SHC	Tigray	2400	Volcanic red ash	No	EAL Group Airport BU	571

Source: World Food Program, Logistic Capacity Assessment Ethiopia, Version 18, 25 Apr. 2019; IATA website.

2.6.3 Offer Fleet (Aircraft)

The private airlines in Ethiopia are listed in the following table. From open sources it has been possible to identify 10 airlines in total: Ethiopian Airlines (EAL) and 9 private airlines operate passenger air transport services in the domestic market. The private air operators have started operation since the late 90s, and none of these are operated on the base of scheduled services, with the exception of National Airways that, according to its website, has a calendar of weekly departures. On the contrary, Ethiopian airlines is the monopolist government owned airline that operates the scheduled domestic services for air passenger and cargo transport. Currently, Ethiopian airlines operate scheduled flight services to 23 domestic airports. According to open published data, for domestic air services, EAL uses the Bombardier Q-40017.

Flights to international destinations have been halted during lockdown due to the Covid-19 pandemic in the first half of 2020. EAL is slowly reopening international flights in accordance with decisions taken by foreign governments aimed at lifting lockdown measures in their own countries when the pandemic shows signs of slowing down.

Ethiopian Airlines is the only airline in the country with a large fleet of aircrafts, as illustrated in the following table. According to the Fact Sheet document published by the airline in June 2020, the total number of aircrafts is 124. Of these: four passenger aircrafts (Boeing 737 Max) are currently grounded; 26 are dedicated to domestic passenger traffic; 12 are for air cargo services. In addition, 46 new aircrafts in total are on order for passenger services. No information is available on any new aircrafts on order for cargo services. One B777 cargo airplane caught fire on 22 July 2020 while in China at Shanghai Pudong airport.

Within Ethiopia a number of private operators is active in passenger air transport as well in addition

[17] Ethiopian Airlines, Fact Sheet, June 2020.

to EAL. The number of private operators is limited and those who provide air transport services tend to operate without a schedule, often in the humanitarian and private tourism/charter sector. Such air operators usually fly small planes and operate in limited areas of the country. This situation is also the effect of previous regulation18 that left to private operators the possibility of flying aircraft with a maximum of 50 seats. As mentioned above, a new Investment Proclamation published in September 2020 is changing the old scenario allowing more space for private initiative in the domestic passenger air transport, and also lifting the seat limitation for privately operated aircraft. Such new scenario has been confirmed by interviews with Director General of ECAA, and by mail exchanges with Ministry of Transport officials. Up to early 2020 flying aircraft with a seating capacity of more than fifty passengers was reserved to the Government or to Ethiopian Airlines. The new investment proclamation and relative regulation represent a significant change of perspective in the approach to planning for future development of Ethiopia in general, and for aviation in particular. Opening the possibility to invest also to foreign investors is a wise approach in order to attract solid operators to the market and speed up development for the future of domestic air transport. However, even if new legislation is going to change the situation, it is difficult to imagine that existing local private operators will transform themselves into national airlines in the short term. Currently the size of aircraft operated by private air companies is small, not more than 40 seats on average. For any of such organization to invest in larger aircraft a transformation is needed together with access to financial resources for investments in larger airplanes. The size of each private operator fleet is currently not comparable to that of EAL.

The list of private operators identified via internet is presented in the following table.

For a number of airlines there were no news available on open sources. It is assumed they are not operating any longer: Transaharan Airlines, Teddy Air Transport, Suhura Airways, RRC Air Services, Oromia Airways.

Table 32: Airlines operating in Ethiopia

Airline	Service Type	Aircraft	Fleet		Difference
			June 2020	May 2020	
ETHIOPIAN AIRWAYS	Long Range Passenger Services	Airbus A350-900XWB	14	14	0
		Boeing B787-8	19	19	0
		Boeing B787-9	7	6	1
		Boeing B777-300 ER	4	4	0
		Boeing B777-200 LR	6	6	0
		Boeing B767-300 ER	4	6	-2
	Medium Range Passenger Services	Boeing B737-800	18	18	0
		Boeing B737-MAX (grounded)	4	4	0
		Boeing B737-700 NG	10	10	0
	Regional and Domestic Passenger Services	Bombardier Q400	26	27	-1
	Cargo and Non-Scheduled Services	Boeing B777-200 LRF (cargo)	10	10	0
		Boeing B737-800 F (cargo)	2	2	0
	TOTAL OPERATING FLEET		124	126	-2

Source: Fact Sheet, June 2020

ABERD AIR	Charter and Touristic Passenger Services	Embraer	3	
		Cessna	1	
	TOTAL OPERATING FLEET		4	
ABYSSINIAN FLIGHT SERVICES	Charter and Touristic Passenger Services	Cessna Caravan / Gr. Caravans	6	
		Thielert engine Cessna 172	6	**tbv**
		Diamond DA40TDI	2	
		Diamond DA42NG Twin engine aircraft	2	
		Helicopter Bell 407	1	
	TOTAL OPERATING FLEET		17	

[18] Investment Proclamation No. 37/1996 kept reserved to the Government air transport services using aircraft with a seating capacity of more than 20 passengers or with a cargo capacity of more than 2700 kg. Investment Proclamation No. 769/2012, increased the passenger limitation to 50 seats. Investment Proclamation N. 1180/2020 and following regulation have lifted the seats limitation and opened domestic air passenger transport to foreign investors in joint venture with Ethiopian operators

AQUARIUS AVIATION	Charter and Touristic Passenger Services	Cessna	1	
		Diamond	1	
		Helicopter	1	
	TOTAL OPERATING FLEET		3	
EAST AFRICA AVIATION	Charter and Touristic Passenger Services	Cessna	1	
		King Air	1	
	TOTAL OPERATING FLEET		2	
KRIMSON AVIATION	Charter and Touristic Passenger Services	n/a	0	**tbv**
		n/a	0	**tbv**
	TOTAL OPERATING FLEET		0	
NATIONAL AIRWAYS	Charter and Touristic Passenger Services	Embraer	5	
	TOTAL OPERATING FLEET		5	
TRANS NATION AIRWAYS	Charter and Touristic Passenger Services	Bombardier	1	
	TOTAL OPERATING FLEET		1	
WALYA AIRWAYS	Charter and Touristic Passenger Services	Embraer ERJ 145	3	
	TOTAL OPERATING FLEET		3	
ZEMEN FLYING SERVICE	Charter and Touristic Passenger Services	Cessna	1	
	TOTAL OPERATING FLEET		1	
TOTAL AIRCRAFTS FOR COMMERCIAL USE			**170**	

The above illustrated data, apart for those related to EAL, will have to be validated through interviews with the stakeholders in Ethiopia in order to represent the current situation for all the air transport organizations operating in the Ethiopian domestic aviation market.

2.6.4 Demand - Passengers

Ethiopia aviation passengers transported on the domestic routes are mainly those who have traveled on EAL scheduled services. According to EAL statistics, in 2019 the airline transported over 12 million passengers in total, counting domestic and international passenger flows together. Of these, 2 million, or 16,7%, are domestic passengers. It is evident the dominance of international business for EAL. However, the domestic traffic flows have grown in the last years at a slower rate than international flows. Therefore, domestic traffic in 2019 represented 16,7% of the total, while in year 2000 represented 28%.

As reported by different international newspapers and aviation dedicated sources, Covid-19 pandemic has had a dramatic impact on air travel with demand decreases up to 90% at global level. It is not yet known what the impact has been for EAL, but during interviews it has been confirmed that impact was very high with and strong also for Ethiopian Airlines. During the first half of 2020, in fact, EAL has had to ground many planes and also has transformed a number of passenger aircraft into cargo ones to increase freight capacity and to keep as many aircraft flying.

It is of maximum importance to have access to direct data sources in order to gather updated information. There is no doubt that most of the strategic effort put in place by Ethiopian Airlines has been aimed at international growth of its network. In some of the past years the share of domestic transport was as low as 12%. Further insight comes from EAL aircraft fleet size. According to information published by EAL for June 2020, out of a total of 124 aircrafts, only 26 (or 21%) are used for regional and domestic passenger services. And regional also includes cross-border international flights to and from neighboring countries.

Analysis of the previous table on the fleet per air transport company shows that there are at least some 170 aircrafts for commercial use in Ethiopia. The total goes down to 156 if we take away 2 helicopters owned by private operators, and 12 cargo planes owned by EAL. Out of the total 156 planes, those in use for domestic traffic (scheduled and not scheduled) are 88. Of these EAL owns 26 aircrafts (29,5%) and all other private operators own 62 (70,5%). Ethiopian Airlines is using Bombardier Q400 planes for regional and domestic traffic. Such aircrafts can transport a maximum

of 78 passengers, and EAL is the only operator that flies according to a public schedule. On the other hand, planes operated by the private airlines are small and offer limited capacity, from 20 to maximum 50 seats, as an effect of old sector regulation. In addition, such operators fly on a private service basis without a published schedule. This means that the amount of traffic developed by such private companies is limited and represents a minimal fraction of the domestic traffic and passenger flown compared to that managed by EAL.

In the current situation EAL is the monopolist operator in Ethiopia. The company is using 26 aircraft, or 20% of its total fleet, for regional and domestic traffic, including international services to neighboring countries. Traffic data provided by the company for the fiscal years 2000/01 – 2018/19 show that total volumes have increased year after year. Passenger growth has been recorded at domestic and at international level except for fiscal years 2006/07 and 2014/15 for domestic traffic, and for 2013/14 for international traffic. Cargo services have recorded a strong trend of growth except for fiscal years 2002/03 and 2012/13.

In terms of market share, in fiscal year 2001/02 domestic traffic accounted for 25% of volumes while international traffic for the remaining 75% of the total. This mix has significantly changed over the period until fiscal year 2018/19. For this year domestic traffic represented of only 17% with international traffic representing 83% of the total passenger transported. The reason for this is that domestic traffic has grown at a slower rate than international traffic. The cumulated average growth rate (CAGR) for domestic travel is in fact of 11,2% over the 19 years period. For international passenger demand CAGR is 15,3% instead over the same period. However, if we only consider the last five fiscal years, from 2014/15 to 2018/19 then domestic passenger shows a CAGR of 16,52% that is higher of both the international passenger traffic (13,35%) and total passenger traffic (13,83%) for the same period.

The following tables provides evidence that there has been a constantly growing demand from air passengers in the international and domestic market. However, since the indicators (ASK and RPK) are cumulative for both markets it is not possible to derive specific insight for the domestic market only. This will be further investigated with Ethiopian Airlines in the next weeks.

Table 33: Capacity, Traffic and Load factor of EAL Domestic Services 2000-2019

Fisical Year	Total Passenger Number	International Passenger Number	Domestic Passenger Number	Total ASK (Millions)	Total RPK (Millions)	Pax Load Factor	Total FTK (000')	Total Cargo Uplift (Freight Kilos) (000')
2000-01	940.412	680.789	259.623	4.460	2.689	62,90	168.658	35.242
2001-02	1.053.480	789.728	263.752	5.098	2.847	55,80	145.290	37.411
2002-03	1.122.577	846.572	276.005	5.555	3.424	61,60	150.749	37.128
2003-04	1.231.378	955.643	275.735	6.076	3.837	63,10	204.083	45.525
2004-05	1.555.380	1.251.706	303.674	7.472	4.964	66,40	222.453	49.758
2005-06	1.762.900	1.455.128	307.772	9.094	5.829	64,10	261.904	61.833
2006-07	2.095.564	1.790.399	305.165	11.156	7.243	64,90	284.616	64.691
2007-08	2.504.646	2.153.269	351.377	12.344	8.682	70,30	378.842	72.758
2008-09	2.812.337	2.423.671	388.666	13.400	9.389	70,06	516.519	100.764
2009-10	3.146.911	2.718.505	428.406	14.832	10.705	71,90	674.050	134.164
2010-11	3.731.321	3.262.802	468.519	18.395	13.151	71,49	769.290	160.129
2011-12	4.644.425	4.097.678	546.747	22.394	16.175	72,23	889.057	180.808
2012-13	5.224.772	4.605.908	618.864	25.728	18.424	71,61	824.303	174.398
2013-14	5.918.364	4.471.919	1.446.445	30.170	21.358	70,79	898.640	186.336
2014-15	6.353.059	5.442.443	910.616	32.399	22.658	69,93	1.200.969	236.773
2015-16	7.595.057	6.427.612	1.167.445	39.910	27.233	68,30	1.386.826	266.223
2016-17	8.766.212	7.368.522	1.397.690	45.164	31.412	69,50	1.862.724	338.646
2017-18	10.632.019	8.885.021	1.746.998	53.067	39.147	73,80	2.167.012	399.126
2018-19	12.140.297	10.184.714	1.955.583	60.090	44.358	73,82	2.318.495	431.859

Source: Ethiopian Airlines

Cargo air transport shows a solid trend of growth over the years, from 35 thousand tonnes to some 432 thousand tonnes per year. Over the period of 19 years cargo CAGR is of 14,1% while over the

last five years it is 12,8%. Cargo air traffic is almost entirely international departing from or arriving to Addis Ababa airport. During the first half of 2020 Covid-19 pandemic air cargo services have represented a key business area for Ethiopian Airlines who converted passenger aircraft into freighters for the distribution of medical goods, Personal Protective Equipment and medicines and supplies in connection with the pandemic coming mainly from China.

Looking at table 4.4 which refers to the period 2000/01-2013/14, taken from open sources, and taking into consideration load factor it seems that supply has not grown at the same pace of passenger demand. In fact, domestic passenger data for the period show an average load factor of 75.8. It seems that in that period the supply of air transport services has been somehow limited considering that in the last years the load factor has reached 80% or more. If one compares the load factor for domestic market in table 24 (81,6%) with that of table 23 (71,61) for the whole market, it is evident that there is a difference possibly produced from a lower load factor on international flights in the same year. It is our assumption then that also in more recent years load factor on domestic flights was higher in line with the period 2000/01-2013/14.

According to IATA World Air Transport Statistics 2019, passenger load factor in 2018 for airlines at global level was at 81,9%. This is close to the level reached by EAL in 2013/2014 and, possibly the same for 2018/19. A sign of good optimization of the capacity put in place by the airline.

Table 34: Capacity, Traffic and Load factor of EAL Domestic Services 2000-2014

YEAR	PAX	PAX GROWTH (%)	RPK	ASK	LOAD FACTOR (%)
2000/01	259.623		112.956.244	169.698.339	66,56
2001/02	263.752	1,59%	115.572.153	164.210.123	70,38
2002/03	276.005	4,65%	116.949.523	162.733.096	71,87
2003/04	275.741	-0,10%	116.977.669	160.607.499	72,83
2004/05	303.674	10,13%	128.739.023	173.526.338	74,19
2005/06	307.772	1,35%	133.822.028	180.758.503	74,03
2006/07	305.165	-0,85%	133.831.625	185.810.378	72,03
2007/08	351.377	15,14%	153.739.026	210.443.700	73,05
2008/09	388.666	10,61%	173.967.719	225.388.862	77,19
2009/10	428.406	10,22%	194.466.572	261.467.451	74,38
2010/11	468.519	9,36%	213.831.954	268.233.502	79,72
2011/12	546.747	16,70%	250.066.943	309.343.340	80,84
2012/13	618.864	13,19%	277.686.125	354.747.396	78,28
2013/14	716.194	15,73%	315.643.759	389.412.822	81,06
TOTAL/AVERAGE	**5.510.505**		**2.438.250.363**	**3.216.381.349**	**75,81**

Source: Internet

The above tables show that in the period 2000/01 – 2018/19 the number of domestic passengers and load factor has been increasing continuously. This indicates that domestic demand of air passengers in Ethiopia is already at a good level. And given the fact that load factor is over 70% since year 2000, it can be argued that there is potential space to increase the offering of domestic air transport services in Ethiopia. Such levels are internationally considered as profitable for efficient airlines such as EAL can be considered. However, from direct interviews and from internet a number of complaints have emerged for the current domestic air services provided by EAL.

Interesting insight is derived from the following table about aircraft movements and passenger traffic at Addis Ababa Bole International Airport alone for years 2006 to 2015. The table was sourced from an ICAO report and clearly shows the growth of passengers transported by Ethiopian Airlines and of aircraft movements. Considering the importance of Addis Ababa airport for the whole country such data provide a snapshot of most relevant part of the market.

The strong numbers achieved in aviation sector in Ethiopia are at the base of the forecast for the future and in particular the document 10 years plan presented by the Ministry of Transport illustrates the objectives identified. According to the document titled “Transport sector’s 10 years perspective development plan (2013-2022)”, the MOT is looking at increasing the number of international

passengers from 10,2 million to 48,4 million. This would represent a growth rate close to 375% in ten years with a theoretical CAGR of 18,9% over the plan period. For the domestic passengers the forecast is to grow from 2 million to 11,8 million transported passengers with a growth of 490% in the period 2020 - 2029. The CAGR for such level of assumed growth would be of 21,8% per year.

The forecast of growth for air passenger transport is in line with the plan of investments in airport infrastructure indicated in the 10 years plan. As highlighted before, brand-new international airport is expected to be built in Addis Ababa in order to manage volumes of over 120 million passengers. Such level is more than double the current maximum capacity of Addis Ababa Bole International airport. And a number of investments are in progress at many regional airports in order to improve the operational capacity of the small airports across the country.

Table 35: Aircraft movement and passenger traffic at Addis Ababa Bole International Airport

Item	Movement		2006	2006 (%)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2015 (%)	CAGR 15/06 (%)
Commercial Aircraft	Domestic	Total	7.351	26,41	7.070	7.332	7.382	8.283	8.661	10.176	12.791	14.423	17.683	24,24	10,24
	International	Total	20.482	73,59	23.904	25.848	27.791	33.063	40.193	43.549	48.137	49.174	55.270	75,76	11,66
	Total		27.833	69,59	30.974	33.180	35.173	41.346	48.854	53.725	60.928	63.597	72.953	87,81	11,30
Non Commercial	Both Domestic and International	Total	12.164	30,41	13.843	16.104	13.884	12.424	13.926	12.728	9.409	10.624	10.130	12,19	-2,01
Commercial and Non Commercial Aircraft		Grand Total	39.997	100,00	44.817	49.284	49.057	53.770	62.780	66.453	70.337	74.221	83.083	100,00	8,46
Passengers	Domestic	Arrivals	146.296	6,40	150.572	146.296	150.572	176.456	182.984	208.726	260.053	307.142	357.903	4,87	
		Departures	137.705	6,02	148.579	137.705	148.579	175.759	182.305	207.775	263.629	302.286	359.152	4,88	
		Total	284.001	12,42	299.151	284.001	299.151	352.215	365.289	416.501	523.682	609.428	717.055	9,75	10,84
	International	Arrivals	995.840	43,53	1.243.535	1.466.637	1.587.769	1.813.208	2.228.241	2.408.988	2.938.390	3.130.866	3.372.898	45,88	
		Departures	1.007.703	44,05	1.290.076	1.506.766	1.598.914	1.811.656	2.329.827	2.635.139	2.906.578	2.954.564	3.262.308	44,37	
		Total	2.003.543	87,58	2.533.611	2.973.403	3.186.683	3.624.864	4.558.068	5.044.127	5.844.968	6.085.430	6.635.206	90,25	14,23
		Total Arrivals	1.142.136	49,93	1.394.107	1.612.933	1.738.341	1.989.664	2.411.225	2.617.714	3.198.443	3.438.008	3.730.801	50,74	
		Total Departures	1.145.408	50,07	1.438.655	1.644.471	1.747.493	1.987.415	2.512.132	2.842.914	3.170.207	3.256.850	3.621.460	49,26	
		Transit	459.144	20,07	470.360	625.014	751.806	91.714	1.288.084	1.463.172	1.769.071	2.113.284	1.456.816	19,81	13,69
		Total (exc. Transit)	2.287.544	100,00	2.832.762	3.257.404	3.485.834	3.977.079	4.923.357	5.460.628	6.368.650	6.694.858	7.352.261	100,00	

Source: ECAA

As the above table illustrates, in the ten years period between 2006 and 2015 aircraft movement at Addis Ababa Bole International Airport has grown significantly for commercial services. Domestic commercial aircraft movements show a CAGR index of 10% for the period, while international aircraft movements show a CAGR index close to 12%. At 2015 international aircraft movements accounted for 75%. While non-commercial aircraft movements at the airport, after reaching their peak in 2008, have been on a decreasing path until 2015.

Passenger traffic at Addis Ababa Bole International Airport shows signs of strong growth for the period 2006-2015. Domestic passengers have recorded a positive CAGR index for the period of 10,8%. However, in total, domestic arrivals and departures have a smaller share in 2015 compared to 2006. The share has in fact decreased from 12,42% to 9,75%. This is evidence of potential less focus on the domestic market growth over the ten years period analyzed. International passengers show much stronger CAGR index of 14,2% for the period. As a result, at the end of 2015 international passenger traffic accounted for over 90% of all passenger passing through Addis Ababa Bole International Airport. Again, this shows that EAL who are the main user of the capital airport has focused its resources more on growth international than domestic traffic. Finally, a positive strong CAGR index rate was shown by transit passengers with 13,7% for the period.

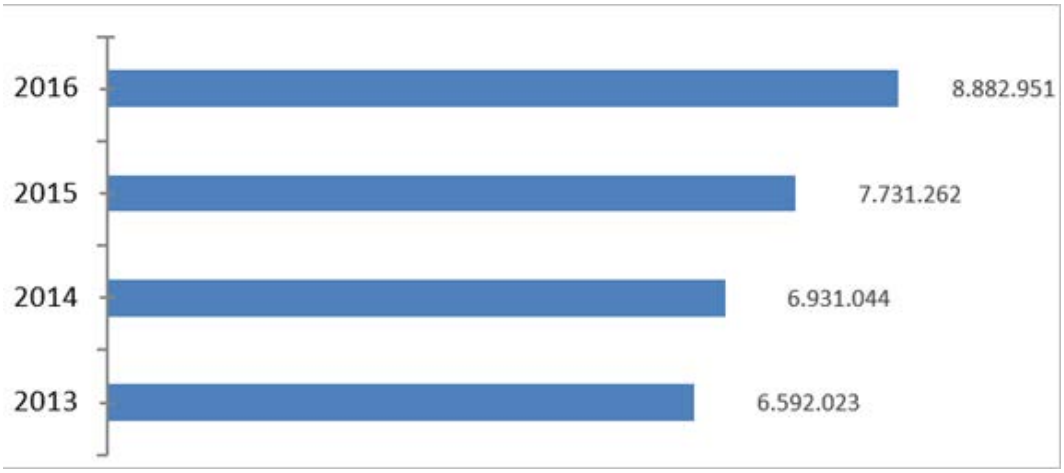
Further analysis will clarify what has happened and how passenger demand has evolved between 2015 and 2019. However, the few public available data allow to think that the trend observed in the period 2006-2015 for Addis Ababa Bole International Airport would be confirmed also at national level.

It is our opinion that there is space to increase domestic offering especially identifying meaningful direct internal routes among provincial cities without the need of passing through Addis Ababa. This can be achieved by deregulating and liberalizing the market to favor a more dynamic and competitive scenario for the next years. The basis has been laid down with the new legislation recently approved.

In the medium term, it is not only Ethiopian Airlines, but also private operators that will have to be involved in the effort to increase the air services offering on the domestic market also via the creation of private competition. The regulatory changes are expected to create interest in the next months from private investments in the domestic aviation market.

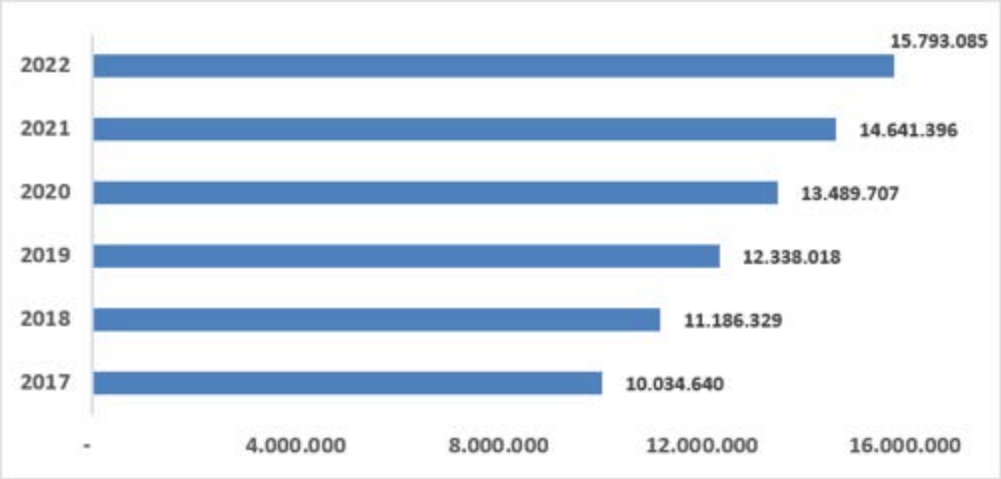
Based on data from Ethiopian Civil Aviation Authority (ECAA) related to passengers' movement and aircraft movement, the following graphs indicate past and future expected performance at Addis Ababa Bole International Airport which accounts for over 80% of passenger share and for over 50% of aircraft movements.

Figure 58: Addis Ababa Bole International Airport passenger movement summary – 2013-2016



Source: ECAA

Figure 59: Addis Ababa Bole International Airport passenger movement forecast – 2017-2022



Source: ECAA

2.6.5 Demand - Freight

Ethiopia transportation of freight by air has grown significantly in the last 10 years. According to EAL statistics, in fiscal year 2018/19 the airline transported some 432 thousand tons in total. In the period 2000/01 – 2018/19 the CAGR level of air cargo service was 14,1%. In the last five years it was of 12,8%. The only years in which EAL has recorded negative growth were 2002/03 (-1%) and 2012/13 (-4%).

For freight transportation too, the percentage share of domestic freight air transport on the total is not published by the air company. However, it can be assumed that most of the freight transported by air is related to international air cargo services. Domestic cargo travels mainly by road in fact. Ethiopia is a producer and exporter of coffee, flowers, cotton, garments, vegetables, fruits, meat and other products. Most of such products depart from Addis Ababa Bole International Airport cargo area. Ethiopian Airlines is also very active in international trade with China. In the emergency of Covid-19 pandemic, EAL has also been the main operator to deliver medical supplies to Ethiopia and other African countries aids sent from China by Ali Baba, a global player in e-commerce from China, and by other international donors.

According to information from direct interviews, private operators are not operating cargo services, but sometimes are involved in serving the NGO charitable organizations to transport first aid goods to remote provincial areas. However, so far statistics on such kind of transport are not yet available. It is our assumption that such volumes are limited.

In addition, from interviews it has emerged that with new Investment Proclamation No. 1180/2020 and following regulation, investments in air cargo sector will be reserved to joint ventures between private investors and the government. This means that EAL will keep its monopoly on air cargo.

As highlighted by the 10 years plan of the Ministry of Transport, one of the objectives for the aviation sector was the construction of cold warehouse for fast-growing commodities from 2 to 10. So far only 3 have been built at international airports of Addis Ababa, Bahir Dar and Mekele. And this was confirmed also by direct interviews.

From open sources the following information has been retrieved with reference to the availability of refrigerated warehouses at different airports.

At Addis Ababa International Airport the company Acunis, a supplier of cargo terminals, planned and implemented a new air cargo terminal, which has been running to capacity since the beginning of 2018. The air cargo facility covers 38,000s square meters, and is divided into refrigeration and a

dry storage zone. This is considered a state-of-the-art cargo terminal with two automatic warehouses for air cargo containers (unit load devices, ULDs) which has helped significantly the improvement of EAL air cargo business.

A further cold storage facility was planned for Dire Dawa International airport in order to preserve more than 150 tons of products. Such addition of cold storage in Dire Dawa Airport, the second busiest airport in Ethiopia would have helped store the increasing export fresh products like vegetables, fruits and meat before delivery to consumers especially to East Africa, the Middle East and Europe. Information from open sources indicated that actually the cold storage facility at Dire Dawa airport is not finished or not working. Information retrieved indicates that the Jigjiga Export Slaughterhouse (JESH) that also exports chilled meat to Dubai has experienced some problems since at nearby Jigjiga and Dire Dawa international airports there were no cold storage facilities and there were no air cargo services to these airports provided with aircrafts fitted with cold storage facility. In such conditions, JESH had to send the chilled meat to Addis Ababa, 650 km away from Jigjiga. The results for the company was higher costs and reduced competitiveness.

A third airport that was planned for improvements with the addition of cold storage facility is Alula Aba Nega International Airport in Mekelle. The planned airport storage area would store 150 tons of goods and perishable exports including fruits and vegetables, flowers, meat and fish. According to a document retrieved from Internet, it seems that such facilities were not yet available at beginning of 2017. Direct interviews have confirmed that the facility is currently completed, the project was estimated at a cost of 28.4 million birr. A fourth airport which should offer cold storage facility is Ginbot 20 International Airport at Bahir Dar. Such storage facilities would also be used mainly for international flights planned to the Middle East.

In 2018 Ethiopian Airlines and DHL Global Forwarding have signed an agreement to form a new joint venture company to provide additional freight capacity and logistics infrastructure in Africa. The new Ethiopian-based company would be called DHL-Ethiopian Airlines Logistics Services. Ethiopian Airlines, as majority stakeholder, would provide regulatory and operational support, and DHL will establish air, ocean and road freight connections between Ethiopia's main trade hubs and the rest of the world. There is little public information available on the actual start of business and related achievements of such joint venture company.

Air cargo business has been the main area of focus for Ethiopian Airlines during 2020 and Covid-19 pandemic spread. EAL has converted to cargo 22 passenger aircrafts in the last months in order to increase its capacity. In a recent interview, the Group CEO stated that the airline aims at becoming Alibaba's official company in Africa. This is due to the fact that Alibaba, the most important e-commerce platform in China, has plans to expand to the African continent. EAL would like to cooperate with Ali Baba bringing to the deal its extensive international cargo network and fleet. In fact, in November 2019 Alibaba established its second African hub in Addis Ababa, after the first in Kigali, Rwanda. And Ethiopia, via its Ministry of Innovation and Technology, has signed a Memorandum of Understanding with Mr. Jack Ma, founder of Jack Ma Foundation and partner of Alibaba Group, as the first step in helping Ethiopia launch its first electronic world trade platform (eWTP).

According to IATA, air cargo has been doing better than ai passenger transport during the period of Covid-19 pandemic. In particular the data released for June 2020 show a slow improvement in a general business context that remains very difficult for airlines.

- Global demand, measured in cargo tonne-kilometres (CTKs), fell by 17.6% in June (-19.9% for international operations) compared to the previous year. That is a modest improvement from the 20.1% year-on-year drop recorded in May.
- Global capacity, measured in available cargo tonne-kilometres (ACTKs), shrank by 34.1% in June (33.9% for international operations) compared to the previous year. This was on par with the 34.8% year-on-year drop in May.

- Belly capacity for international air cargo shrank by 70% in June compared to the previous year due to the withdrawal of passenger services amid COVID-19. This was partially offset by a 32% increase in capacity through expanded use of freighter aircraft.
- Global manufacturing demand stabilized in June:
  - The new export orders component of the Purchasing Managers Index (PMI) rose by 11 points compared to May, the strongest monthly increase since the series began in 1999;
  - The PMI tracking global manufacturing output rebounded in June to its highest level since January.

"Cargo is, by far, healthier than the passenger markets but doing business remains exceptionally challenging. And the capacity crunch continues because passenger operations are recovering very slowly," said Alexandre de Juniac, IATA's Director General and CEO.

According to IATA data, in June African airlines posted a contraction of 13.8% which compares negatively to the 7.3% fall in demand in May. The small Africa-Asia market continued to grow in June up 20.1%. However, the region suffered from the effects of the pandemic becoming more severe in June. International capacity in this region decreased 46.2%.

IATA reports that while airlines in Q3 airlines in all regions reported sharp decline in passenger revenues, demand for cargo was strong in Q3 since the economic activity rebounded following the lock-down period. Nevertheless, cargo yields soared due to the limited belly cargo capacity. As a result, cargo revenues in the sample of airlines analysed for September-October 2020 improved year-on year by 15%.

2.6.6 Pricing & Cost Recovery

Pricing of air transport services is different according to the kind of service taken into consideration. As for passenger air travel at domestic level, for flights within Ethiopia offered by Ethiopian Airlines the price seems to be flat without discriminations for the date of travelling, or the time of the day. What makes the difference in order for the passenger to be entitled for a reduction on the official rate is the status of the traveler. In fact, for the travelers who hold one of the following status: a) Ethiopian passport; b) Ethiopian renewed kebele Id.; c) Ethiopian resident permit; d) Ethiopian yellow Id.; Ethiopian Airlines offers a significant range of discount on its official fares. A second category of passengers who are entitled to receiving a fare discount, albeit not as significant as in the previous cases, is represented by those who have reached Ethiopia from abroad flying on EAL from a foreign country of origin and will reach a domestic destination via Addis Ababa. Lastly, all other travelers who are not included in the previous categories have to pay the full fare for domestic flights. This means that while travelers who fly EAL are entitled to a rate reduction, most of the tourists and business travelers coming from abroad using airlines different from EAL represent the majority of full fare payers when purchasing domestic flights in Ethiopia.

From direct information collected via interviews, it seems that such discounts on the official fare system are not the result of some form of regulation, but more a marketing choice and, possibly, a consequence of moral suasion exerted by the Ethiopian Government on EAL's management to create better price conditions for some categories of people. There are no reimbursement mechanisms that prevent EAL from losses on domestic routes due to such form of pricing, therefore the company covers such potential losses with the potential extra profits on those domestic routes that are profitable. In addition, direct interviews have confirmed that Ethiopian Airlines is not entitled to receive any financial support from the Government. It is therefore highly possible that the way the airline manages its fares may change over time according to demand circumstances and to commercial objectives of the organization.

Considering the context, one potential development to allow airlines reduce losses from operating on unprofitable domestic routes would be the introduction of service contract to be signed with

the government in order to establish the provision of some form of economic support to the air carrier.

The following table shows the current fare system for passenger air transport on domestic routes by Ethiopian Airlines. Data shown were collected on August 3rd, 2020 and fares are shown in Eur and ETB at the conversion rate of the day (1 Birr = 0,0242573 Eur). As it is visible from data shown in the table, air fares differ significantly depending on the status of the traveler but not on the chosen date of travel. Data shown are sourced from Expedia.com in Euro for a set of four different departure dates. For two of the same dates, information is sourced from EAL website in order to determine the different fares for specific types of passengers.

Of course, not every Ethiopian citizen can afford flying within the country even at discounted fares. Nevertheless, such kind of discounting makes domestic air travel appealing and somewhat more affordable if one considers the modal alternatives in terms of speed, traveling time and comfort. A large proportion of demand is assumed to be business travelers but also those living abroad who travel to visit relatives at different locations throughout the country.

Table 36: Samples of prices of domestic flights offered by Ethiopian Airlines

Origin	Destination	Date Fly Out (Year 2020)	Date Fly Back (Year 2020)	Price Return (economy)					
				flight economy class	Ethiopian passport	Ethiopian Passport EUR	international passport and intl. flight with EAL	international passport EUR	international passport EUR
				EUR	ETB	EUR	ETB	ETB	EUR
Addis Ababa	Mekele	10Aug	11Aug	317,00	5.393,00	130,82	5.813,00	12.357,00	299,75
		17Aug	18Aug	317,00	5.393,00	130,82			
		24Aug	25Aug	317,00	5.393,00	130,82	5.813,00	12.357,00	299,75
		24Sep	25Sep	317,00	5.393,00	130,82			
Addis Ababa	Dire Dawa	10Aug	11Aug	230,00	4.251,00	103,12	4.537,00	8.997,00	218,24
		17Aug	18Aug	230,00					
		24Aug	25Aug	230,00	4.251,00	103,12	4.537,00	8.997,00	218,24
		24Sep	25Sep	230,00					
Addis Ababa	Bahar Dar	10Aug	11Aug	221,00	4.137,00	100,35	4.409,00	8.661,00	210,09
		17Aug	18Aug	221,00					
		24Aug	25Aug	221,00	4.137,00	100,35	4.409,00	8.661,00	210,09
		24Sep	25Sep	221,00					
Addis Ababa	Jijiga	10Aug	11Aug	281,00	4.913,00	119,18	5.277,00	10.945,00	265,50
		17Aug	18Aug	281,00					
		24Aug	25Aug	281,00	4.913,00	119,18	5.277,00	10.945,00	265,50
		24Sep	25Sep	281,00					
Addis Ababa	Gondar	10Aug	11Aug	272,00	4.799,00	116,41	5.149,00	10.609,00	257,35
		17Aug	18Aug	272,00					
		24Aug	25Aug	272,00	4.799,00	116,41	5.149,00	10.609,00	257,35
		24Sep	25Sep	272,00					
Addis Ababa	Hawassa	10Aug	12Aug	150,00	3.201,00	77,65	3.361,00	5.905,00	143,24
		17Aug	19Aug	150,00					
		24Aug	26Aug	150,00	3.201,00	77,65	3.361,00	5.905,00	143,24
		24Sep	26Sep	150,00					

Source: EAL and Expedia

Fares for air cargo services are not published. The industry norm is that there are standard prices for reference that need to be customized for the kind of transport ordered by the customer. EAL Cargo services are divided into general cargo and special cargo with the latter being the category for perishable or valuable goods, live animals or dangerous goods. The airline also offers services for the storage and transport of pharmaceuticals goods, including Covid-19 drugs and vaccines.

For what is related to airport management, this is a relatively new business for EAL Group. In fact, it was only in 2017 (July, 8th) that Ethiopian Airport Enterprise was brought within EAL with the birth of Ethiopian Airlines Group. From interviews, it has emerged that such change was requested by EAL to the Government. This has allowed EAL to directly face two main issues it was not in the position to tackle before: lack of efficiency and quality of services at airports. In addition, having

the airports under the same ownership of the airline has meant that the two organizations could grow together at similar speed, especially for Addis Ababa Bole International Airport.

There is no official recent document available on open sources on the activity the Ethiopian Airport business unit. In the last available annual report of Ethiopian Airlines for 2017/18 it is shown that the group has recorded revenues as "airport charges". When the annual report for 2018/19 will be available, it will be possible to appreciate the evolution of incomes that EAL has achieved as airport charges. These revenues are generated from activities such as: catering operation and airport services like landing, parking, lighting, terminal facility, passenger services and rental of offices, warehouses, restaurants, shops, and checking counters. EAL Group offers catering and baggage handling to other airlines too at Bole airport. However, there are also some private operators who serve other airlines using the Addis Ababa airport.

EAL is possibly the most important company in the country and benefits from a degree of freedom of movement that other organizations are not yet given, this is due to its role as leading contributor to the economy and as generator of foreign currency flows. Therefore, the fact that the former Ethiopian Airport Enterprise falls now under the umbrella of EAG, allows the company to operate with more flexibility and less currency constraints when planning for improvements of the domestic airports and upgrading to international standards. It also means that it is possible to use the know-how and experience of EAL for managing international procurement for equipment and services to be purchased for the different airports.

Given the investment forecasts for improving the airports across Ethiopia illustrated in the 10 Years Plan by MOT, one of the open points is what will be the recovery time for each investment, and if a return on the investments has been calculated. Aviation infrastructure investments relate to different areas such as: airstrip and collateral areas, real estate in terms of buildings for commercial and technical use, navigation equipment, etc. The characteristic that has emerged through interviews is that at Bole airport each EAL business unit is responsible for managing its own assigned terminal, hangar, and other physical facilities. There is collaboration among business units but each one operates independently at Bole airport with the objective of maximizing service performance and revenues from commercial services. At domestic airports the situation is different given the smaller size of locations and operational volumes. In such airports most key activities generally fall under the management of the Airport Business Unit. And here a number of upgrading are under way.

For small airports defining a cost recovery horizon may be more difficult since such investments are needed in order to allow the airports get the minimum level of equipment and structure and run commercial services on a regular basis. Therefore, for some small provincial airports the assumed recovery time might be pretty long. Such analysis is needed for the existing Addis Ababa Bole International Airport for which significant expansion works have already been completed. The investment was of over USD 300 million and should have been approved on the base of a business plan showing what kind of contribution towards the investment was expected in the future from the airport Business Unit that is part of Ethiopian Airlines Group. The same goes for the announced new Addis Ababa international airport that is not yet in construction phase. According to open sources, for this airport a feasibility study has been prepared by the French firm ADP Ingénierie. In addition, many sources state that the expected cost that may easily reach USD 5 billion. For such kind of investment, the evaluation and approval process must be very accurate in order to secure the ability to generate cash flows sufficient to pay back the resources that will be mobilized.

2.6.7 Safety

Safety is the main issue in aviation. All airlines have to provide maximum safety embedded in their services. The government owned Ethiopia Airlines suffered a major airplane crash of a Boeing 737 MAX bound to Nairobi in Kenya on March 10, 2019. Due to crucial flight software that was flawed, the aircraft crashed six minutes after takeoff and killed all 157 people on board, triggering the global grounding of the 737 MAX. Apart from such bad accident, aviation safety for Ethiopian Airlines

can be considered good. Since year 2000, in fact, Ethiopian Airlines recorded 6 accidents. Only in two cases there were casualties: 90 people in 2010 and 157 people in 2019. And accidents were not due to human errors. All other accidents recorded no casualties.

For private operators, it has not been possible to interview them directly, however the fact that they are still operating makes us assume that they are considered compliant with current safety regulations by the ECAA. This area will be further investigated in the next weeks.

2.6.8 Environment Issues

Aviation is generally considered one of the least environment friendly forms of transport. Given the high development of civil aviation, the concerns with its environmental impact have grown considerably in the last years. A study by UK Civil Aviation Authority (CAA) highlights that the most common concerns around the environmental impact of aviation are climate change and noise, but air quality and local environments are also directly impacted by aviation.

Aircraft emit a range of greenhouse gases throughout different stages of flight. And aircraft are fairly unique in that they directly emit gases into the higher levels of the atmosphere. When emitted at very high altitude, the same gases can have very different effects than when emitted at ground level. Scientific evidence strongly indicates that these greenhouse gases contribute to climate change. Greenhouse gases move throughout the atmosphere regardless of international boundaries. Therefore, such gases represent an international and common issue.

According to the above-mentioned study, in the UK aviation accounted for approximately 6% of total national emissions. Around 90% of these emissions arise from international flights; and 10% from domestic flights. In addition, aviation emissions have doubled since 1990. Over the same time period, aircraft have become substantially more energy-efficient, through improvements in engine and airframe technology: but these improvements have not kept pace with the growth in emissions from increased air traffic. In fact, the study highlighted that continued increases in forecast demand for aviation and a lack of low carbon alternative technologies were expected to generate an increase in the relative share of UK's emissions if greater improvements are not made.

In addition to flying there are other associated activities that also create a small proportion of CO2 emissions. In particular: airport buildings; onsite ground vehicles; and those travelling to the airport in vehicles whether to work at the airport or take a flight.

2.6.9 ICAO actions against climate change

Aviation industry is addressing environmental issues within the framework devised by the International Civil Aviation Organization (ICAO), a specialized agency of the United Nations.

In 2010, member states gave a strong mandate and a roadmap to the ICAO to act on climate change. Thus, international aviation became the first global sector to adopt global aspirational goals for CO2 emissions – two per cent fuel efficiency improvement annually, and carbon neutral growth from 2020 - and a "basket of measures" to progress towards these goals.

In 2013 commitment towards this climate change strategy was reaffirmed and enabled the organization to take the necessary actions to realize the ambition set, through

- incentivizing innovative aircraft technologies,
- implementing more efficient operations,
- facilitating the use of sustainable alternative fuels, and
- creating a global market-based measure, the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

ICAO is therefore currently serving as a multilateral platform for cooperation on international aviation environmental protection. Over the years, the ICAO member states, have agreed to concentrate their aviation environmental collaboration on three core areas:

- Climate change and aviation emissions
- Aircraft noise
- Local air quality

A significant aspect of the ICAO activity is that of supporting members in taking action and advancing initiatives on environmental protection. In order to help those countries who were lacking the human, technical and financial resources to do so, ICAO launched the State Action Plan initiative in 2010 as a means to provide member states with the capacity and tools needed to take action. This included the development of a series of guidance documents and quantification tools.

According to ICAO, Ethiopia is among the 120 States representing 97,39% of global RTK that have voluntarily submitted their State Action Plan. Ethiopia also benefited from taking part to the CORSIA Buddy Partnerships, an ICAO's plan to support States to prepare for the scheme implementation. According to ICAO's 2019 Environmental Report, on-site training activities took place in Ethiopia in February 2019

2.6.10 Ethiopian airlines Group Environmental Policy

In 2008 Ethiopian Airlines Group unveiled plans to plant trees throughout Ethiopia, during the Ethiopian Millennium year, and launched a long-term environmental campaign known as FLY GREENER.

Today only less than 3% of the land mass of Ethiopia is covered with forest, once it was over 60% according to estimates. And this before aviation industry contributed to produce impact on the environment. EAG has started environment friendly actions as part of its corporate social responsibility, and has invested, among others, also in bringing trees back to land pursuing the initiatives of Greener Ethiopia, a community-based association dedicated to the improvement of the local environment by planting trees.

Although within the aviation industry aircraft manufacturers are currently investing significant resources to produce low pollution airplanes, the impact on the environment has been pretty high until the beginning of 2020, before the start of Covid-19 pandemic. Actions aimed at reducing general pollution such as planting trees or implementing best practices for reducing environment impact are taken by most organizations who are in businesses such as heavy industry, aviation, chemicals, etc. EAG has therefore showed that its approach was that of an organization that knows what kind of actions may bring positive contribution to the reduction of environment impact.

EAG has defined its own environmental policy and states that it is committed to implement environmental management system meeting the requirements of ISO 14001:2015 as a means of moving the organization in the strategic direction defined by the environmental policy. The EAG website has a specific page dedicated to explaining in detail the content and the key elements of such policy. The main points addressed by the airline are: protection of the environment, compliance obligations, communication (internal & external), risk reduction and emergency preparedness, sustainable resource management, continual improvement. It must be noted, however, that EAG is not publishing any specific reporting on environmental or sustainability issues. Nor any such information is provided in the document "Ethiopian Annual Report 2017/18" the latest annual report document available in English language on the company's website for free download.

2.6.11 Main Present Problems

The aviation in Ethiopia sector has been experiencing a period of strong development in the recent years. While the domestic market has grown at a speed possibly lower than its potential, the international market has grown substantially. Ethiopian Airlines, the government owned national carrier, has achieved a market position of leadership in the African continent and is now offering services in passenger and cargo air transport to many international destinations. The airline is globally recognized as one among the fast-growing operators and is part of Star Alliance network.

The aviation sector shows a strongly unbalanced situation for domestic and international services with presence of a limited number of small private operators in addition to the national air carrier on the internal market. This is mainly due to a legislation that up to early 2020 has limited the activity of private operators. And, at the same time, has kept investors away from the domestic sector.

Circumstances have radically changed in the international aviation market in recent years. Africa is emerging as a target market for many non-African airlines who operate internationally and who have positioned themselves on the routes between Africa and China, and the rest of East Asia. The only African airline currently able to compete in such dynamic context seems is Ethiopian Airlines. Other continental airlines are in more difficult situation and often EAL is identified as the potential allied to relaunch African ailing airlines. In addition, the Covid-19 pandemic that has spread in 2020 has severely hit the global aviation market. Most passenger flights have been halted globally in the first months of the year due to lack of demand, while cargo has shown a more resilient performance due to the emergency goods shipped, mainly from China, to help other countries fight the pandemic. And Ethiopian Airlines have been very effective in making the most out of the opportunities emerged in the cargo business.

The following is a SWOT analysis is provided for the aviation sector.

Strengths

- National carrier international positioning in passenger and cargo
- Commercial focus for management of national carrier's BUs other than airline
- Leading role of national carrier in African market
- Improvements at Addis Ababa Bole International Airport
- New legislation enforced in 2020
- Country with strong GDP growth in recent years
- Project for new international airport near Addis Ababa

Weaknesses

- Domestic air market needs support for development
- Domestic infrastructure needs investments for improvement
- Traffic at some domestic airports is still limited with minimal international flows
- International passenger traffic concentrated on Addis Ababa
- Only few domestic airports have cargo facilities
- Legislation up to 2019 has limited private investors initiative
- Size of private operators is small
- International tourism arrivals decreased in 2018 over 2015-2017 period

Opportunities

- New legislation enforced in 2020 may create conditions for development
- International growth of national airline brings opportunities for the country
- Conditions for entrance of new investors in aviation, also foreign, are being created
- MOT investment plan aims at significant improvements in aviation sector
- Developing a culture of leisure domestic travel for affluent local residents
- Attracting higher flows of international tourism
- Introducing dynamic market pricing for domestic passenger air services
- Development of new accommodation infrastructure of international standards
- Potential introduction of service contracts

Threats

- International competition of national airline drains financial resources
- Long time needed to recover from Covid-19 pandemic at global and local level
- Market opening for air passenger transport may attract international competitors
- Lack of adequate financial support for new private ventures in domestic aviation

- Inability to support economic development of regional areas and consequent demand for air transport services
- Keeping airports within national airline group may slow down development of regional infrastructure since most attention is given to Addis Ababa international airports, existing and future

2.7 MARITIME & INLAND WATER TRANSPORT

In reference to the detailed assessment of the present multimodal transport system in Ethiopia, studies and analyzes on the state of fact of the country were also carried out for the maritime and inland waters transport sector.

A United Nations report recently revealed that poor maritime connectivity continues to keep smaller and weaker economies from reaching world markets. However, for those few landlocked countries that have defied their geographical limitations and developed a maritime industry, the risk seems to have been worth it.

2.7.1 Maritime sector

In August 2007 the Ethiopian Federal Democratic Republic's Ministry of Transportation established the **Ethiopian Maritime Affairs Authority (EMAA)** under Proclamation No.549/2007. The Ministry of Transportation vested EMAA with the responsibility and authority to ensure the standards of Ethiopia's maritime training and seafarer certification, marine & dry ports, and transport logistics infrastructure. EMAA is a Transport Ministry agency, managed by the Office of the Director-General. The Authority is based in Addis Ababa, Ethiopia, and operates separate departments for the accreditation of training centers & seafarer certification, registration of Ethiopia's national fleet, and maritime security and safety.

Recently the Ethiopian Maritime Affairs Authority has issued the Blue Strategy Document, with which Ethiopia, in addition to its national green economic goal, has joined the blue economy geared at supporting sustainable economic growth through water bodies' activities and preserving the environment.

The **purposes of the EMA** are:

- To plan, coordinate and enforce requirements so they result in the transport operations and movement of goods in import and export sectors becoming more economical.
- To reduce waste and cut costs by better coordination with the concerned government bodies.
- To seek ways and means for the promotion and development of marine transport.
- Ensure the availability of uninterrupted resource of skilled manpower in the maritime sector for the country.
- To implement obligations and rights of Ethiopia under international maritime conventions.

The Policy of the Ethiopian Maritime Affairs Authority (EMAA) aligns to the National Transport Policy and the Growth and Transformation Plan (5 Year Plan) in as much as it concerns the maritime industry.

EMAA is committed to the maritime industry contributing to the Ethiopian economy and in reduction of poverty by providing world class, competent and timely maritime services ensuring:

- A safe and secure maritime environment
- And conduct of maritime operations in a socially responsible manner.

Despite being separated from the Red Sea by a stretch of land less than 200km long, Ethiopia has only recently established direct coastal access, thanks to a Chinese-built 750km-long railway linking Addis Ababa to the port city of Djibouti.

However, Ethiopia's blue growth has taken a different path until now. A number of agencies and

institutes have been training up young Ethiopian seafarers to export their skills on ships all around the world.

- Two MET institutions are accredited to conduct maritime education and training in Ethiopia: The Ethiopian Maritime Academy – a higher education institution providing postgraduate bridging courses leading to certification as officer at operational level for the engine department. It also provides ancillary training courses under chapters V and VI of the STCW Convention;
- The Babogaya Maritime and Logistics Training Academy, which is the Ethiopian Shipping and Logistics Services Enterprise Training Centre – providing qualification courses for certification as rating and ancillary training under Chapter VI of the STCW Convention.

Global manning and crewing support agency EMA Marine have been aiming to attract and train the best talent in the country since its foundation in 2011.

“As a country with over 100 million people and exceptional educational standards, Ethiopia is well positioned to meet the manpower needs of the maritime industry,” the company’s website reads. “The maritime field that was at first unknown to most people, since Ethiopia is landlocked, has now become popular.”

Similarly, the Ethiopian Maritime Training Institute (EMTI) also provides professional maritime training for Ethiopian engineering graduates. Working in partnership with Bahir Dar University, EMTI trains more than 500 officers annually, and is now looking to increase that number to 1,000.

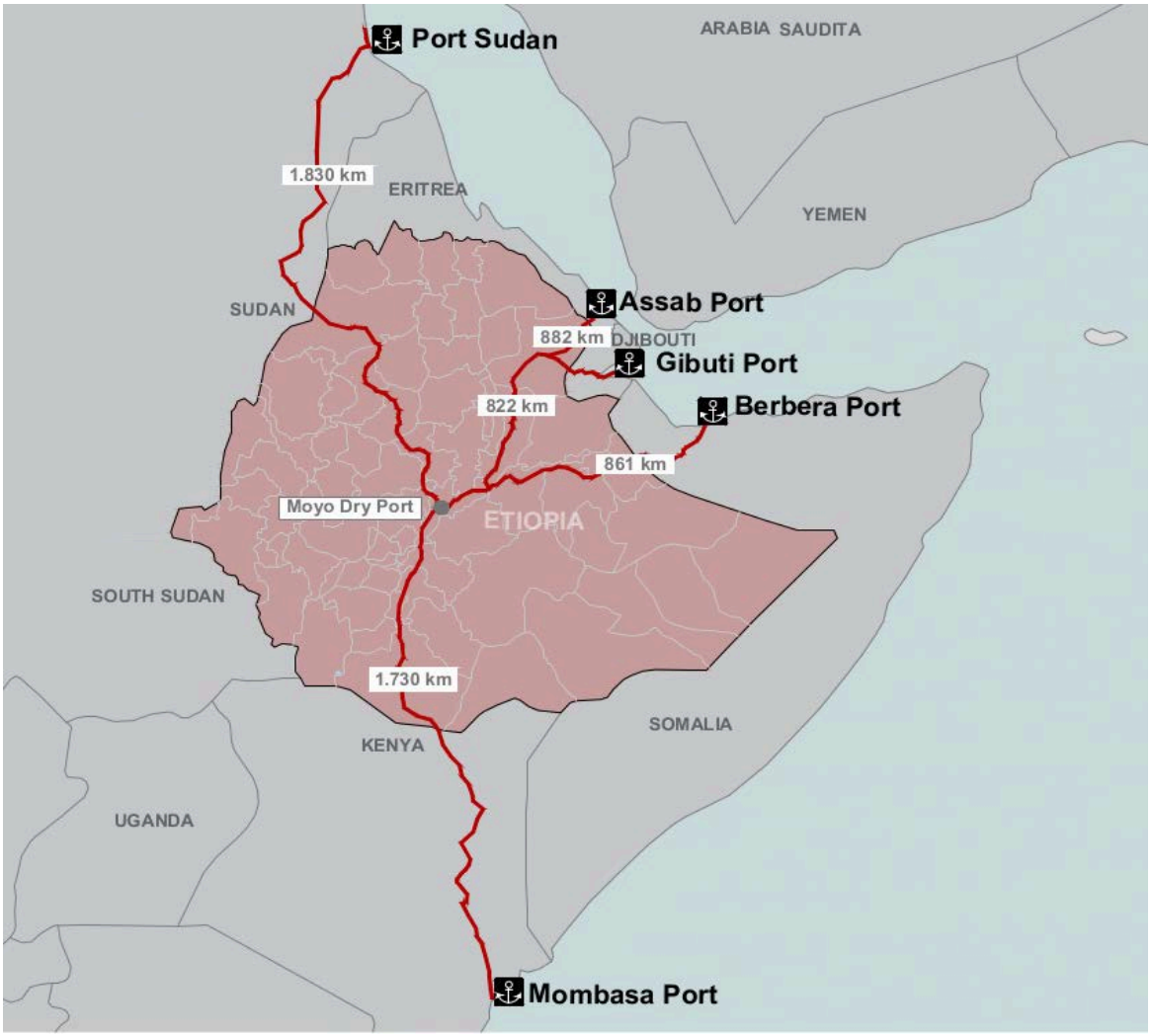
The ultimate goal is to use the boosting economic powers of the maritime industry to “create a large middle class replacing those below the poverty line,” the Ethiopian Maritime Affairs Authority states.

Maritime sector in Ethiopia is inextricably linked with ports in neighboring countries. The principal ones are:

- Port Sudan (Sudan);
- Assab Port (Eritrean)
- Gibuti Port (Djibouti);
- Berbera Port (Somali)
- Mombasa Port (Kenya).

These principal ports are linked to Modjo Dry Port in Ethiopia between the road infrastructures. The Modjo Dry Port is the most important storage area in the country.

Figure 60: Distance of the Modjo from the ports of neighbouring countries



Port Sudan

Port Sudan's Berth 16, handles roll-on/roll-off cargoes and tankers with a 128-metre-long berthing position with alongside depth of 10.7 metres. The South quay has two container and a tanker berths of 426.8 metres with the alongside depth of 12.6 metre. The port of Port of Sudan is linked by road to Khartoum, El Obied, the Darfur states, Kasala, Kosti and main cities in Sudan (see section 3.3 Road Assessment). The rail link from the links the Port to El Obeid, Khartoum, Kasala and Nyala are some of the strategic distribution hubs. A rail line links the port to the river Nile at Rabak and to various destinations through to Juba in the South using the Nile River barges (see section 3.5 Railway assessment). The harbour is in the mouth of a gulf continuing seawards through a coral free channel, depth between 18 and 26 metres.

Port of Assab

The Port of Assab is located in southern Eritrea along the Red Sea. The port of Assab can only provide berthing space for seven ships and its draft is limited to a maximum of 10 meters. Furthermore, the overall length of ships that Assab can handle is limited to 200 meters. The port of Assab presently handle 2.5 million tons of goods through thirteen commercial and nine specialised berths with a joint capacity of 480,000 cubic metres of space. The port can accommodate 6 vessels at one time.

Jetty Characteristics: North Jetty is 490 meters long, berths depths between 9,1 meters and 10 meters; South Jetty is 530 meters long, berths depths between 5,6 meters and 9,7 meters. Port of Assab Equipment are n°8 mobile crane and n°29 forklifts with capacity between 3-10 tones.

Djibouti Port

The Port of Djibouti has excellent nautical condition and benefits from a natural protection by coral reef that plays a role of a breakwater structure. The benches of coral reef which are close to the port absorb the agitation of the waves and offer deep area and quiet water. The anchorage offers depths between 10 to 40 meters and are well sheltered by the coral reef. They also manage the dangerous goods & cargo and prevent pollution. The shipping agent has to send the manifest 48 hours before the ship call. Since July 2011, their partnership with DP World has significantly improved its efficiency though implementation of management systems, international technical and managerial expertise in operations, maintenance, safety, security and trainings. Djibouti port is compliant with the international Ship and Port Facility (ISPS) standards and since 2006; it has received the 28,000-security accreditation from Lloyd's register. Djibouti Port provides a Container Terminal, Bulk terminal (managed by SDTV-private), General Cargo, livestock & Dry port facilities and Marine & Engineering related services

Berbera Port

Berbera Port is on the Northern coast of Somalia and is located on the Gulf of Aden. The Port is owned and operated by the Somaliland authorities. In addition to an oil terminal the facilities can accommodate containers, general cargo, and bulk cargo. The port foundation is traced back more than a hundred years, and the current place, a linear wharf of 300 meters, was established in 1968 by Soviet Union and expanded to a 350 meters linear wharf in 1984 by United States of America. Since then, the port has developed numerous properties as well as constructions. The Port's task hasn't changed over the years but its scope of services has expanded considerably. The port contributed significantly in the development of the Somaliland community.

Mombasa Port

The port of Mombasa is the Principal Kenyan seaport and comprises of Kilindini Harbour and Port Reitz on the Eastern side of the Mombasa Island and the Old Port and Port Tudor north of the Mombasa Island. Kilindini is naturally deep and well sheltered and is the main harbour where most of the shipping activities take place. It has 16 deep water berths, two oil terminals and safe anchorages and mooring buoys for sea-going ships. The Port of Mombasa not only serves Kenya but is also the main gateway to the Eastern African hinterland countries of Uganda, Rwanda, Burundi, DRC and Southern Sudan.

The Shipping Line Operators of bulk carriers, car carriers, container ships, Roll-on/roll-off (for freight), and tankers operating in the ports servicing Ethiopia are the following:

- Bollore;
- Maersk;
- Green Internatinal Logistics;
- DP World;
- Italferr;
- MSC Mediterranean Shipping Company;
- Ignazio Messina &C.;
- J.J. Kothari & Co.

The **FUTURE DEVELOPMENT** will allow to achieve the following objectives:

Transform ESLSE's service delivery system and structure

Establish effective presence at sea ports in line with the country's interests: It will facilitate improve functioning of the ports and corridors of the country's Import and export trade by opening offices

at the seaports as per the interests of the country and to play a leading role for other service providers to enable them offer better services.

Strengthen the capability of logistics service providers

Improve the coordination among cross-border freight forwarding service providers: Freight forwarders engaged in cargo handling operations in Ethiopia have poor relations and coordination with their counter parts in the port of Djibouti and other ports. The problems include the lack of enforcement mechanisms to protect the rights of freight forwarders when they face operational challenges at the seaports, failure of foreign freight forwarders to deliver commitments under their contracts with Ethiopian forwarders, and Ethiopian forwarders failure to settle payments timely. The problem-solving procedure which is now in place for solving the above problems has not been effective. Therefore, review of these procedures and through negotiations with transit countries, sustainable operating systems or modalities will be established for freight forwarders.

Establish effective customs facilitation procedures

Establish regional single window service: As a landlocked country, Ethiopia utilizes seaports of neighbouring countries for its foreign trade. Therefore, it is a necessity to establish a single window service for integrating regulatory bodies and service providers who play essential roles in the logistics processes. But this by itself will not provide a complete solution. Rather, the national single window system must be integrated with similar single windows at seaports.

Improve port utilization

Joint seaport development: There are multiple disadvantages if port development is monopolized by a single seaport developer. In line with this strategy, Ethiopia will have full participation on joint seaport development so as to ensure the nation's interest related to seaports utilization and bargaining power in various negotiations such as port tariffs and other day to day operational issues which arise in the course of port utilization.

Create regional seaport logistics center

Create regional seaport logistics center One of the essential ways to reduce transport cost, especially sea transport cost, is to have economies of scale of shipments. The transport charges of vessels with large loading capacities are relatively low. Using such vessels requires consolidation of shipments and development of large ports with adequate handling capacity. Hence, it is very important to build a "Regional seaport" for common usage through joint ventures and cooperation with neighbouring countries.

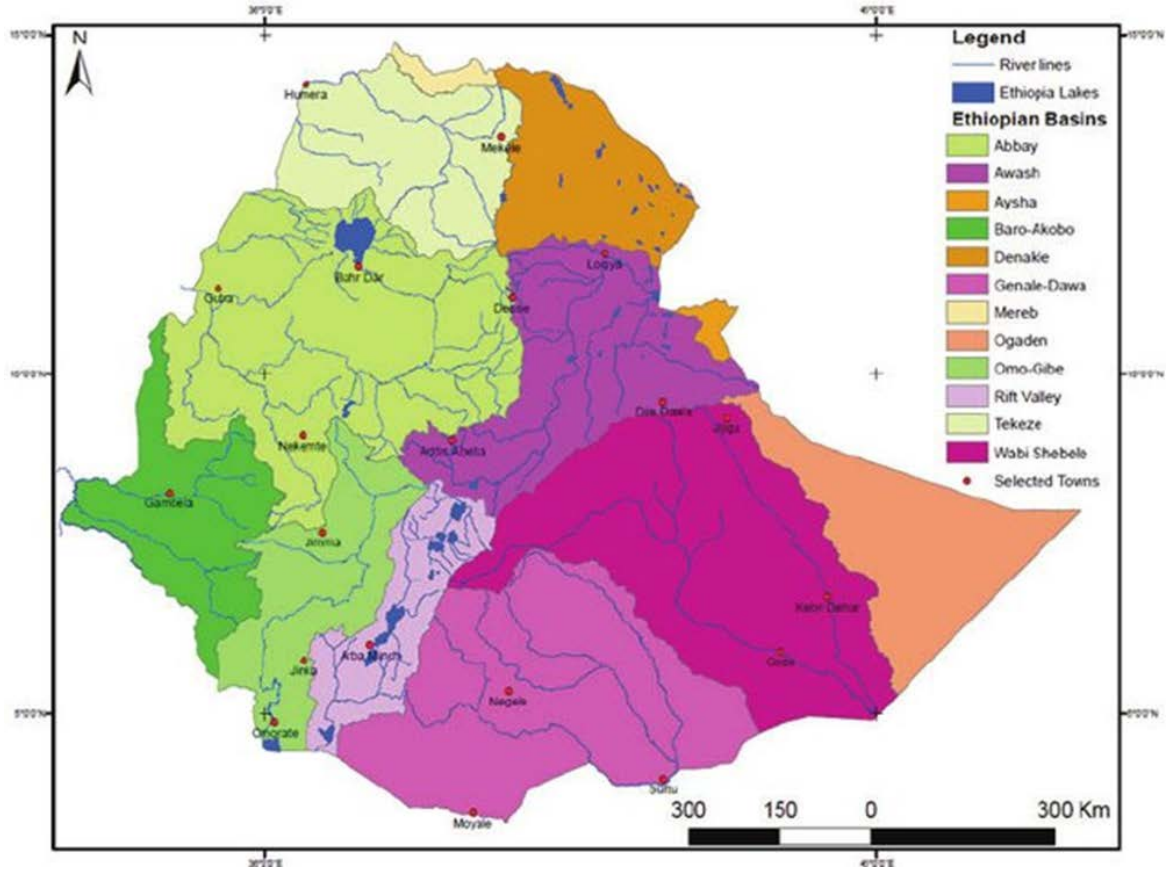
2.7.2 Inland water sector

The potential of river transport is generally small, being confined to local movements, most useful where there are no roads or the roads are only seasonal. Lake transport has more potential and is particularly important on Lake Tana, where services to the islands and for tourists have a long tern future. In the south, tourist services on Lakes Abaya and Chamo, near Arba Minch, also have potential. Ethiopian rivers basins, lakes and existing inland waterway transport will be described below.

RIVER BASINS

The country has 12 river basins, represented in Figure. Ethiopian waterways generally have a torrential regime. The major rivers cannot be excluded from the strong floods that occur essentially in the rainiest semester. In the lower course the waters often disappear from the surface, but are found at a modest depth.

Figure 61: Ethiopian Basins



Source:Water Resources and Irrigation Development in Ethiopia - International Water Management Institute

For our study, 5 of the 12 existing river basins were particularly examined:

- Abbay;
- Baro-Akobo;
- Omo-Gibe;
- Rift Valley;
- Tezeke.

ABBAY RIVER BASIN has a catchment area of 199.812 km^2, covering parts of Amhara, Oromia and Benishangul-Gumuz regional states. It has the major sub-basins of Anger, Beles, Dabus, Debre Markos, Didesa, Dindir/Rahid, Fincha, Guder, Jemma, Lake Tana, Mota, and Muger. The major river in the basin is the Blue Nile (Abbay) river, it was born at 3120 m in the heart of the Ethiopian plateau in a marshy basin at the foot of Mount Amidamit and flows, fed by the waters of the streams and small streams, towards the N until it enters Lake Tana, from which it exits at the southern end, enriched from the waters of the vast catchment area of the region.

BARO AKOBO RIVER BASIN has an area of 75.912 km^2, covering parts of the Benishangul-Gumz, Gambella, Oromia, and SNNPR. The Baro was born in the Moccia region; in the upper course it has a mountain character, with narrow, pebbly riverbed and impetuous current. It takes place to the west and, after passing Gambela, is dispersed in swampy expanses in the Sudanese lowland near the Sobat river.

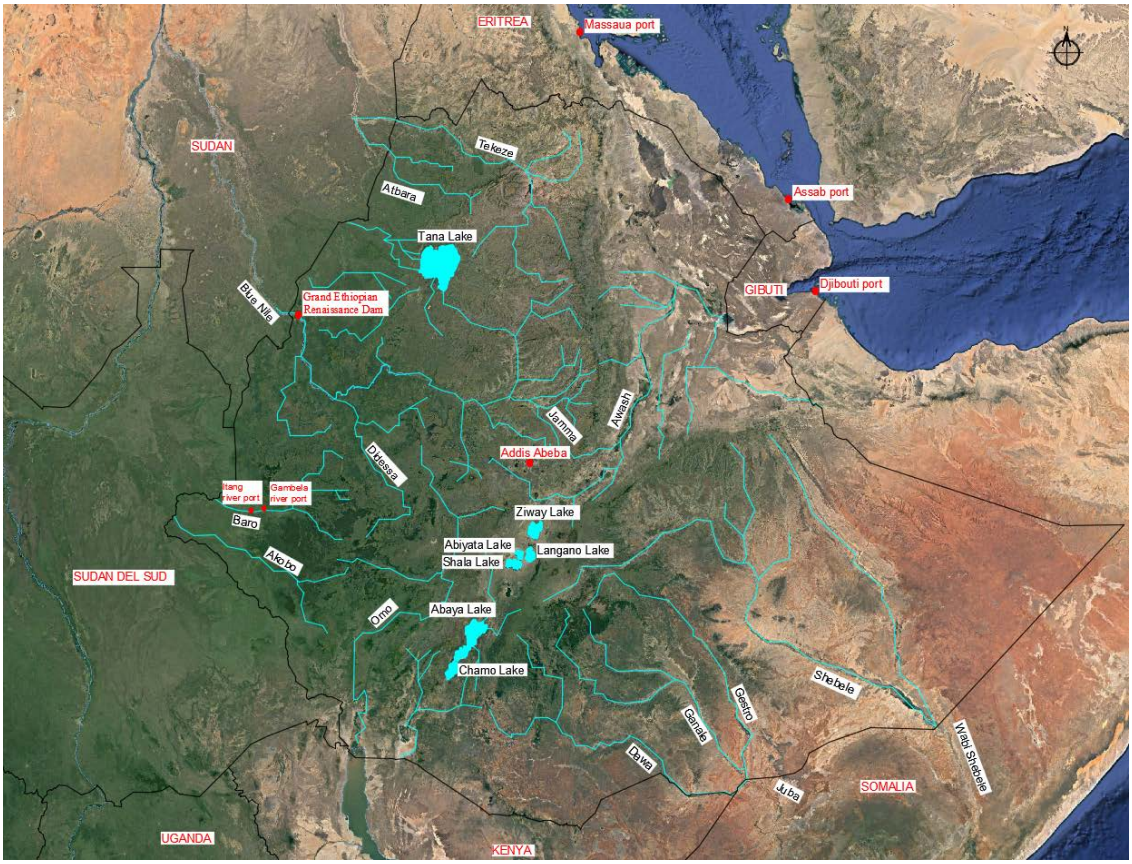
TEKEZE RIVER BASIN has an area of 82.350 km^2, covering parts of the Amhara and Tigray regional states. There are two main tributaries (Angereb and Goang) that contribute to Tekeze River which rises in the central highlands of Ethiopia, and joins the Atbarah River, the lower course of

which is a tributary of the Nile. The Tekeze, which was born in the Lasta mountains, in the central Ethiopian plateau has a length of about 760 km. The high basin includes some of the richest regions of the plateau and the river, despite having a torrential course, has perennial water.

The ***OMO-GIBE RIVER BASIN*** has an area of 79.000 km2, covering parts of the SNNPR and Oromia. The total mean annual flow from the river basin is estimated at about 16,6 BMC. In terms of hydropower development potential, it is the second largest, and it is a basin in which a variety of wildlife; with Omo and Mago parks being located in the basin, its tourism potential will be further exploited as infrastructure develops in the area.

The ***RIFT VALLEY BASIN*** has an area of 52.739 km2, covering parts of the Oromia, SNNPR regions. The total mean annual flow from the river basins is estimated at about 5,6 BMC. The basin is endowed with a number of lakes of varying size with high environmental significance. An integrated development master plan preparation for the basin is currently in progress and more reliable data could emerge in the near future.

Figure 62: Ethiopian main rivers and lakes plan



Source: Consultant's elaboration

2.8 URBAN LAND USE & MOBILITY

Following is the description of the urban planning system in Ethiopia and the transport planning activity, detailed for Addis Ababa, the other major cities, demography, land use and the way to harmonize urban and transport planning.

2.8.1 Ethiopia Urban Planning System

Under the present planning system, Ethiopia has a four-tier system, with national, regional, city and

local planning layers. However, spatial planning is statutory only at city and local area scales. At national scale, work has been done on the NUDSP (National Urban Development Spatial Plan) and sector plans exist (and will be assessed). Regions draft general development plans, not corresponding to a regional spatial plan document. However, at city level, the city and the local scales correspond to specific statutory documents: The City-Wide Structure Plan (SP) and the Neighbourhood Development Plan (NDP). This division between structure plans and local plans corresponds to international practices

The link between urban planning and transport & mobility is widely recognized. In Ethiopia this formal link was established in 2016 with the publication of the Urban Design Manual to be used and adopted by local government, professional and government officials, residents, private sector operators, etc. towards the preparation of urban design in accordance with the development status/zones/ within an urban area.

Being the Ethiopia's urban population continuing to grow significantly over the next few decades, with approximately 30 million persons arriving in large, medium and small urban centres, between 2015 and 2035 it is very urgent to take into a duly consideration this rapid as well as massive increase in urban numbers inevitably connected with increased demand for urban housing, basic services, industrial, commercial and recreational uses as well with an increasing mobility of the people in all the urban areas.

URBANIZATION

In 2014, the level of urbanization in Ethiopia was 19%, very low even by sub-Saharan African standards. There are currently 927 urban settlements and Addis Ababa accounts for 23.8% of the total urban population. World Bank in 2015 expected an increase in the urbanization rate of about 5% per year. On the other hand, Ethiopia until recently had a high rate of employment in agriculture and this is the main reason for the low level of urbanization. It is from the beginning of the 2000s that industrialization began to take effect with the aim of reaching the status of "middle-income country" by 2025. In fact, it is only since 2005 that the government has adopted a urban development policy contextual to a strong push towards industrialization. (Ministry of Finance and Economic Cooperation MOFEC- 2015).

This major policy shift towards urbanization and industrialization has significantly contributed to rapid transformation of the Ethiopian economy, resulting in a noticeable shift in economic sectors' contribution to the GDP – away from agriculture towards services and, to a lesser extent, manufacturing (World Bank, 2015). High public investments in infrastructure projects have significantly contributed to subsequent economic growth.

Urban settlements serve as administrative units and centres of trade and commerce. Some of them are heritage areas and attract a large number of tourists. Urban centres are generators of economic momentum and growth. They are important for rural development as they provide markets for rural products, provide services for rural needs, and absorb surplus population. They, generally, play a very important role in the socio-economic, political, and cultural development of the nation.

New urban settlements and an increase in city size and related transformations in urban morphology facilitate the growth of urbanization. The sustainability of urban transformations largely depends on the availability and affordability of infrastructures and services including urban transport.

The status of urban settlements also varies. There are two "Chartered cities in the country"- Addis Ababa and Dire Dawa. In the case of Addis Ababa, it is a "Chartered City" in terms of a 2003 Federal Proclamation. There are 10 sub-cities within Addis Ababa, which, according to CSA's 2007 statistical abstract, have a total population of 3,147,000 in 2007. The other Chartered City is Dire Dawa, which was in 2007 the second largest city in Ethiopia (252,279) , the fifth city with 268,000 inhabitants which is expected to reach 378,000 in 2025 and over 600,000 in 2050. It has two woredas – the city and the largely rural Gurgura. The city accounts for about 70% of the region's population. In Gurgura – total population 116,000 – there are a few very small urban settlements, amounting to

12% of the woreda's population or roughly 14,000 persons. In the region of Harari, the city of Harar accounts for over 60% of the total population of the region, or 122,000 out of 135,000.

Table 37: Status and population of the main cities in Ethiopia

Region	Chartered Cities	Population	Main Cities	Population	Intermediate	Population	Developing Cities	Population	Emerging Cities	Population	Total Pop.
Addis Ababa	Addis Ababa	2.757.729									2.757.729
Dire Dawa	Dire Dawa	252.279									252.279
Total		**3.010.008**									**3.010.008**
Oromia			Adama	219.395	Asela	110.088					
			Bishoftu	104.215	Nekepmt	75.219					
			Jema	120.960	Dila	59.150					
			Shashemenei	85.871	Goba	34.369					
				530.441	Ambo	49.421					
Total			**4**	**1.060.882**	**5**	**328.247**					**1.389.129**
Amahara			Gondar	153.914	Debre Markos	59.920	Woldeja	180.000			
			Desie	136.056	Kombocha	93.605	Debre Tabour	55.596			
			Bahir Dar	168.899	Debre Birham	57.787	Kobo	24.867			
Total			**3**	**458.869**	**3**	**211.312**	**3**	**260.463**			**930.644**
Tigray			Mekele	215.546	Adigrat	65.000	Alamata	33.214			
					Axum	41.249	Endeselase	47.284			
							Adewa	40.500			
							Michew	27.186			
							Koren	30.633			
							Wukro	30.210			
							Humera	21.653			
Total			**1**	**215.546**	**2**	**106.249**	**7**	**230.680**			**552.475**
SSNP			Awassa	133097	Arba Minch	69.622					
					Hosaena	75.693					
					Sodo	86050					
Total			**1**	**133.097**	**3**	**231.365**		**0**			**364.462**
Harari			Harar	90218							
Total			**1**	**90.218**	**1**	**0**		**0**		**0**	**90.218**
Somali			Jiiga	56821							
Total			**1**	**56.821**	**1**	**0**		**0**		**0**	**56.821**
Bensha Gumez									Asosa	32613	
Total						**0**		**0**	**1**	**32.613**	**32.613**
Gambela									Gambela	20790	
Total						**0**		**0**	**1**	**20.790**	**20.790**
Afar									Semera *	904	
Total						**0**		**0**	**1**	**904**	**904**
Total General		**3.010.008**	**11**	**2.015.433**	**15**	**877.173**	**10**	**491.143**	**3**	**54.307**	**6.448.064**

2007 Census
*Semera to be verified

FREQUENCY AND HIERARCHY OF URBAN CENTRES

The definitions of urban hierarchy (below) were applied to present-day statistical population data at a woreda-level from the Central Statistics Agency. Against this, regional population and urban growth profiles were applied and the baseline urban hierarchy was developed. It can be seen that Ethiopia's urban population today is mostly structured into a large number of urban villages and tertiary cities. High-order levels of urbanisation are confined to a small number of tertiary cities.

- **Metropolis (capital) city** is the highest order settlement including global cities with a population of more than 5 million, but in a national context will refer to Addis Ababa as it serves the highest order functions such as the seat of government, the economic powerhouse and centre of culture. Metropolis (capital) cities have diverse economic activities, a complex level of infrastructural organisation (utilities, transportation, housing and social), and attract migrants from all regions of the country and possibly beyond, acting as a hub at a national and international level. Land use and planning within a Metropolis (capital) city will be complex, focused on densification within the urban core or 'downtown areas' with zoning that is coordinated between residential, commercial and industrial requirements. Within a Metropolis (capital) city, municipal governance may be devolved to some extent to sub-city levels of organisation with local influence on some issues such as zoning, form of service provision (for example waste collection frequency) and municipal taxes.
- **Regiopolis (primary) cities** are defined by MUDHCo (Ministry of Urban Development and Housing) as the 26 cities that have participated in CBDSD (Capacity- Building for Decentralized Service Delivery)/ UDF (Urban development Fund)/ULGDP (Urban Local Government Development Program) projects; excluding Addis Ababa, but including all nine Regional capital cities and Dire Dawa. These cities may specialise or focus on a lower number of economic activities and have a level of infrastructural organisation and complexity mostly focused within the urban core or 'downtown' area. Land use and planning with a Regiopolis (primary) city will be similar to that of a Metropolis (capital) city, however with municipal governance devolved to a lesser extent or not at all. Regiopolis (primary) cities can grow over time to be significant national hubs with much larger populations.
- **Secondary cities** are defined as the 18 cities that will participate in the ULGDP capacity building component only. These cities are currently regionally important settlements, but in the future may evolve in size and prominence to Regiopolis (primary) city status. Secondary cities may eventually be specialised cities focused on a key economic activity or be defined by a nationally importance piece of infrastructure, such as a special economic zone, or a prominent university.
- **Tertiary cities**, for the purposes of this study, are distinguished as those 41 remaining cities/towns with a population of 20,000 or more. Tertiary cities function as access points to infrastructure and economic activities within zones and will feature developed areas for commercial and light industrial activities, but mostly are designed around residential needs.
- **Urban villages** are those settlements identified as towns or urban agglomerations in the 2007 CSA census that have a population of 19,999 or less. These areas may have no clear zoning and instead be communities that have grown organically from areas that were previously rural. Provision of services and infrastructure will generally be low, though some level of self-organisation of economic activities may be apparent, with for example, a street or promenade of commercial activity.

In terms of how the current structures of settlement in Ethiopia may evolve, it is evident that urban villages and tertiary cities will evolve into higher levels of urban organisation, as secondary cities and regiopolis (primary) cities. In the baseline scenario, Addis Ababa is currently the only Metropolis (capital) city, attracting population from all parts of the country and acting as an economic and cultural hub within East Africa. In the future, cities that are currently secondary cities may evolve to an extent where Addis Ababa is no longer primary in terms of urban hierarchy but is

networked with a number of competing cities within the country.

Table 38: Frequency and hierarchy of urban centres

	2,000 - 20,000 pop.	20,000 - 50,000 pop.	50,000- 100,000 pop.	100,000 - 200,000 pop.	200,000 - 500,000 pop.	500,000 – 1 million pop.	> 1 million pop.
Today							
Addis Ababa	-	-	-	-	-	-	1
Afar	16	4	1	-	-	-	-
Amhara	81	36	5	1	2	-	-
Benishangul-Mumtaz	15	1	-	-	-	-	-
Dire Dawa	-	-	-	-	1	-	-
Gambella	8	-	1	-	-	-	-
Harari	-	-	-	1	-	-	-
Oromia	184	49	11	4	1	-	-
Somali	36	7	1	1	-	-	-
SNNPR	92	23	6	4	1	-	-
Tigray	23	12	4	2	-	-	-
2025							
Addis Ababa	-	-	-	-	-	-	1
Afar	20	6	2	-	-	-	-
Amhara	54	46	19	5	2	1	-
Benishangul-Mumtaz	11	7	1	-	-	-	-
Dire Dawa	-	-	-	-	1	-	-
Gambella	8	1	-	1	-	-	-
Harari	-	-	-	1	-	-	-
Oromia	154	61	28	9	3	1	-
Somali	36	6	5	-	1	-	-
SNNPR	75	36	15	3	4	-	-
Tigray	13	16	7	3	2	-	-
2050							
Addis Ababa	-	-	-	-	-	-	1
Afar	15	5	4	3	1	-	-
Amhara	15	43	34	27	6	3	2
Benishangul-Mumtaz	7	6	6	1	-	-	-
Dire Dawa	-	-	-	-	-	1	-
Gambella	6	5	-	-	1	-	-
Harari	-	-	-	-	1	-	-
Oromia	52	103	49	32	17	4	1
Somali	28	16	4	3	1	-	-
SNNPR	36	49	24	17	6	1	1
Tigray	4	12	13	6	5	1	-

Table 3 below outlines baseline population projections for the main urban centres in Ethiopia, using medium-scenario population growth profiles at regional levels applied to the constituent urban centres. It must be noted that these projections are not deterministic – it is not a prediction of what the population in these cities will be – but is an indication of what the implications of projected regional growth rates will be on each of these urban centres.

Table 39: Population projections for Ethiopia's major urban centres

City	Today	2025	2050
1. Addis Ababa	3,195,000	4,105,000	5,086,000
2. Adama	308,526	529,281	1,322,290
3. Gondar	306,246	532,674	1,252,837
4. Haw assa	285,785	485,845	1,001,600
5. Dire Daw a	268,000	378,000	606,604
6. Bahir Dar	266,667	463,832	1,090,921
7. Dessie	177,688	309,065	726,913

City	Today	2025	2050
8. Jimma	169,446	290,687	726,217
9. Jigjiga	154,183	216,422	347,500
10. Shashemene Tow n	140,717	241,402	603,089
11. Bishoftu Tow n	140,039	240,239	600,183
12. Mek'ele	131,0201	224,372	470,895
13. Harar	125,000	171,000	259,485
14. Gambela	62,093	114,171	253,927
1 It is thought thatthe population of Me'kele is misrepresented here and isactually closer to 250,000.			

2.8.2 Demographic Overview

The major Ethiopia's urban center is the capital region of Addis Ababa, with a population of 3.6 million as of 2016 (CSA, 2013b) and housing about 21percent of the country's urban population. With 10 times the population of some of the other major regional capital cities, migration and economic activity have polarized in the capital region.

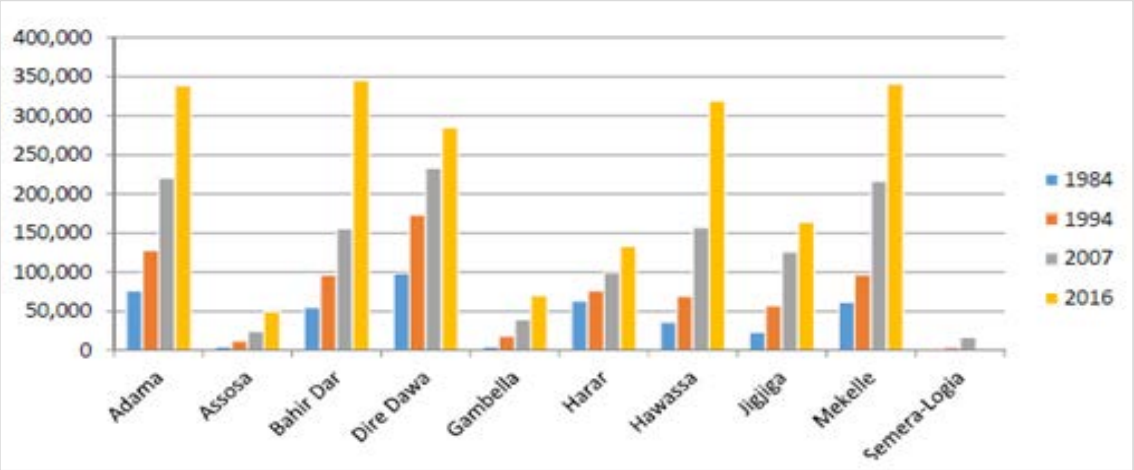
Following Addis Ababa, the nine regional capitals and Dire Dawa City Administration can be categorized into two groups based on their population size and regional location. The first group is comprised of the cities of Adama, Bahir Dar, Dire Dawa, Hawassa and Mekelle, each with a current population between 300,000 and 400,000 people, representing the next tier of cities after Addis Ababa.

They are located in the country's fastest growing urban regions, including Amhara, Southern Nations, Nationalities, and People' Region (SNNPR), Tigray, Oromiya, and Dire Dawa, and contribute significantly to the country's economic growth. The regional capitals in these growing regions are increasingly establishing themselves as industrial and commercial centers. For instance, Adama, Hawassa, and Dire Dawa are the three cities in the country designated as industrial parks as part of a nationwide initiative. At the other end of the population and urbanization spectrum are the cities of Assosa, Gambella, Harar, Jigjiga, and Semera-Logia, which are relatively small, each with a current population between 20,000 and 170,000 people.

These cities are, however, experiencing very high rural-urban migration and most are projected to have populations between 100,000 and 400,000 by 2037, except Jigjiga, which will house close to half a million people by then.

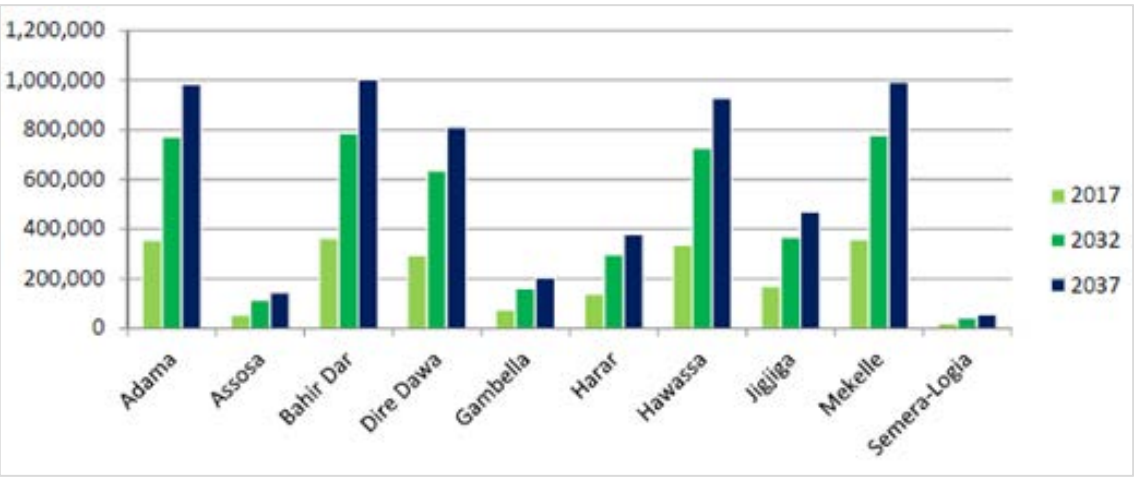
Figures 36 and 37 show the strong urban population growth that Ethiopia has experienced (CSA 1984, 1994, 2007, 2016). Semera-Logia (12.1%) and Jigjiga (9.1%) had the highest growth rates between 1994 and 2007, while Gambella (14%) and Assosa (10.4%) experienced the highest growth rates between 1984 and 1994. All four cities are in the emerging regions and have a relatively small urban population. Migration is a major cause of population growth in the regional capitals. The proportion of migrants in seven cities in 2007 ranged between 52 per cent and 72 per cent indicating that in the majority of the cities, more than half of the population are migrants (CSA 2007).

Figure 63: Population across Census Periods and Projections for 2016 in Regional Capitals



Source: CSA (1984, 1994,2007,2016)

Figure 64: Population Projections in Regional Capitals



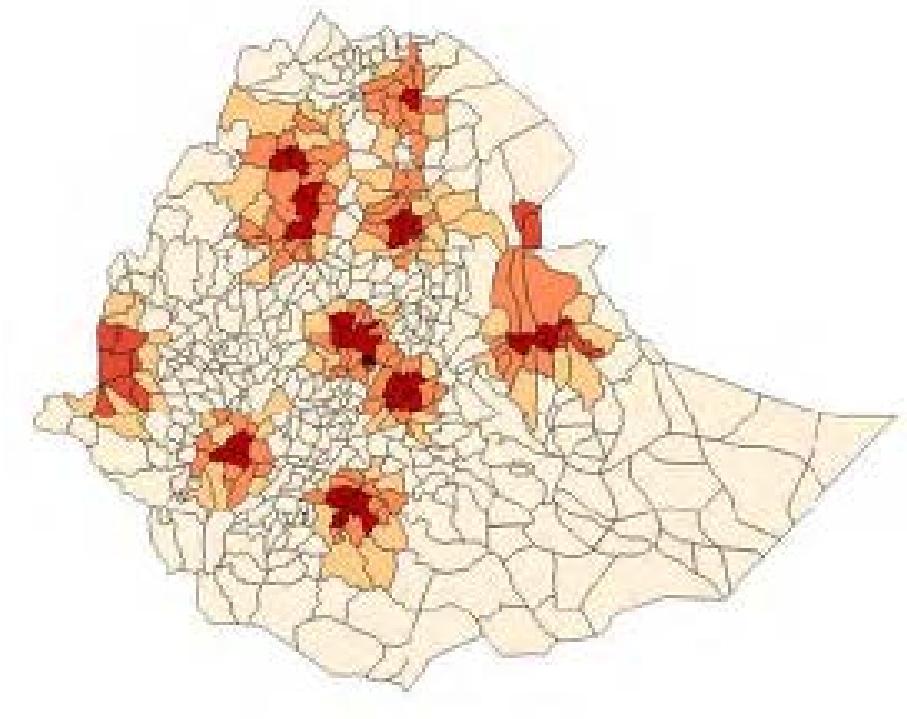
Source: Ethiopian Central Agency and WB estimates

Ethiopia's current urbanisation level of 19% is projected to steadily increase to at least 30% by 2030. This estimation is slightly higher than the Government's Central Statistics Agency (CSA) population projections for the following reasons:

- A number of very large industrial mega projects are being planned that will also drive further urbanisation in the country in a similar way.
- The impact of 70,000km of recent road building schemes in rural areas is likely to increase the rate of urban growth in agricultural regions.

Both the biggest challenge and biggest opportunity to Ethiopia's effective management of urbanisation is the projected rate of growth of its population; from a population of around 65 million in 2000 to a population close to 88 million in 2014, Ethiopia's annual growth rate has been 2.5% over this period. In the medium term, this is forecast to maintain momentum at between 2 and 2.58%, stabilising at 1.6% in the long term. Explaining population growth in relative terms only conveys part of the message – in absolute terms, Ethiopia will add another 20 to 27 million people to its population by 2025, with a projected population of between 135 and 150 million by 2040.

CURRENT URBAN STRUCTURE IN ETHIOPIA



The areas shaded in dark red show the largest urban centres and regional capital towns of Ethiopia. Current urban areas will drive future urban development and expansion. Towns and smaller cities represent the beginning of future large secondary cities. Creating urban areas in new places, where existing settlements are not present, is expensive and difficult due to the lack of basic infrastructure and transport network. The current urban network acts as a starting point from which selected growth poles can drive development of secondary cities' network.

Population Projection for Regional Capitals

The Central Statistical Agency (CSA) of Ethiopia conducts a population census every 10 years. Three censuses have been conducted, in 1984, 1994, and 2007. On the basis of the census results, the CSA projects the population of the country at national, regional, woreda, and city levels.

Population projection for different cities on the basis of the CSA projection

Table 40: Population Projection of Regional Capitals

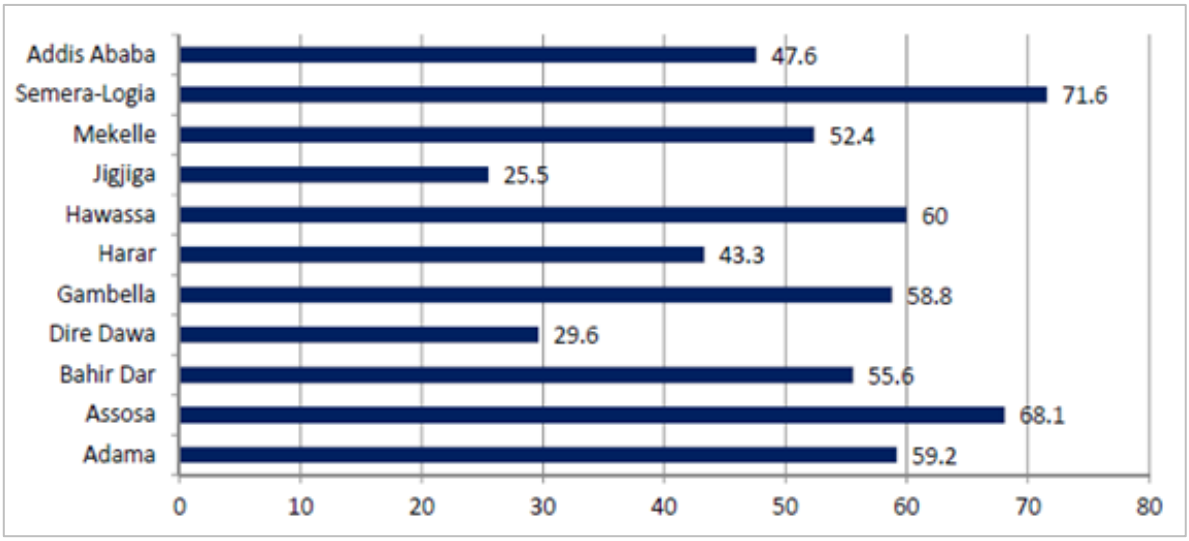
Regional Capitals	1994 Census	2007 Census	2014 CSA	2017 CSA	2022	2027	2032	2037
Addis Ababa	2,084,588	2,738,248	3,195,000	3,433,999	4,466,869	5,782,892	7,451,158	9,509,776
Adama	127,842	220,212	308,526	355,475	462,394	598,624	771,317	984,417
Assosa	11,749	24,214	43,203	52,575	68,388	88,537	114,078	145,596
Bahir Dar	96,140	155,428	266,667	362,297	471,268	610,112	786,119	1.003.309
Dire Dawa	173,188	232,854	268,000	293,000	381,128	493,415	635,757	811,405
Gambella	18,263	39,022	62,093	74,102	96,390	124,789	160,788	205,211
Harar	76,378	99,368	125,000	137,000	178,207	230,710	297,265	379,394
Hawassa	69,169	157,139	285,785	335,508	436,421	564,999	727,992	929,123
Jigjiga	56,821	125,876	154,183	169,390	220,339	285,255	367,546	469,092
Mekelle	96,938	215,914	307,304	358,529	466,367	603,767	777,943	992,875
Semera- Logia	3,775	16,663		19,749	25,689	33,258	42,852	54,691

2.8.3 Land Use

Access and allocation of land for urban housing differs across scales of governance and intended use. Access is regulated by the federal Land Lease Proclamation (No. 721), revised in 2011. Regional governments have their own lease proclamations and regulations, which contain the details of handling of the expansion and recognition of informal housing. City regulations guide the release of land for residential housing. Ethiopia's Integrated Housing Development Program (IHDP) is the primary government program focusing on home ownership and it features government-built condominiums.

Other than in Addis Ababa, Ethiopia's urban population is mostly concentrated in Dire Dawa, Adama and Mekelle, followed by Hawassa and Bahir Dar. The proportion of migrants in seven cities in 2007 ranged between 52 per cent and 72 percent (Figure 38), indicating that in the majority of these cities, more than half of the population are migrants. It is projected that by 2037, the major cities will house nearly a million people each.

Figure 65: Migrant Population in Regional Capitals, 2007 (%)

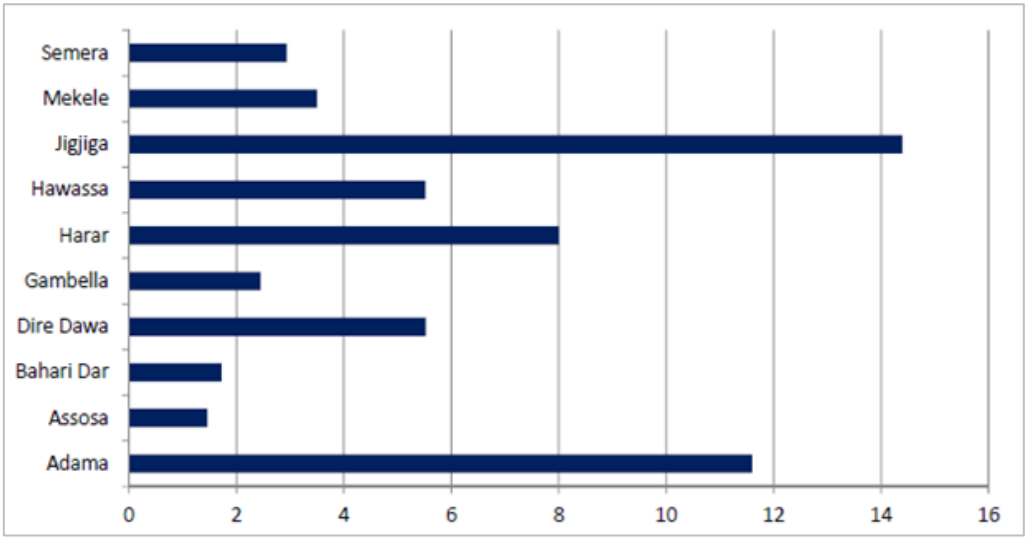


Source: CSA 2007

Informal settlements represent a challenge associated with urbanization, particularly due to the higher vulnerability to fire and other hazards associated with the high density of housing.

Informal settlements are found in all the capital cities, with Jigjiga (14.4 percent), Adama (11.6 percent), and Harar (8 percent) each having a relatively higher proportion of their land area under informal settlements than the other cities (Figure 39). Informal settlements are generally found on marginal lands, such as quarry sites, river banks, and precarious areas and are highly vulnerable to disasters such as flooding.

Figure 66: Proportion of Land Under Informal Settlement in Regional Capitals, 2015 (%)

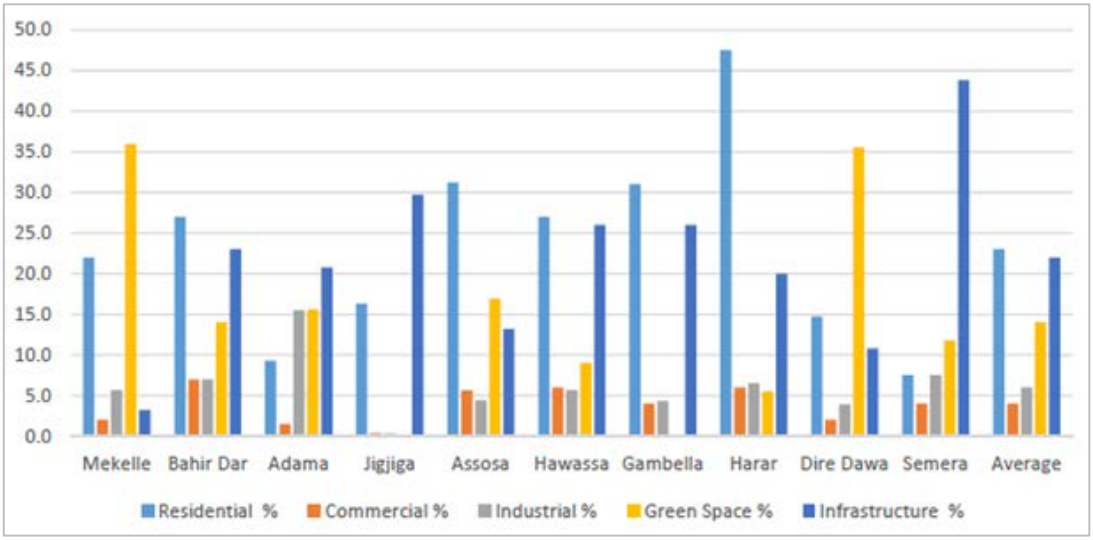


Source: MUDHCo ESCUO 2015

Land-use classification provides the basis for urban development. The GoE's Urban Land Development and Management Policy and Strategy, among other regulations, has established land-use proportions in urbanized areas as follows: 30 per cent park and greenery, 30 per cent roads and infrastructure, and 40

Per cent built-up area (with a possibility of adopting a 30-25-45 ratio in the case of older settlements) to address problems related to mobility and access to public spaces. On average, regional capitals have 22 per cent of their land dedicated to infrastructure and 14 per cent to green spaces (Figure 40).

Figure 67: Land-Use Composition in Regional Capitals, % of Total Area (2015)



Source: MUDHCo ESCUO 2015

2.8.4 Urban Master Plans

Almost major cities currently have a Master Plan. According to our survey, the time elapsed from the first preparation to today exceed 10 years or are at the limit. Hence the obsolescence of this tool, especially due to the profound demographic, social and economic evolution that has affected the

whole Ethiopian society. Although the Master Plans have to be revised every ten years, it seems that all the cities selected are very late for the preparation of the new urban plan (also called Structural Plans). Obviously, these delays also affect the increasing overall mobility for both passengers and freight.

Structural Plans are necessary for settlements with more than 20,000 inhabitants, while for the lower settlements the elaboration of Basic Plan is enough. For the elaboration of these plans, the federal government provides technical assistance while the individual cities have full autonomy to decide the strategic lines of development.

Table 41: Box 1. Current status of urban planning in selected cities.

Town/ City	Prepared	Completed	Under preparation
Dire Dawa	1998	2000	2012
Goba	1998	2008	
Kombolcha	2000	2010	2010>
Adama	2010	2011	
Agaro	2008	2009	
Axum	2001	2011	2012
Hawassa	2011	2012	
Bahir dar	2011	2012	
Mota	2004	2015	
Assosa	2011	Under review	
Harar	2011	Under process	
Adigrat	2001	2011	
Gambella	2011	2012	

2.8.5 Harmonizing urban and transport planning

In the coming months starting from the approval of the ENMP, it will be the primary task of the regional and local authorities to reconsider both the regional development plans and urban planning, with specific attention to the mobility needs of passengers and goods by updating the knowledge and needs of people and companies.

A framework that will put the basis for an integrated national mobility and regional plan, enhancing the role of large urban centers for sustainable mobility of citizens and workers in harmony with economic, territorial and social development policies. In this context, the concrete possibilities of giving operational guidelines to gender policies as well as those necessary for the inclusion of disabled people in the productive and social fabric will also be analyzed.

Moreover, together with the main important stakeholders the Consultant, in order to harmonize urban and transport planning will suggest the Client to adopt the preferred scenario indicated in the ***"Unlocking the power of cities in Ethiopia"*** report launched in 2015. In this report the preferred scenario was a combination between: four alternative spatial economic growth scenarios for Ethiopia such as:

A. Primary City	Addis Ababa continues to grow into a dynamic, multi-functional and cosmopolitan megacity
B. Polycentric network	A network of regional secondary cities emerges to support Addis Ababa.
C. City Clusters	Large and dynamic metropolitan areas develop in two clusters: one in central Ethiopia around Addis Ababa and one in the north of the country.
D. Regional Distribution	Addis Ababa devolves greater power to the regions and regional capitals take on many of the urban functions that Addis Ababa formerly held.

The preferred scenario recommended is to combine the best features of each scenario particularly between the Scenarios B and C to outline a poly-clustered spatial development pattern. Of course,

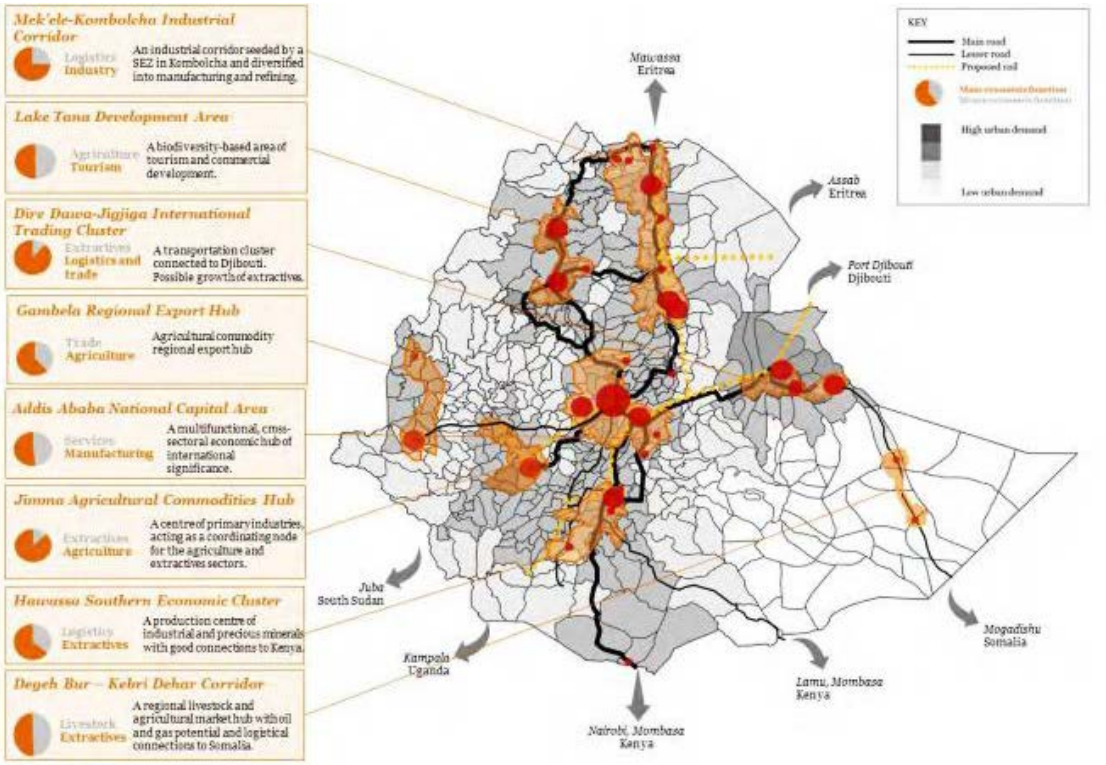
also Scenarios A and D make important contributions. The preferred scenario was based on three recommended strategic directions for growth.

1) **Unlocking the potential of secondary urban growth centres** by harnessing the economic efficiencies offered by enlarged 'second cities' that can diversify and accelerate growth. To ensure future balanced growth. Government needs to invest in a network of cities distributed across regions that will improve links with international and regional markets. This will diversify the economic activity and distribute wealth across the country.
2) **Agglomerating and connecting economic functions**. Clustering economic activity brings additional value to economic activity, and the location of these clusters should help to strengthen the value chain (raw materials, manufacturing, supply chains and trade).
3) **Targeting the development of a compact, connected and resilient urban network**. As outlined in the work of the Global Commission on the Economy and Climate, well managed urban growth based on dense, mixed-use urban neighborhoods improves economic efficiency, improves climate and environmental performance and enhances resilience, all at a lower cost. The same principle applies to the national urban plan and highlights the value of key supporting infrastructure in delivering Ethiopia's Climate Resilient Green Economy.

On these issues the Consultant will try to overcome and update the existing urban and public transport policies formulated in the National Transport Master Plan Study in 2008 with the above-mentioned scenario to found out not only the gaps but concrete strategic direction based on "growth development corridor the way to enhance a suitable updated policies and methodologies to afford the needs of a modern urban mass transport as well to harmonize urban and regional planning, transport planning, necessary funds and development policies already depicted at national level.

The figure below represents the polycentric-clustered development growth corridors on which the Consultant will set up the proposal for a harmonization between urban, regional planning and transport planning.

Figure 68: Development Growth Corridors



The network will be further analysed in the way to understand the linkages between land use, spatial plan & mobility at regional and national level. The results will be matched with the OD and related surveys to find out the range of intervention options for each development area/corridor and development centres taking in consideration the previous National Transport Master Plan Study.

The consultant will further analyse the urban transport issues/developments according to the following urban centres studied in the previous NTMPS:

Category	City
Primate	Addis Ababa
Main Cities	Adama
	Awassa
	Bahir Dar
	Dire Dawa
	Harar
Intermediate cities	Adigrat
	Axum
	Goba
	Kombolcha
Developing Cities	Agaro
	Mota
Emerging cities	Asosa
	Gambella

As a consequence, the consultant will adopt the meanings of the four categories (in addition to the one defined Primate City, which currently concerns only Addis Ababa) introduced in the NMTS

The definitions of the categories are:

- **Main cities** along the established corridor which have populations of more than 100.000 units with a complex urban morphology that needs appropriate and immediate urban transport planning next to the prime city, Addis Ababa.
- **Intermediate cities** intended as urban centres with populations of 50,000-100,000 which exhibits urban transport demands in between main cities and developing cities where motorized transport has started to be used depending on specific characteristics of each city.
- **Developing cities** urban centres with 25,000-50,000 populations whose urban transport demand can be satisfied by non-motorized transport means but requires responsible institutions for the provision and up keeping of appropriate transport infrastructure.
- **Emerging cities** are regional capitals also with less than 100,000 populations. These cities, being political and economic centres of their respective regions are expected to grow rapidly and exhibit characteristics of full-scale urban morphology that a regional capital requires.

2.8.6 Urban Transport Planning in Ethiopia

As happened until a few years ago in many other countries of the world also in Ethiopia transport planning has always been associated mainly with road system planning. And it is only since 1986 that, with the Addis Ababa masterplan, urban transport has become an integral part of mobility, integrating, albeit slowly, with the rest of mass public transport programming and planning of land use. It can be said therefore that the practice of urban and transport planning strictly linked together is still at is infancy. However, the shortage of experienced transport professional together with the high staff turnover, segmentation of the authorities and responsibilities and the severity of transport problems imposed a limitation for a necessary harmony between urban and transport planning. That means a strong limitation to fulfil the mobility and accessibility not only in Addis Ababa but also in all the regional Capital cities despite the lower mobility rates that characterized the country and the still low level of motorization.

Especially for Addis Ababa the rapid urbanization, the limited urban control on growth and land

use worsened the situation. The pace of the urbanization together with limited resources to afford the increasing needs of road infrastructures lead to a substantial crisis in the management of the entire urban mass transport. From the 2,739,551 million people surveyed in 2007 to the about 4 million estimated in January 2020, no administration would have been able to manage an increase of about 100,000 thousand people per year, moreover with scarce economic and financial resources, limited professional experience as well as inadequate regulations and laws governing the transport sector. The same phenomenon happened for the rest of the main cities across the country even although same places the pace of urbanization was less impetuous. The results despite the great effort of the FUPI (Federal Urban Planning Institute) and the Regional works and Urban Development Bureaus established at regional level were very limited therefore the master plan revisited was not able to integrate the land use with the increasing urban transport demand, the road network with necessary mass transport needs, demand forecast and the related infrastructure and necessary services and facilities.

2.8.7 Urban Transport in Addis Ababa.

Following the development of the 2019 Transport Policy, the Addis Ababa City Road and Transport Bureau (AACRTB) has been empowered and its capacity strengthened. Five new institutions have been established and the organization structure of the existing transportation institutions under Addis Ababa Road and Transport Bureau have been reformed. In 2017, the City Council ratified the Addis Ababa City Master Plan (AACMP) including a land use development plan, transport and road network plan, building height plan, city centre development plan, environmental plan, industry development plan, river buffer development plan, municipal and social service provision plan and an economic plan. The mentioned 11 key points can be adapted for all major urban areas in the country.

Since the Ethiopian transport sector is dominated by the road sub-sector which represents about 90% of motorized transport, different modes of movement have developed in urban areas especially in Addis Ababa to which the other large cities look carefully. The main travel mode in Addis Ababa is walking that account for more the 60%. One of the reasons why walking is a preferred mode is that the scarcity of the economic resources of people to afford their daily trips although prices are relatively low in general. Another reason is a substantial scarcity of quantity and quality of public transport offers.

The burden of urban mobility in Addis Ababa is borne by four public operators, paratransit sector (code 1 and code 3), and three-wheeled vehicles as known as Bajaj. The summary of the performances of these operators are:

Table 42: LEA Draft Route Re-estimation January 2020

Operator	No. Vehicle	Ridership per day	Percentage %
Anbessa	612	309,000	15
Sheger	217	198,000	10
Light Rail	33	55,000	3
Code 1 – Mini Bus	3,038	408,307	20
Code 3 – Mini Bus	6,284	844,570	41
Higer – Midi Bus	191	61,120	3
Kitkiti – Midi Bus	257	82,240	4
PSETSE	184	77,280	4
TOTAL		**2,035,517**	**100**

Source: SCTDP- Report on Model Development – Rambol & IRD 2020

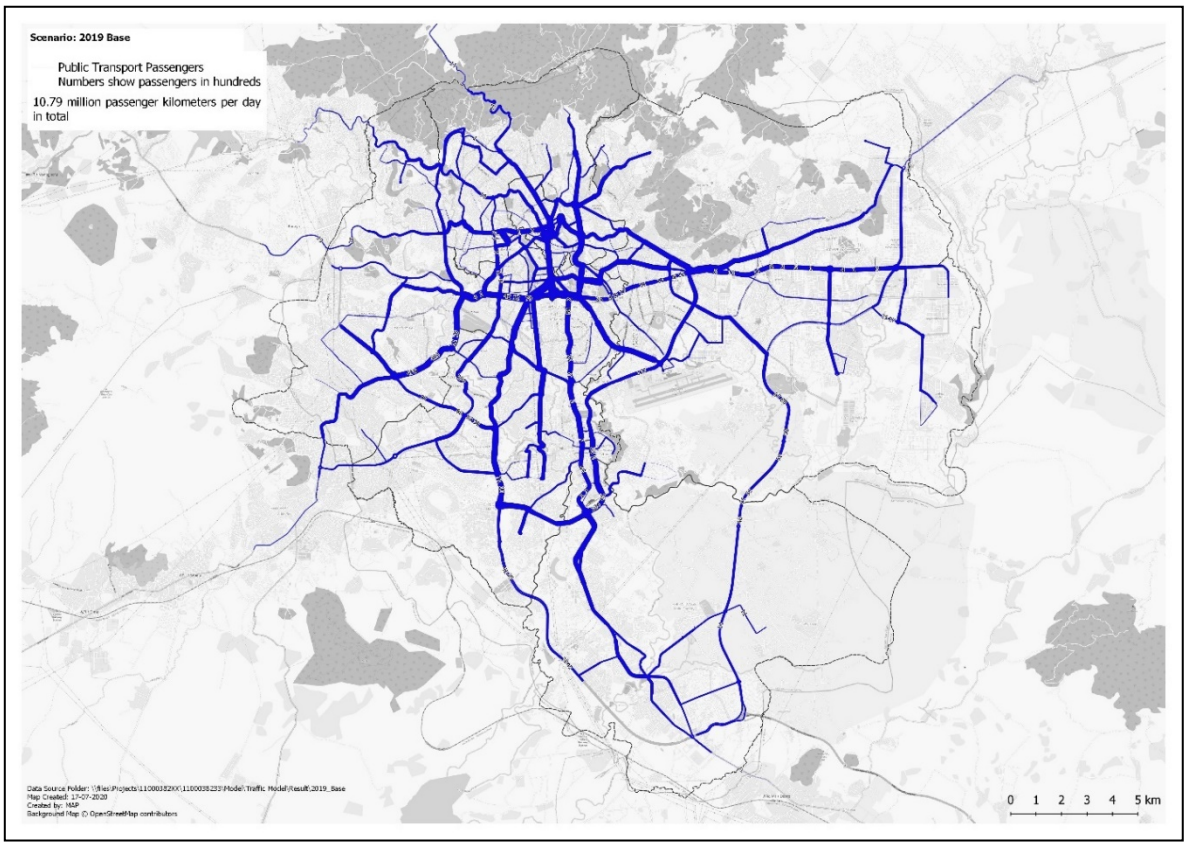
According to the latest survey on household held on March the last revealed that (SCTDP- Report on Model Development – Rambol & IRD 2020) at least once a week the modes sorted by descending use are:

- Walk: 82 %
- Minibus: 74 %
- LRT: 12 %
- Digital taxi: 6 %

- Bus (Sheger, Anbessa, PSETSE): 36 %
- Midibus: 22 %
- Bajaj: 24 %
- Blue white Lada Taxi: 4 %
- Yellow Taxi: 3 %
- Bicycle: 3 %

Despite its relatively low rate of motorization, vehicle registration in Ethiopia continues to rise; especially in the urban areas such as Addis Ababa which hosts about 70% of all vehicles registered in the country (Ethiopia Ministry of Transport, 2018). Cognizant of the environmental impacts of increasing vehicle ownership, the Ethiopian government in its Climate Resilient Green Economy strategy, is promoting a shift to more sustainable urban transport. Effectively in Addis Ababa the light-rail transit appeared in 2015 and bus rapid transit systems - BRT will be probably launched in 2021-2022 with the BRT2. These initiatives also aim at improving fuel efficiency standards for vehicles and encourages the adoption of hybrid and plug-in electric vehicles (Government of Ethiopia, 2011). Public transport trips (mini-bus, bus and LRT) according to the 2019 base scenario contribute with 10.79 million daily passenger kilometers. The following figure show how this trip are distributed in the network and which part of the network is highly used by public transport network.

Figure 69: Public transport passengers per day in Addis Ababa



The transport sector in Ethiopia is overseen by the Ministry of Transport with collaborative responsibility of other state institutions such as the Ministry of Water and Energy, the Ministry of Urban Development and Construction and the Environmental Protection Authority.

2.8.8 Public Transport and land use in Ethiopia main cities

In the coming months starting from the approval of the ENMP, it will be the primary task of the regional and local authorities to reconsider both the regional development plans and urban planning, with specific attention to the mobility needs of passengers and goods by updating the knowledge

and needs of people and companies.

ADAMA

Adama is the third largest city of the country next to Dire Dawa and Addis Ababa being a transport node of the major routes of Addis Ababa-Djibouti. The Road network of Adama is still characterized by poor quality, narrow width, and substandard roads that. These characteristics given the high number of inhabitants, the concentration of industrial and commercial centers as well as higher education institutions causes the city to have a high level of congestion.

However, the transport service is also constrained by shortage of access roads, absence of alternative routes and narrow coverage of the services that together with limited funding of transport infrastructure and services in the city made the public transport poorly efficient despite the efforts of the public company established in 1980 that was obliged to stop the services now completely entrusted to the paratransit sector.

AWASSA

With a master plan designed between 1950 and 1951 by Ethiopian and Italian Engineers, revised 1956 Awassa is really a beautiful lakeside town. Awassa is situated in the Northern edge of SNPRS 275 km south of Addis Ababa along the Addis Ababa-Nairobi International road.

The beginning of motor transportation service in Awassa town dates to 1952 E.C. There is only one mode of transport, road transport, which serves the interurban and inter-regional communications. The road transport serves as a means of communication between Awassa and Addis Ababa, Shashemene, Dilla, Aletawondo, Yirgachefe, Moyale, Wolaita Sodo, Arbaminch, Alaba and others location.

Walking is a major mode of transport in the town together with a large amount of cyclist that in 2008 was estimated in more than 25.000. Horse drawn carts and paratransit sector dominates the urban transport services has the city attract a lot of visitors from from Shashemene and Yirgalem towns.

It appears that the central part and commercial area is not well connected with administrative, health and educational institutions, localized in the south west (Tabor Kifleketama) and in the north (Misrak Kifleketama).

BAHIR DAR

Bahir Dar is the capital city of Amhara National Regional State located near Lake Tana 567 km North of Addis Ababa. The area under Bahir Dar metropolitan city administration comprises three rural *kebeles* (namely: *Zenzelema, Addis Alem* and *Woramit),* and three satellite towns/urban centers (namely: *Tis Abay, Meshenti and Zegie).* The Bahir Dar proper, which lies central with respect to all other settlements of the metropolis, comprises of nine *kebeles* with 2645.5-hectare built-up area that is physically divided into two unequal parts, to the West and to the East of the Nile River.

The 2008 National Transport Plan stated that three modes of transport were active in city system.

The city has a bus terminal in the central part, which is also passenger node for the north-western part of the country. The existing marine transport system on Lake Tana plays a significant role in the metropolitan level connection.

Bahir Dar could still face major problems like absence and shortage of access roads; substandard or low quality of roads; and absence and shortage of transport services. Urban transport services in Bahir Dar at the time of National Master Plan consisted of city bus providing transport services with only two buses along two routes and about 161 taxis serving along the different routes in the city. The city is known for high utilization of bicycles. More over 100 horse-drawn freight carts provided transport services. and a water transport services for tourists and nearby communities completed the picture on urban/metropolitan transport. At that time the modal split was as follow: Walk: 43.7 %, Cycle: 40.8 %, Public and para transit: 11.8 %, Private car: 3.7 %

The motivation of the trips was for 56.0 % home to work and work' 36.0 % home to school while the average trip length was 2.4 km. As like other Ethiopian cities, other than the poor geometry and surfacing of roads the inadequacy of public transport, poor pedestrian facilities, poor road safety, and scarcity of funds were detected. The previous master plan identified two actions to be taken for urban development:

- The establishment of a Regional transport Policy at Regional Level
- The implementation of specific transport system action at city level.

The urban transport study, of Bahir Dar has proposed a city structure with a clear road network to reduce fragmentations of the city morphology consisting of four levels of road types such as: principal arterial 40 m, minor arterial 30 m, major collector 20 m, minor collector 12-20 m.

DIRE DAWA

Dire Dawa is the second chartered town in Ethiopia with a population of 306,499 in 2008. The city has an international airport, railway station, and a good road network connection. The City Administrative Council of Dire Dawa had undertaken an urban transport study.

The study pointed out at that time (2008) that the public transport system in the city consisted of city bus, taxi, and non-motorized means. The three city buses provided service for only 25,000 passengers monthly. However, the service was weakly managed and lacked central terminal and garage facilities. As usual the paratransit sector takes over with about 690 taxis providing transport services for about 130,000 passenger-trips per day and a large animal carts known as "Gari" numbering about 1154 and providing service for about 46,000 passenger-trips per day. Also, the bike mode appeared consistent with about 5,000 bicycles.

Three different institutions related to transport were city transport agency, road authority and traffic police office. The shortages of manpower, and lack of coordination and the absence of an urban transport policy at that time was assessed.

The main issues coming out from stakeholder discussion were the following:

- traffic accident;
- Traffic congestion;
- Weak transport and road network plan;
- Weak road and transport management.

To this end, the study envisaged the following listed components of transport developments such as:

- A dry port which gives service for the different modes of transport;
- Support for freight and passenger transport by air, rail, and road interconnected through
- modern inter modal facilities;
- Adequate public transport services;
- Make trips by bicycle and foot more convenient, safe, and reduced conflicts with motorized
- modes;
- Provide street and road networks that have adequate structural and traffic capacity and
- properly maintained and managed;
- Coordinate transport and land use planning to create balanced development along the road
- network as well as preserving the quality of neighbourhood environments.

Based on the above visions of transport development, the study has defined the strategies related to the following goals and objectives:

- **Goal 1:** Achieve and sustain safe, secure, and efficient movement of people and goods:
  - › Reduce the level of traffic accidents by 50 % by the end of the planning period.
  - › Reduce the level of traffic congestion.
  - › Coordinate land use and transport planning to protect the economy and social benefits of

neighbourhoods.
  - Plan roadway, bicycle and pedestrian facilities to create smooth movement of people and goods.
  - Provide efficient public transport service for the community especially the poor.
- **Goal 2**: Enhance/provide spatial inter modal integrated economic growth and smooth mobility of the city:
  - Facilitate smooth transfer of passenger and goods transport from one mode to another.
  - Plan and mange infrastructure facilities especially terminals and loading unloading facilities.
- **Goal 3**: Achieve adequate capacity of streets and highways according to their purpose:
  - Plan streets and highways with appropriate structure and traffic capacity.
  - Manage and maintain streets and highways properly.
- **Goal 4:** Manage traffic to maintain safe, efficient, and environmentally acceptable movement of people and goods:
  - Create strong traffic management team.
  - Capacitate the institutions that are involved in the traffic management system.

Based on the formulated strategies, the study pointed the need of infrastructure and facility development and their priorities such as

- Freight terminal;
- On the street and off the street parking facilities;
- Bus terminal relocation;
- Development of inter-modal connection points;
- Improvement of existing roads;
- Development of sustainable funding mechanisms for transport sector.

HARAR

Harar City, the capital of the Harari People's National Regional State, is located at about 526 km from of Addis Ababa. It has a linear/ an elongated/ shape that is costly and difficult for provision of urban infrastructure. Harar situated at altitude ranging in the south 1700 m, and east 2200 m. a.s.l. and it is highly exposed to severe sheet and gully erosion and landslide. In Harar the availability of roads/streets is very low and the quality is very poor as compared to the physical size as well as the economic, political and regional importance of the city. In 2006, there was only about 72.5 km of road, of which asphalt, gravel and earth roads constitute 20.5 km, 22.3 km and 29.7 km, respectively. The existing road network is mainly limited to the central part of the city that extends only to the east-west direction. Most of the roads are narrow in width and lack pedestrian walkways.

The mobility was supported at the time by 550 taxis including the small taxis with a seat capacity of the tree wheel ones called Bajaj operating on seven main routes. They carried about 35,000-40,000 passengers per day. Due to the poor development of collector and local roads and absence of interconnections within the city, the availability of taxi transport service is limited only along the major roads. Therefore, most of the residents, especially residents of the peripheral areas, have poor or no access to taxi transport. Walking is a major mode of transport, which has an estimated share of 60-75%. There was also about 10 horse drawn carts that provide urban transport service in the city. Bicycle transport is not significant. The bus terminal gave service for about 8 large buses, 70 medium and 180 smalls vehicles per day. All vehicles, carts and street vendors share the same area as the result they are highly congested and the size is insufficient.

Harar city is located along the main highways connecting Addis Ababa and Dire Dawa with Jijiga. As a result, a number of freight vehicles used to make a stopover (during the day time and overnight) for various purposes. In addition to this, there are also about 210 freight transport vehicles operating in the Harari People's National Regional State and East Hararghe Zone of the Ormiya National Regional State.

Thus, there is a considerable flow of freight transport vehicles. However, there is no freight terminal in the city. Therefore, roadside parking is widely practiced.

There are nearly 5000 vehicles registered in the Region, of which more than 3000 vehicles are operating in the Harari People's National Regional State; and about 300 vehicles cross the city daily on the way to/from Jijiga from/to Addis Ababa/Dire Dawa that generate traffic congestion in the city. Traffic Accident was one the critical problems of transport in Harar **and to avoid/** minimize the congestion and in turn the accidents, private parking firms have been established in the main corridors of the town.

Transport and the road network account for about 14.53 percent of the total built-up area and the rest including commerce and trade, manufacturing and storage, and administration take 3.77, 3.67, and 2.71 % of the built-up area, respectively. Most of the road network of the city were not designed and constructed to accommodate high motorized traffic. This coupled with poor traffic management and transport infrastructure causes traffic congestion in the city. Poor quality and coverage of the road network as well as transport services in the city were identified as the fifth pressing problem.

AKSUM

Aksum was founded around the 4th C.AD and served as a capital city for the Aksumite kingdom. This historical city was declined and abandoned in the 8th-9th century. In 1992 NUPI had prepared a development plan. However, implementation did not follow the plans.

As the capital of the central zone of Tigray, the major urban economic means of Aksum include small scale manufacturing, trade/business, administration and social services, construction, and transport and related activities. Moreover, being the centre of ancient civilization and religion, Aksum and its environs are endowed with variety of tourist attractions that include stelae and monuments as well as temples.

The intra-urban transport of the town is provided by the paratransit sector and consist of small number of taxi and minibuses, horse-drawn carts (about 25 passenger carts and about the same number for freight transport), and bicycles (about 1819 registered bicycles in 1999).

According to the Integrated Urban Development Plan (IUDP) prepared by NUPI in 2001, the built-up area of the town is partially compacted stretching predominantly in the West, South and Southeast directions for about 4 km along the main highway. At that time Residential land use takes about 36 % of the total built up area while transport infrastructure takes about 24 %. The road network is grid like pattern with the following road hierarchies: Arterial road 30 m, Major collector road 20 m, Minor collector road 12-20 m, and Local road 6-10 m.

In terms of transport infrastructure, the result of IUDP was to create an interior loop by shifting the Mekelle-Enda Selassie main highway to the South and adding two other arterial roads to Mahbere Deguie and Edaga Berhe with the following hierarchies which reduced the share of transport infrastructure to 19 %: Arterial road 30 – 40 m, Major collector road 16 - 20 m, Minor collector road 10-14 m, and Local road 6-10 m.

ADIGRAT

The city was funded by the Italian during the colonial era in 1930s. The Italian's master plan divided the town into native and Italian settlement zones. The roads form Adwa and Mekelle meet at *Piassa*, the oldest section of the town separating the two zones. In 1995 the development plan of the town was prepared by The National Urban Planning Institute (NUPI) which helped give her a better shape until the IDP of 2006.

The existing streets of Adigrat town are well designed and fairly distributed, though they have some apparent limitations. The main streets of Adigrat are the Mekelle-Adigrat-Zalambessa (asphalt) and Adigrat-Adwa (gravel all weather) roads that cross south to north and east to west respectively. The presence of the three in and outlet roads have great contribution to the development of Adigrat by making it an influential transport center of the influence area.

After the Derg Regime, political stability was created which resulted the reviving role of the town in

commerce, transport and service provision and it also become an important administrative center of the region developing trade and communication with Asmara, Mekelle, Adwa, Axum, and the nearby towns.

The town is found on a site with a high proportion of flat topography. Elevation within the town is between 2530 m.a.s.l. in the southeast and 2660 m.a.s.l. in the western part of the town. By 2006, the total area of the town under the municipal jurisdiction was about 714 hectares, out of which 535.5 hectare or 75 percent is built-up area and the remaining 178.7 hectare, or 25 percent is non-built up area. The major land uses of Adigrat constitute of residential area 36.7 %, the service 21.0%, and the road and transport 26.7 % of the built-up area.

The inter-urban transportation system is supplemented with a bus terminal which is centrally located. There is no freight terminal and thus, trucks use on– street parking that aggravates traffic congestion. The total area of land used for transport and road network is about 143.13 hectares, i.e. 20 per cent of the total urbanized area.

In the IDP, transport issues were not identified as critical to be addressed in the plan but proposals for the construction of freight terminal, improvement of bus terminal, and prohibit the use of horse-drawn carts the main roads were made. The hierarchy of the proposed road network is arterial roads (25-30 m), collector roads (14-20 m), and local roads (6-12 m).

GOBA

Goba is a highland town along high Bale Mountain system ranging between 2640 and 2870 m.a.s.l. Generally, large area of the town. In 2008 the population of the town is estimated to be 55,566. Goba has a potential high tourist attraction potential and where the tourist industry can be easily developed. The most important attraction is the Bale National Park, Sof Umar Tunnel and the shrine of sheik Hussein. In 1974 EC, the Goba town development plan had proposed main (32 meters) and minor arterials (26 meters), and collector roads (20 meters).

Most of the roads in the town are gravel surfaced and walking is the main mode of travel within the city. At the time of the NTMNP (2008) The only mode of public transport in Goba town was horse drawn cart whose service has begun in 1978 EC now with more than 130 horse drawn cart. An intercity bus station was built in 1990 EC which is centrally located with an area of 940 m2. However, the station lacks facilities and waiting rooms as well other modern passenger services.

Other important gaps at the time were:

- The lack of access to some service giving institutions and residential areas;
- Most of the roads lack proper road surfacing;
- Old and new part of the town are disintegrated because of inadequacy of roads that connect these areas;
- Lack of proper drainage and erosion.

By 2002, Goba town has a total area of 1916.3 ha out of which the share of road and transport was recommended to be increased to 16.82% of the total area.

KOMBOLCHA

Kombolcha is a city localized along the Addis Ababa-Dessie Highway at 377 km just before Dessie and lying down in a range from 1,800 m a.s.l. to 2,000 m a.s.l. Kombolcha was founded during the Italian occupation at the crossroads of the Addis Ababa-Asmara and Addis Ababa-Asseb. The development of the town occurred with the establishment of textile factory in 1986.

Currently, Kombolcha houses a lot of medium and large-scale manufacturing plants including textile factory, meat factory, tannery, beer factory, steel factory, and wheat flour factory. The transport services in Kombolcha at the time of the 2008 NTMP was provided by about 32 small and minibus taxis operating along the major asphalt roads as well as horse drawn carts operating along secondary roads. Moreover, the city is also serving as a node of inter-urban transport services in the region next to Dessie, with a bus terminal that unfortunately is always congested due to common entrance and exit with the local market. Lack of office and passenger facilities is a really gap.

The municipal boundary encompasses about 1050 ha out of which 636 ha or 69% is built-up area out of which the residential land use constitutes 38 % of the total. The rest major land uses include manufacturing and storage 20.18%, transport and road 17.93%, and services 15.29% of the built-up area.

The first master plan for Kombolcha was prepared in 1981, revised in 1986 to introduce new residential and related activities and strengthen the industrial zone. Although most physical growth of the city is guided by the master plans, significant unplanned developments have also occurred due to due to lack of capacity and legal backing of these master plans.

The 2001 Development Plan of Kombolcha has proposed a total area of 2181.11 ha out of which 41.28% for residential, 17.79 for roads and transport, 15.36 % for manufacturing and storage, 11.28% for services, 7.53% for commerce.

AGARO

Agaro is a town dispersed along small hills, valleys; rivers and sometimes flat terrain prone to flooding.The elevation of hilltops gradually decreases from south to north. The elevation ranges between 1716 and 1836 m.a.s.l. In 2008, the population was estimated to be 45,657. The area used for the road transport (vehicular and pedestrian paths, bus terminals and parking areas) purposes was estimated to reach 50.76 ha (only 7%of the total area) which is low. The main type of public transport was horse-drawn cart which has commenced its service since 1970 E.C.

The main problem with regard to this transport service is narrowness of the roads that makes congested when animal-drawn carts is mixed with vehicles. The roads also do not have sidewalks. The other means of transport in the town was bicycle.

Agaro has a standard bus station constructed in 1994 E.C with approximate area of 12,081 25m2. It is owned and managed by Jima zone transport and communication department. In 2008 the major problem of the bus station was the absence of public latrine.

The existence of major roads such as Jima- Bedele road and those radiating from this high way to different neighbouring areas like Dalecho, Gera, Chioche, and others indicate that the road system is characterized by a radial pattern. The total area occupied by the road infrastructure network was nearly 49.44 ha (16% of total built up area. The development plan in 2002 has proposed 16.24% of the built-up area for road and transport. It was made by considering appropriate circulation network by redesigning the existing circulation network, creating reliable access for expansion areas, and integrating the existing and future expansion areas with necessary access. The road net-work is structured with a mix of arterial, collector and local roads. Upgrading of existing roads was at the time highly envisaged.

MOTA

Mota town lie on a rugged terrain within the altitude between 2390-2440 m.a.s.l. The general elevation decreases from north to south of the city. In 2008, its population is estimated to be 34538 with an area coverage of about 774 ha out of which 300 ha is built-up area.

The transport infrastructure counts to 11.26% of the total area of the town. The layout and arrangement of road network of Mota town reveals the impacts of the previous master plan with relatively well designed and fairly distributed roads. According to the standard right-of-way the road width has to be of 30 m, 24 m, 20 m, and less than 15 m, but at the time 2008 the actual width of streets in each category are 25 m, 20 m, 15 m and less than 10 m respectively. Waking is the main mode of travel in the town. During the development plan of 2004, there were one animal-drawn cart, about 378 bicycles, 16 motorcycles, and 37 private and government owned cars in the town.

Other than the absence of parking places for horse-drawn carts, problems of congestion and sanitation due to animal waste was among the ugly scenes particularly around the market area and along main roads. An intercity bus terminal constructed in 1996 by the municipality, unfortunately has no shelter for passengers and its ground is poorly surfaced and creates difficulty of movement during rainy season.

The 2004 development plan, recommended to increase the proportion of road and transport to

13.91% of the total area without increasing the existing total urban area other than to improve the condition of existing road network, the reconstruction of the existing unsafe roads, the upgrade width and function of some of the existing roads.

ASSOSA

Assosa is the capital of Benishangul Gumuz National Regional State and is located in a flat area ranging from 1580 –and 1730 m.a.s.l. In 2008, the population of the town was estimated in 21,884. During the Integrated Development Plan in 2006, the total area within the boundary of the municipality has been to be 948 ha of land out of which the built-up area constituted close to 55 percent (521 ha). Of the total built up area, residential land use and road and transport accounts to 48% and 34 % of the total built up area, respectively.

Walking is the main mode of transport while the use of vehicles for intra-urban public transport at the time was totally nonexistent with a limited use of bicycles in the town and about 140 donkey drawn carts which are mainly used for transporting goods. Generally, inter-urban interaction between Assosa and other towns is very limited due mainly to the poor quality of road and the low level of economic development in the region. The main road from Nekemte was improved under RSDP-III. In the IDP (2006) problems related to infrastructure was identified as a priority issue of Assosa, particularly in the old quarter known as “Arab Sefer”.

A total area close to 1344 ha of land was proposed to be developed within the boundary of the municipality. Of the total proposed land, residential land use accounted to 36%, service nearly 10 %, and transport and road accounts for about 9.5 %.

GAMBELLA

Gambella is the administrative center of the Gambella Peoples’ National Regional State, founded in the early 20th century as the trading post localized along the navigable Baro River, in proximity to the resource rich highland areas of the region. During the Italian period, roads were constructed that run between Gore to Gambella as well as Gambella to Dembidolo and some urban services begun to appear like schools, clinics, bars, shops, etc. The first master plan was prepared in 1967, revised in 1986 by the then Ministry of Works and Urban Development. Then after, the National Urban Planning Institute (NUPI) also prepared the development plan of the town in 1995, and this plan has remained the basic development document until the Integrated Development Plan of 2007 was prepared.

In 2008 Gambella was a small town with an overall population of about 32,613 people It has all weather roads connection to Metu, Dembidollo or Itang, Elia Adura, and Abobo. Gambella town is one of the few Ethiopian towns being served with water transport system being the Baro River the only navigable river of Ethiopia, which crosses the town and provides transport service up to the Sudan. The service is provided only for a short period of time in the months between June and October during which the river has sufficient volume of water to enable boats successfully float. According to the 2007 IDP of Gambella, the municipal boundary of the town covered about 765.07 hectares, of which 529.73 hectares or 69.24 per cent are built-up and the remaining 235.34 hectares or 30.76 per cent is non built-up area.

Generally, only few areas of the town are accessible. Almost all local roads are very narrow and are in poor condition usually with a width between one to two meters. The total area covered by transport and road network is about 72.91 hectare or 9.54 per cent of the total urbanized area. In the 2007 IDP study, the road problem of Gambella town has been identified among the major priority issues of the City.

The problems identified during the assessment included absence of access roads in some parts of the partial plan area; absence of road side channels; bridges and culverts in places where they are very important to cross. The 2007 IDP has proposed the construction of new roads, opening and widening of narrow roads, and construction of bus and fright transport terminals.

According to the Urban Transport Study (2005) the predominant transport mode was (78%). walk and cycling with an average trip time of 20 minutes (about 2 km length). At the time there was not public transport, though pick-up vans, when they are empty, carry passengers.

The main recommendation of the IDP was related to: institutional capacity building, improve regional connectivity, improve the town road network, provide pedestrian facilities, develop Regional Bus Terminal, promote privately operated intermediate Public Transport System

According to the 2008 ENTMP the following policies to promote urban transport in Gambella Region State were proposed: The establishment of a Gambella Regional Urban Transport Policy, The Setup of a Gambella Region Urban Transport Board, Technical Assistance to Gambella Town Administration, A vast Capacity Building programme as well as a Gambella Mater Transport Plan involving with the Improvement of Baro Bridge Road, the Improvement of Arat Kilo Road, Traffic Management, Development of Pedestrian Facilities, Improvement of Intersection Geometries, Improvement of Airport Road, Development of River Bank Road, Development of Bus Terminal, Development of Truck Terminal, Establish Traffic Engineering and Management Unit, Capacity Building for City Administration, Police, Traffic Safety Education Program, Development of Gambella – Jima Federal Road (by ERA)

2.8.9 The proposed framework in the 2008 National Transport Plan

This paragraph describes what was suggested in the previous Master Plan, also to verify the implementation of the action suggested

At the time of the 2008 ETNMP the consultant suggested to afford the Urban Transport demand according to the different city's categories and sizes. Of course, the solution for Addis Ababa was deemed not applicable to any other urban centres of the country. However, was rightly observed that the urban transport situation as a trend was similar in pace but different in quantity. The suggested frame work for a sustainable urban transport system was:

MAJOR ISSUE	RECOMMENDATION
Transport Infrastructure	• Provide a minimum of 25% of land in the built up area for transport infrastructure • Plan and implement the provision of transport infrastructure to provide access and mobility to support sustainable socioeconomic growth and reduce poverty for all inhabitants and visitors • Provide economically appropriate all-weather road surfacing that sustainably be maintained and used for motorized and non-motorized traffic
Transport Services	• Provide well-regulated city bus services to enhance access and mobility on main corridors • Promote other forms of public transport systems such as middy-buses, minibuses, and small taxi including three wheelers as appropriate to supplement city bus services • Regulate the use of horse drawn-carts so that they give services on lower hierarchy road network of cities • Provide appropriate central station(s) and bus stops for city buses and other public transport systems
Freight Transport	• Provide terminals for freight transport vehicles out of the main built-up area of the city • Locate main stores, industrial areas, and fright vehicle terminals out of ring roads or by pass roads • Prohibit parking of heavy freight vehicles within the built-up areas • Regulate goods delivery vehicles in time and standard size
Pedestrian, Bicycle, and Parking facilities	• Include in the plan and implementation of transport infrastructure careful consideration of pedestrian, bicycle, and parking facilities. • Promote walking and provide pedestrian walkways, crossing facilities, islands for pedestrian refuges, traffic calming measures, school zone improvements, etc • Promote bicycle transport and provide segregated bicycle lanes wherever appropriate on main streets • Provide on the road and off the road parking lots. The construction of buildings which attract/generate traffic should consider parking requirements
Safety, Environment,	• Incorporate safety, environment, and energy saving requirements in the planning and implementation of transport infrastructure and services

MAJOR ISSUE	RECOMMENDATION
Energy	• Establish sustainable traffic accident data base, analyse data, and take appropriative safety counter measures periodically and sustainably to maintain the safety • Minimize negative impacts of transport (from affect biodiversity, and from air and noise pollutions. • Save energy by reducing congestion.
Transport System Management	• Create responsible body under city the administration (Department of Transport) for the provision and regulation of sustainable transport infrastructure and services with the following functions: • Undertaking integrated urban transport planning • Construction and maintenance of transport infrastructure, • Provision and regulation of public transport services, • Provide traffic engineering and management services, and • Regulate transport within the respective city
Land Use And Transport Planning	• Promote and facilitate the preparation and implementation of integrated urban transport master plan for all major urban centres (see the framework below) • Urban master/development plans should incorporate urban transport plan as the major component
Private Sector Participation	• Promote and attract large resources on a systematic and continuous basis the participation of the private sector in the provision of public transport services
Gender and Disable Considerations	• Plan and implement transport environment that provides equal opportunity considering gender and disabilities. • The public transport system and the design of transport infrastructure should consider disable people. • Consider gender equality in the provision of public transport services, bicycling, and walking.
Regulatory and Legal Considerations	• City administrations under this category need to create institutions for the planning, development, operation and management of the transport system. • The laws need to be reviewed and legal provisions should be created to enable the development and management of urban transport system.
Urban Transport Funding	• Budgetary support to urban transport by Federal and Regional Governments need to be increased. • Create special funding at city level for urban transport, for example: • Parking fees, penalties from violation of traffic regulation • Levies on property taxes

Finally, the 2008 Transport Master Plan suggested to afford the transport planning according to four categories: **Main Cities**: (Chartered cities like Addis Ababa and Dire Dawa) with more than 100.000 inhabitants: **Intermediate cities**: population between 50.000-100.000. Developing cities: population between cities where the transport issues at the time was not critical but requiring considerable attention to support their social, economic and political activities. Emerging cities: such as the growing capitals such as Afar, Benshasgul, Gambella, Semera and Assosa. In other words, cities with basic problem of transport infrastructure that was expected to grow rapidly.

The consultant moreover also envisaged the need for a National Urban Transport Policy within the Ethiopian National Urban Policy (ENUDP) where the following aims were suggested:

- Integration of urban land use and transport planning,
- Promotion of mobility of people and accessibility to opportunities,
- Promote freedom of choice,
- Maximise safety,
- Minimise environment impacts,
- Conserve and mobilise resources,
- Facilitate private sector participation,
- Encourage research,
- Build capacity, and
- Enhance aesthetics of urban areas.

Last but not least the needs to allocate specific funds for urban transport was proposed indicating the eventually source of such funds mainly addressed to land leasing and permits, tariffs and taxes, technical. services

2.8.10 The future of the Ethiopian urban development: the smart cities

The Consultant believes that this Ethiopia National Transport Plan cannot be a standalone plan, but must seek very close links especially between transport, urban planning, and new ITC tools. In other words, along the path of construction of this plan, the consultant wants to reconcile with the client involvement the future of the transport sector with many other sectoral plans and strategic visions that are currently contaminating both the social and economic dimension of different cities starting from Addis Ababa.

Certainly, and as suggested by the client and by recent mobility planning studies, especially in Europe and the USA and in the more complex and attentive urban realities, actions on urban mobility must give greater attention to pedestrians, bicycles and mass transport. The Consultant fully shares the new paradigm shift of the concept of "inverted pyramid" which at federal and regional level needs to be developed and applied in other cities as it happens in Addis Ababa.

The recently issued “non-motorized strategy” at national and Addis Ababa level will be incorporated in the ENTMP adhering completely to the guidelines of the Ministry of Transport

The Consultant therefore will provide guidelines on sustainable mobility program and plans (according to the inverted pyramid model) to be applied at all the cities and or urban agglomeration of Ethiopia, primarily focusing on;

(a) Enhance and facilitate none-motorized transport through design and implementation of connected pedestrian streets and facilities all cities.
(b) Provide and promote none-motorized transport through design and implementation of bicycle network infrastructure and facilities in all cities.
(c) Capacitating major regional cities and emerging towns by providing urban mass transport using renewable energy sources.
(d) Provide supplemental green infrastructure to support the use of non-motorized transport modes.

The aim of the Consultant is also to enable the transition of the urban fabric to a smart city.

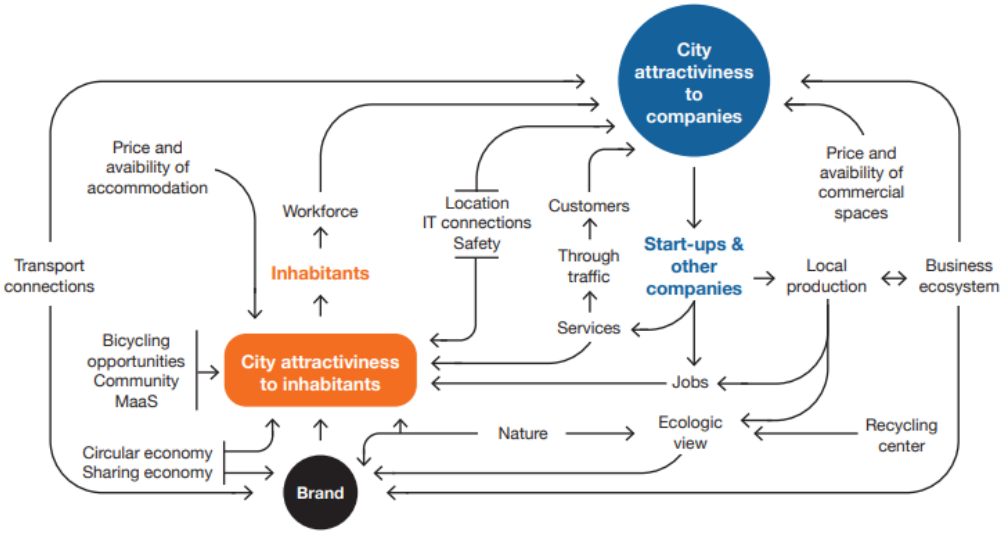
A smart city can be defined in different ways depending on the level of development, resources and aspirations of its residents. In general, a smart city is developed when ‘smart’ technologies are deployed to change the nature and economics of the surrounding infrastructure and urban services. A smart city is a city where the built environment and buildings run on smart energy and the people and businesses utilise smart mobility. Not simply cleaner and greener, but driven by the desire to maximise the potential of buildings and municipal infrastructures, such as energy and transport networks, in order to create the best possible living environment for the citizens. That is:

- Realising a socially inclusive community where both the citizens and private-sector companies collaborate openly with and for the city.
- Maximising resource and energy efficiency with sustainable production and consumption.
- Establishing firm foundations for economic growth and innovation-driven future.
- Launching smart-city ecosystems, where positive cycles of development feed the development of each and every stakeholder.

One of models that can best illustrate the path for a smart city is based on two main pillars:

- The attractiveness for the companies and
- The attractiveness for the inhabitants

Figure 70: City Attractiveness



In this context, the Consultant wants to explore and submit the concrete possibilities that can affect the mass mobility of the Capital and other cities both at a technological, managerial and operational level. The interconnections with the growth corridors already identified by the Ethiopian scientific, economic and social community will also be developed.

Development of innovative means of mass transport, use of less polluting energies, from electric to GCNG, to hybrid up to the forecast for areas and cities with accentuated height differences in transport systems such as cable cars will be suggested.

As regards the management of public transport, there is no doubt that a strong involvement of the private sector such as paratransit should be considered through the widespread use of PPP, together with more advanced payment systems, up to the use of sensors for management traffic, environmental monitoring.

The use of big data for the management of urban systems, planning and decision making thanks to the liberalization of the telephone network will be envisaged in all areas of interest of the plan.

2.9 ENVIRONMENTAL, SOCIAL ASPECTS & CLIMATE CHANGE ADAPTATION

Following is the description of the environmental, social, gender and climate change aspects related to transport planning in Ethiopia

2.9.1 Transport and Environment

Transport infrastructures, like other development projects, pose impacts on the environment in different ways and levels. That is, depending on the mode, they have impacts on the air, soil, water, vegetation, wildlife. In addition, construction and operation of transport systems can have an adverse effect on human health. In the process of achieving their primary objectives, transport projects contribute several benefits (positive impacts) that foster development at different levels mainly in the form of: creating/enhancing accessibility and mobility, creating employment opportunity, and contributing to induced development.

However, beside its benefits, the transport sector has also posed detrimental impacts especially on the environment. That is, the construction or upgrading of transport infrastructures involves impacting the physical, biological and socio-economic environments regardless of the extent of the impacts. Each of the impacts associated with road works may be positive or negative, short- or long-term, localized or widespread, etc. The risks to the physical environment include: soil erosion in

the longitudinal and transverse directions in the road route/corridor; slope instability when the road cuts through mountainous areas; decreased water quality due to both pollutants and sediment loads linked to soil erosion; soil and water pollution from hazardous wastes such as used oil and lubricants; and decreased air quality due to emissions from construction machinery and traffic volume (there are also stationary sources of emissions). The risks to biological environment include: loss of natural vegetation and of wildlife habitat due to land clearing, and the impact of road activity on wildlife migration patterns (due to ecosystem fragmentation). The risks to the socio-economic environment include: loss of fertile land and cash (perennial) crops, loss of residential houses, loss of business, etc.

As construction of transport infrastructures impact the environment, the environmental impacts in turn affect communities, including their health and livelihoods. That is, decreased water and air quality affects households' environmental health. Loss of properties like land, crops, residential houses and other businesses affects the livelihoods of communities. During the operation phase of transport infrastructures, the performance of the systems could also be related to environment. That is, the status of transport safety affects the environment, for example, in the form of air pollution (possible burning of vehicles, aircrafts, etc.); and soil pollution from spillages of fusels due to accidents.

Environment Legal Framework

The Constitution of the Federal Democratic Republic Ethiopia (FDRE), adopted in August 1995, forms the fundamental basis for enactment of specific legislative instruments governing environmental protection matters at national level. The Constitution has several provisions which have direct policy, legal and institutional relevance for appropriate implementation of environmental protection and rehabilitation action plans targeted to avoid mitigate or compensate the adverse effects of development actions.

The Constitution thus contains a number of articles which are relevant to social and economic issues/objectives (such as, rights of women, children, labour & employment), environmental matters in connection with development projects in general, and the prominent Articles relevant for the proposed Subproject include the following:

1) Article 44 states that all person have the right for a clean and healthy environment;
2) Article 44.2 indicates that interventions for public goods that cause the displacement of people or adversely affect the livelihood of the local population shall give the right to commensurate monetary or other means of compensation including relocation (resettlement) with adequate State assistance. This provision has a strong relevance for the resettlement action plan;
3) Article 92, which sets out national policy principles and objectives, includes the following significant environmental objectives:
   - Development projects shall not damage or destroy the environment, People have the right to full consultation and the expression of views in the planning and implementation of environmental policies and projects that affect them directly,
   - Government and citizens shall have the duty to protect the environment;

Environmental Policy of Ethiopia (EPE)

The Environmental Policy of Ethiopia (EPE was approved by the Council of Ministers in April 1997. Its conceptual framework was based on the findings and recommendations of the National Conservation Strategy of Ethiopia. This policy document, along with CSE was developed with the assistance from the International Union for the Conservation of Nature (IUCN). EPE includes 9 policy objectives, 19 guiding principles, 10 sectorial and 10 cross-sectorial policies.

The sectorial environmental policies are; Soil husbandry and sustainable agriculture, Forest woodland and tree resources, Genetic species and ecosystem bio-diversity, Water, Energy, Mineral resources, Human settlement, urban environment and environmental health, Pollution from

industrial waste and hazardous materials, Atmospheric pollution and climatic change, and Cultural and natural heritage.

The cross-sectorial environmental policies cover the following main areas/theme, such as, Population and the environment, Community participation and the environment, Tenure and access rights to land and natural resources, Land use plans, Social and gender issues, Environmental economics, Information systems, Research, Environmental impact assessment and Environmental education and awareness. The implementation of transport infrastructures and operation of the system has a direct relation and impact on the sectoral environmental policies stipulated in the EPE.

Transport Policy of Ethiopia

The National Transport Policy of Ethiopia was issued in May 2020 by the Council of Ministers. The Policy is structured into five major parts. In relation to environmental and social consideration by the Policy, it is observed:

In Section 1.6, major principles of the Policy, it is stated that the Transport Policy shall be in harmony with environmental (natural) ecology;

In section 2.1.3, the Policy has made inputs of the following with due attention and consideration:

- Climate-resilient Green Economy (CRGE);
- Reduction in Greenhouse Gases (GHGs);
- Forest development and protection (management);
- Attention to energy-efficiency technologies;

Section 2.1.8 of the Policy is dedicated to the Policy and the Natural Ecosystem

Under section 4, Implementation Strategy of the Policy, Section 4.6 deals with Transport and the Environment

Institutional Capacity in the Sector

Institutional capacity here refers to the capacity of the institutions under the Ministry of Transport to consider and manage environmental and social issues at different stages of their respective project implementation and operation. To this effect, a preliminary assessment of the existence of safeguard units within organizations under the Ministry (including the Ministry) was made and the findings are presented in the following Table:

No.	Sector Component Org.	Safeguard Unit Established?			Name of Unit
		Yes	In Progress	Not yet	
1	Ministry of Transport	X			› Environmental and Social Impact Monitoring Team; › Climate Change Team
2	Ethiopian Roads Authority	X			› Environmental Management Team; › Social and Rehabilitation Team; › Occupational Health and Safety Team
3	Ethiopian Railway Corporation	X			› Environmental Management Team
4	Federal Transport Authority	X			› Environmental and Social Impact Support and Monitoring Team; › Road Transport Air Pollution [Protection] Team
5	Ethiopian Aviation Authority		X		› -
6	Ethiopian Toll Roads Enterprise	X			› Environmental Protection Team
7	Ethio-Djibouti Standard Gauge	X			› Quality and Environmental Team
8	Ethiopian Maritime and Logistics Authority			X	› -

ERA Safeguard Unit

Due to the predominance of road sub-sector, the Ethiopian Roads Authority establish its own Safeguard Unit, consisting on three units: 1) Environmental Management Team, 2) a Social management Team and a 3) Occupational Safety and Health Management Team.

AACRA Safeguard Unit

In addition, because there are considerable proportion of vehicle fleet in and around the city of Addis Ababa, the AACRA set its safeguard unit (Environmental and Social Affairs Team) under the Quality Assurance and Road Safety Inspection Directorate.

2.9.2 Social Issues in Transport

Transport improvements may have a great impact on poor and vulnerable people provided when other interventions are also adequately put in place and vice versa; indeed, without a good transport system many sectoral interventions may be ineffective: e.g., well-equipped health posts are useless to poor people who cannot reach them somehow.

Improved access and mobility are critical for reducing isolation, vulnerability and dependency for poor and vulnerable people, such as elderly or people with disability. In this sense, transport alone cannot reduce poverty, but it can serve as a crucial leverage in many ways.

However, to think that any transport intervention necessarily has a beneficial impact on the poor or on the most vulnerable population would be a mistake. The poor can indeed benefit from road transport projects for example but meeting their needs on a sustainable basis depends on the details of the project design, which has to listen to the poor and understand his needs.

Upgrading transport services for instance may lead to an increase in tariff regimes, making the services less affordable to the poor, and contributing to increase isolation; so, in this case, subsidy could be an important policy option for ensuring equitable transport access for poor and vulnerable people. Moreover, a focus on transport sector only on who can pay for the transport service excludes other transport users, such as pedestrians or street vendors, implicating safety problems for the latter.

Thus, affordability of transport is only a small part of the equation: without affordable access and without adequate mobility, poor people will be unable to take full advantage of any improvements in other social services, such as health, education, safe water, social protection etc...

Another crucial difference is that transport concerns differ for the **rural and urban poor.**

Rural transport and poverty

When we talk about rural transport is essential to differentiate between roads passing through rural areas *vs* roads serving the needs of rural communities. Rural roads are often described as rural access, feeder, agricultural or community roads. Such roads connect various settlement of less than 2000-5000 inhabitants to each other and to higher classes of road and higher population settlements.

A great deal of the transport time of rural people is spent on paths close to the village that are used to access water, fuel wood, fields, pastures and village amenities. Footpaths are also the main way in which most rural people start their journeys to connect to the road network, transport services and towns. The problems and the isolation of rural people can be exacerbated by poor footpath condition and/or the lack of bridges that would allow the safe crossing of rivers. An important aspect is that women and youth usually undertake the great majority of rural transport.

When interviewed, poor rural people often cite the need for better transport (roads and transport services) as key investments that would improve their lives. Investment in rural roads can involve connecting villages that are not on the road network and/or improving the maintenance and quality of existing rural roads. Both types of investment bring significant benefits to rural communities and to poor people, but there is evidence that the greatest benefits often come from providing motorable

access to people that are currently far from any road.

Modelling longitudinal household data from 15 villages in Ethiopia, it was found that improved access (all-season, motorable rural roads compared to paths and trials) reduced poverty by 6.9 percentage points and increased consumption growth by 16.3 percentage points[19].

In particular, rural transport projects can have a positive impact through four main channels:

- Increase in agricultural production. The agricultural benefits of rural roads have been clearly identified in many countries and the lack of rural roads and the poor quality of road infrastructure has been cited as a major constraint to agricultural production in East Africa[20]. However, the link between greater agricultural production and poverty elimination can be altered by issues of land ownership and costs, employment and migration.
- Access to health care. Maternal and perinatal mortality are among the most common causes of death in rural areas. Many studies from around the world highlighted how poor access was a major cause of peri-natal mortality, with an estimated 75% of mortality resulting from inadequate transport to access basic health facilities and/or transport for referrals to hospitals. In particular, the perinatal mortality rate in Ethiopia is one of the highest in sub-Saharan Africa countries (a 2014 study showed a rate of 90 per 1000 birth in a hospital setting, and 40 per 1000 births in community-based settings). The corollary of the problem analyses is that constructing and maintaining rural roads, paths and bridges leads to improved maternal health outcomes and healthier rural communities.
- Access to education. Rural roads can greatly influence where schools are built, how many rural boys and girls go to primary and secondary schools and how adequately the schools are staffed. In most countries, rural primary schools are within walking distances of their catchment communities, but secondary schools are more spaced out, requiring much longer average journeys (and perhaps boarding arrangements).
- Local workforce involvement. There is much evidence that involving local people in labour-based road construction and maintenance can provide valuable employment for poor people and help empower women and disadvantaged groups. Instead of construction and maintenance funds going towards the use of heavy equipment, imported fuel oils and urban-based contractors, the money is spent on employment within rural areas. The money 'transferred' in this way can reduce poverty and improve livelihoods, particularly for people for whom there are many days of work over a long time

Rural accessibility and Social inclusion in Ethiopia

As confirmed by the World Bank Ethiopia Poverty assessment 2020, in Ethiopia the poor tend to live in more remote and poorly-connected areas. Statistics combined with the most recent Ethiopia Household Consumption Expenditure Survey (HCES) and the Welfare Monitoring System (WMS 2016) showed that relative to the rural non-poor, the rural poor live further away from roads, health facilities, and urban centers.

For instance, 57 percent of the poor live more than three kilometres away from an all-weather road, compared to 45 percent of the non-poor, as showed in the Table below. Also, concerning distance to health facilities, 43 percent of the rural poor live more than three kilometres away from the nearest health post, in comparison with the 34 percent of the non-poor.

Same conclusions are showed in the average distance to the nearest town (in walking time) which normally represents hub for economic opportunities.

[19] Dercon and Hoddinott, 2005; Dercon et al, 2009

[20] Dercon et al. in a study found out a positive correlation between new rural roads and increasing crop outputs in Ethiopia

Table 43: Distance to health facility and road connectivity by poverty status in 2016 in rural rural areas

		NON-POOR	POOR
Distance to health facility	% located less than 2 kms	46.3	38.6
	% located between 2 and 3 kms	19.6	18.3
	% located more than 3 kms	34.1	43.1
	Average distance in km	3.4	4.2
Distance to all-weather roads	% located less than 2 kms	43.1	33.2
	% located between 2 and 3 kms	11.5	10.1
	% located more than 3 kms	45.4	56.7
	Average distance in km	6.3	8.0
Distance to the nearest town	% located less than 2 kms	46.4	33.8
	% located between 2 and 3 kms	26.4	29.7
	% located more than 3 kms	27.2	36.5
	Average distance in km	1.8	2.2

Source: HCES, WMS, 2016

Since 1997 the RSDP has contributed to expand and maintain the rural road network. The benefits of such plan include a significant increase in the density of the road network, a reduced distance and time to reach an all-weather road for many users and the creation of a wealth of trained private contractors who are capable of expanding and maintaining the infrastructure.

As major component of the RSDP-IV, Universal Rural Road Access Program (URRAP) was launched envisaging connecting all Kebeles by standard and affordable all-weather roads that provide year-round access. Within the program implementation period, it was planned to construct 71,523 km of all-weather roads throughout the country at an estimated cost of more than ETB 26.4 billion. The full-fledged implementation of URRAP was supposed to ensure year-round access to road for about 80% of the total rural population.

The second phase of URRAP has continued in RSDP V with a target of constructing 90,000 km of URRAP roads. For the four years of RSDP V, regions managed to construct 14,902 km of all-weather roads till the 2018/19 fiscal year. The encouraging impact of URRAP roads has already been reflected on the improved accessibility situation of the rural population as the average time households have to travel to get all weather road reduces from 2.9 hrs. (8.7 km) in year 2011/12 to 1.3 hrs. (4 km) in 2018/19. In addition, more than 7 million man-days have been contributed as a free labor contribution during the implementation years of URRAP.

Rural connectivity has improved considerably since 2010, linked to the URRAP, resulting in decreases in travel time and improved market access (World Bank, 2018). However, URRAP roads have been constructed in places that were already less isolated to begin with, leaving the most remote and difficult-to-reach places unconnected.

In addition, recent studies from the York University[21] suggest that the areas which have received the greatest benefits in terms of transport cost reduction have seen the most benefits from the production of agricultural goods. However, as highlighted in the most recent RSDP reports, the cost of maintenance is becoming an increase burden for public finances and raising funds for this purpose remains an issue.

Poverty and Urban Transport

Urban areas face very different challenges to rural areas, and necessarily the nature of transport solutions is very different. Transport interventions (principally road building) in the rural areas of developing countries are mainly designed to improve the rural economy and so directly help the rural poor. In contrast urban transport interventions are overwhelmingly designed to address the

[21] T. Adamopoulos, Spatial Integration Agricultural Productivity and Development: A Quantitative Analysis of Ethiopia's Road Expansion Programme, 2019

problems of urban congestion and the rapid increase in urban car populations.

In this case the main beneficiaries are not the urban poor but are much more likely to be the rich and middle-income sections of the population. The poor may benefit from the changes, although often the reverse is the case, particularly with new road building, severance and resettlement.

Rapid urbanisation has dramatically increased the challenges of providing adequate transport infrastructure capacity and services for the poor.

Strengthening the inclusiveness of transport projects helps disadvantaged groups to benefit equally from new opportunities, new employment opportunities for example - not just jobs, but for more productive and better-paid jobs that can raise incomes. Without a careful social analysis, transport systems can exclude the growing members of urban poor and exacerbate their relative poverty, for example, by supporting private vehicles at the expense of public transport systems on which the poor heavily rely.

Access by the urban poor to employment, schools and other facilities depends on a range of factors:

- the location of their housing
- the distance and location of work opportunities and other facilities
- the location of local transport infrastructure, including roads and transit facilities
- the service density of public transport
- public transport fare levels and available income for transport
- the gender, age and any disabilities of those concerned.

Poor people in inner city areas generally have better access to employment and facilities than those living further out. For all income groups, there is a 'trade-off' between housing costs, living space and transport costs. Inner city areas generally have higher rents and less living space but lower transport costs to work.

For those in the suburbs (including informal settlements) there are generally lower rents and more living space but higher transport costs to work. Poor people in inner cities may have low transport budgets and little time spent travelling, but poorer living conditions mean they do not feel 'better off' than those further out.

High job search costs further constrain job search and matching in urban centers. In particular, in 2014 study on youth searching for job in Addis Ababa[22], it emerged that finding a job in Addis entails considerable investment in public transportation to job boards and interviews. In fact, after four months of job search, 83 percent of unemployed youth had stopped actively looking for a job because it was too expensive. This result stress the presence of constraints that have been highlighted: poor urban planning which increases travel time and costs between residential and commercial areas; low wages which do not make the costs of search worthwhile; and limited access to credit markets for job seekers to help manage the cost of transition. In the aforementioned experiment, some job seekers were randomly assigned to receive a transport subsidy twice a week, covering the cost of travel from the outskirts to the city centre where information about vacancies is available. The result was that receiving the transport subsidy increased the likelihood of finding a permanent employment by 7 percentage points after 4 months.

2.9.2. Gender Issues in Transport

Transport infrastructure and services are often incorrectly considered "gender neutral." It is wrongly assumed that transport projects equally benefit men and women and there is no significant difference in their travel patterns, modes of transport access, and utilization of transport infrastructure and services. In fact, mobility is experienced differently by women and men, as they use different modes of transport for different purposes and in different ways depending on their

[22] S. Franklin, Job Search, Transport Costs and Youth Unemployment: Evidence from Urban Ethiopia, 2014.

socially determined reproductive, productive, and community-related gender roles. Women's and men's relative economic and social status and livelihoods also influence their different transport needs and utilization of transport services.

These differences need to be well understood in order to inform the design of gender-inclusive transport projects. Gender dimensions of transport become more evident when transport investments are viewed in terms of enabling the mobility of people for different purposes and needs, and by different modes—which are experienced differently by women and men, girls and boys, rather than in terms of mere investment in hard infrastructure that equally benefit all social groups.

Therefore, in the transport planning process it is useful to bear in mind the interrelations existing between transport and gender and their consequences. Among the most evident differences in the use of transport by men and women there are:

- Gender Differences in Travel Patterns. Women have daily mobility patterns that are more complex than men, owing to their gender roles, which combine domestic and care giving tasks with paid employment, income-earning activities, and community and social obligations. As primary family caregivers, for instance, women are more likely to be responsible for accompanying children to school and medical services, and purchasing fresh produce and groceries from markets; hence, their daily mobility will involve travel to and from these services and locations.
- Gender Differences in Use of Transport Modes. For many women in developing countries, walking remains the predominant mode of travel, particularly in rural areas, because other transport modes are often not available, are too expensive, or are located too far away from home for women to access. In some contexts, women and children head-loading may also act as a form of freight transport for agricultural production. In addition, where women do use vehicles or transport services, they are more heavily reliant on slower, non-motorized transport (NMT) or intermediate modes of transport (IMTs, such as bicycle, cyclo, motorbike-taxi, tricycle, rickshaws, and animals or animal-drawn carts). In urban areas, this usually translates to women being more dependent on public transport.
- Gender Differences in Time Use. Women often experience "time poverty" that impacts significantly on how much time women can allocate for travel— where they go, for how long, and what for purpose, and the scheduling of trips they make. This because women's travel has to be undertaken in between or simultaneously with other daily household tasks and this could have critical consequences: for example, women may turn down employment opportunities further distances away from home if the transport system does not enable them to travel to and from work in time to also meet their domestic family care obligations. Instead, they may have little choice but to accept lower-paid local job opportunities or informal income sources closer to or at home, so they can combine their dual responsibilities of managing household and productive activities.
- Gender differences in Access to Resources. As women generally have lower cash incomes and may have less decision-making control over household financial resources, they may have limited affordability for public transport services.
- Gender Differences in Mobility and Safety. In some sociocultural contexts, strict sex segregation especially in public spaces is the cultural norm. This influences the social and cultural acceptance of women's independent travel beyond the home and vicinity of the community and constrains women's mobility. In these situations, women remain relatively homebound and it is generally unacceptable for a woman to travel away from home on her own without being accompanied by a male or elderly female family member. Moreover, personal safety and harassment on public transport are significant concerns for women. Women are often subjected to sexual and other forms of harassment when using transport services. Therefore, for women, perceptions of safe travel go beyond physical road safety to include risks of harassment, stalking, sexual assault, or rape.

Gender-related aspects in transport in Ethiopia

In Ethiopia, Gender considerations in transport were included in the first Road Sector Development Program (RSDP) and, in particular in its component, the Ethiopian Rural Travel and Transport Program (ERTTP), which has a goal, to promote the development of community-based integrated rural travel and transport services.

Findings from the Village Level Transport and Travel Study (VLTTS), conducted in 1999, show that women spent almost twice as much time on household related travel, and that they expended three times more effort on tasks involving travel and transport.

In addition, the analysis of the travel and transport burden showed that 73% of the trips, 61% of the travel time or 93% of the transport effort were related to meeting household needs: i.e. the collection of fuel, water (excluding waiting time at the source) and food.

This domestic transport is largely done by women, and takes up between 20 to 25% of the adult women's working time. This meant that women spent, on average, 4 hours a day or 1,440 hours per year moving and carrying household goods. In addition to domestic transport, women travel to the local market and health care facility – constraining their time for cooking, cleaning and childcare. These results are comparable with earlier synthesis of village level transport and travel studies (VLTTS).

From these surveys, RSDP planners and implementers sought to reduce the transport burden, particularly of women and children, by consulting the women and increasing their representation in transport planning and decision taking. Throughout its economic and social interventions, the program sought to sensitize policymakers and local people on gender aspects of transport.

It is worth also noting that the 2016 Ethiopia Demographic and Health Survey (DHS) reported that in Ethiopia more than 2 in 3 women (70%) report having problems in accessing health care. Among these problems, distance to the health facility is declared by the 50 percent of the women interviewed.

2.9.3 Gender Issues in Transport

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These differences need to be well understood in order to inform the design of gender-inclusive transport projects. Gender dimensions of transport become more evident when transport investments are viewed in terms of enabling the mobility of people for different purposes and needs, and by different modes—which are experienced differently by women and men, girls and boys—rather than in terms of mere investment in hard infrastructure that equally benefit all social groups.

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- Gender differences in Access to Resources. As women generally have lower cash incomes and may have less decision-making control over household financial resources, they may have limited affordability for public transport services.
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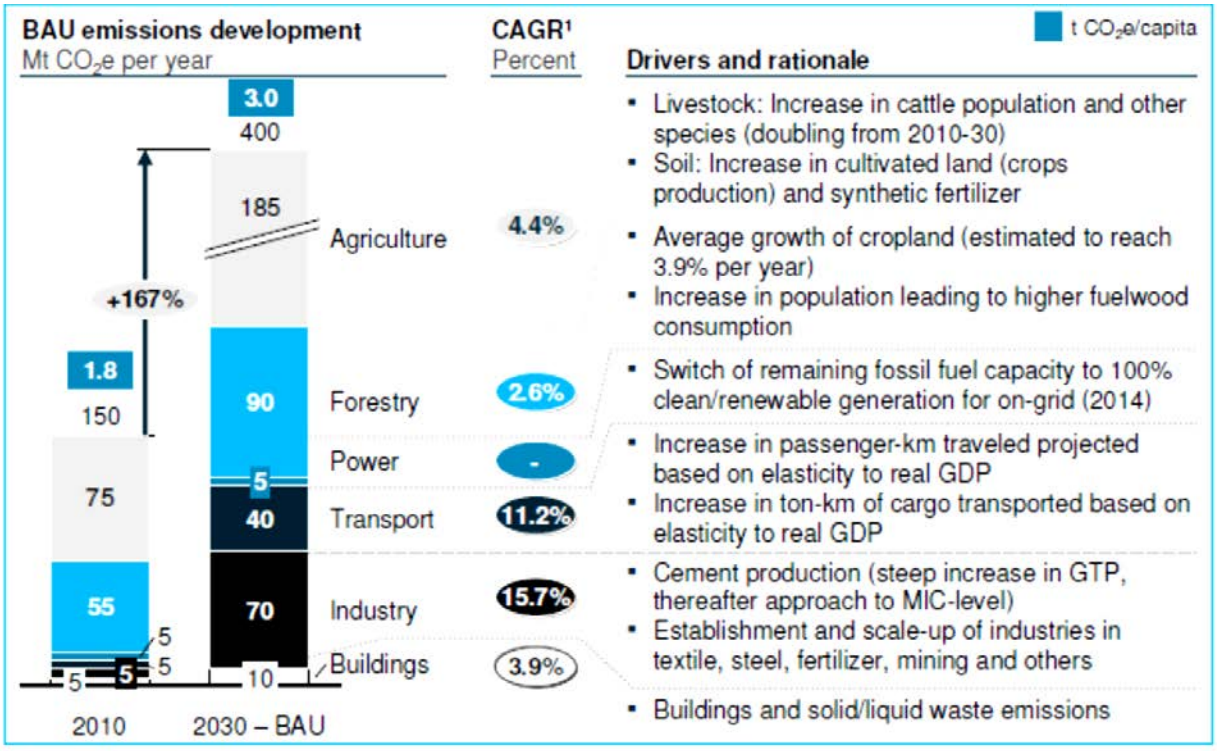
Gender considerations were also addressed institutionally through the establishment of an Environmental Monitoring and Safety Branch (EMSB) within the ERA.

2.9.4 Ethiopia climate change adaptation strategy

In the latest years, Ethiopia implemented a comprehensive set of climate change mitigation policies and strategies that already cover all relevant sectors for emission mitigation, focusing in particular on agriculture, forestry, transport, power and waste management.

One of the milestones in the Ethiopia's effort in mitigating climate change was the Climate Resilient Green Economy (CRGE) initiative launched by the Government in February 2011. In this strategic document, it is estimated the expected development of GHG emissions from different sectors based on the current model of economic development, represented as a Business-as-usual (BAU) scenario.

The results of the BAU estimate show that the current pathway for economic development will increase GHG emissions from 150 Mt CO2e today to 400 Mt in 2030 – an increase of more than 150% (Figure below). In absolute terms, the highest increase – adding around 110 Mt CO2e in GHG emissions – will come from agriculture, followed by industry at 65 Mt and forestry at 35 Mt. In relative terms, the emerging industrialisation will manifest itself in an annual emission increase of more than 15% from the industrial sector and around 11% from transport. Industry emissions under BAU assumptions are therefore projected to increase more than 12-fold, while transport emissions are projected to increase 7-fold.



1 Compound average growth rate

Ethiopia and the Paris Agreement

2015 was a historic year in which 196 Parties came together under the Paris Agreement to transform their development trajectories so that they set the world on a course towards sustainable development, aiming at limiting warming to 1.5 to 2 degrees C above pre-industrial levels. Through the Paris Agreement, Parties also agreed to a long-term goal for adaptation – to increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production.

At the heart of the Paris Agreement there are the Nationally determined contributions (NDCs) which embody efforts by each country to reduce national emissions and adapt to the impacts of climate change.

Ethiopia's nationally determined contribution includes the conditional mitigation goal to limit net GHG emissions in 2030 to 145 Mt CO2e or lower. This would reduce 2030 BAU emissions by about 64% and represent absolute emission reductions of 5 Mt CO2e relative to 2010 emissions. While the largest share of envisaged emission reductions is to come from agriculture and forestry, transport, buildings and industry are also expected to contribute to NDC achievement. Power sector emissions are to remain constant (FDRE, 2017a).

Transportation and Climate Change

The main drivers of rising emissions in the transport sector are increases in passenger-kilometres travelled, in tonne-kilometres of cargo transported, and in construction and mining transport.

The **Ethiopia's Climate Resilient Green Economy (CRGE) Strategy**'s already called for a emission reductions in transportation, through different countermeasures, such as: improving and extending Ethiopian public transport and its electric rail network, including outside Addis Ababa, raising efficiency standards as well as applying them to a larger share of vehicles in Ethiopia, and further expanding the use of alternative fuels and propulsion systems. Additional measures ranged from avoiding traffic with an urban planning transition focusing, inter alia, on transit-oriented development and improving rural and urban transport infrastructure both for non-motorised and motorised transport to fiscal instruments.

To realise these options for emission reductions, several barriers have to be tackled. Thus, there is a lack of institutional capacity for enforcing efficiency standards as well as a lack of technical knowledge for the construction of electric rail networks. A further barrier consists in the high upfront costs that accumulate in several of these measures. For investments in public transport, however, they will be offset by future revenues (FDRE, 2011).

To address the adaptation strategy concerning transport sector the GoE released the **Climate Resilient Transport Sector Strategy**, which sets the framework to deliver an integrated, modern transport system with a strong focus on multi modal transportation links and a customer service. The vision of this Strategy is to ensure that Ethiopia's national development, poverty reduction and climate resilience goals are promoted by the transport sector.

Within this context, five strategic objectives define the desired 2030 outcomes:

- Improved coordination of transport sector plans and results;
- Improved public transport accessibility and safety;
- Reduced exposure to the negative impacts of transport pollution on human health;
- Increased non- motorized transport mode use in urban areas;
- Reduced greenhouse gas (GHG) emissions from the transport system and network;
- Improved public transport links to and between higher density growth centres identified;
- Improved value for money from transport investment.

Within this overarching framework, the focus is on the three aspects of the transport system that drive its use and shape its long-term sustainability, which are: (1) Freight transport plan (2) Urban mobility and transport plans and (3) Integrated modal delivery plans.

More recently, in 2019, the FDRE released the **National Adaptation Plan** (NAP-ETH) which aim to strengthen holistic integration of climate change adaptation in Ethiopia's long-term development pathway, supported by effective institutions and governance structures, finance for implementation and capacity development and strengthened systems for disaster risk management and integration among different sectors.

NAP-ETH focuses on the sectors that have been identified as most vulnerable, namely: agriculture, forestry, health, transport, power, industry, water and urban. Within these sectors, 18 adaptation options have been identified for implementation at all levels and across different development sectors, recognizing the considerable diversity in context and vulnerability across Ethiopia's regions and social groups.

Regarding Transport sector, the NAP-ETH calls for building a sustainable transport system. This adaptation option will focus on protecting and improving the lifespan of transport infrastructure. Transportation design and safety standards will be reviewed and adaptation-oriented asset management systems will be implemented. Furthermore, adequate transport system will facilitate the movement of aid and support to climate change-affected communities.

The Ethiopian effort in climate change mitigation in transport is also reflected in the latest 10 years Development Plan, elaborated by the MoT, which call for establishing *a Climate-resilient transport infrastructure and services*, and set three objectives:

- making 20% of the national road infrastructure climate-resilient;
- reducing aviation fuel consumption by 5.2 Mil litres with the aim to reduce GHG emission of the whole sector;
- increasing climate smart mass transport vehicles.

Regarding the third point it is worth noting that the first all-electric car in the country (Hyundai Ioniq)[23], has been recently assembled by Marathon Motor Engineering, a joint venture between Hyundai Motor Company and Olympic Champion Haile Gebrselassie.[24]

[24] https://cleantechnica.com/2020/07/27/first-ethiopian-assembled-all-electric-hyundai-ionic-rolls-out-of-haile-gebrselassies-marathon-motor-engineering-plant/

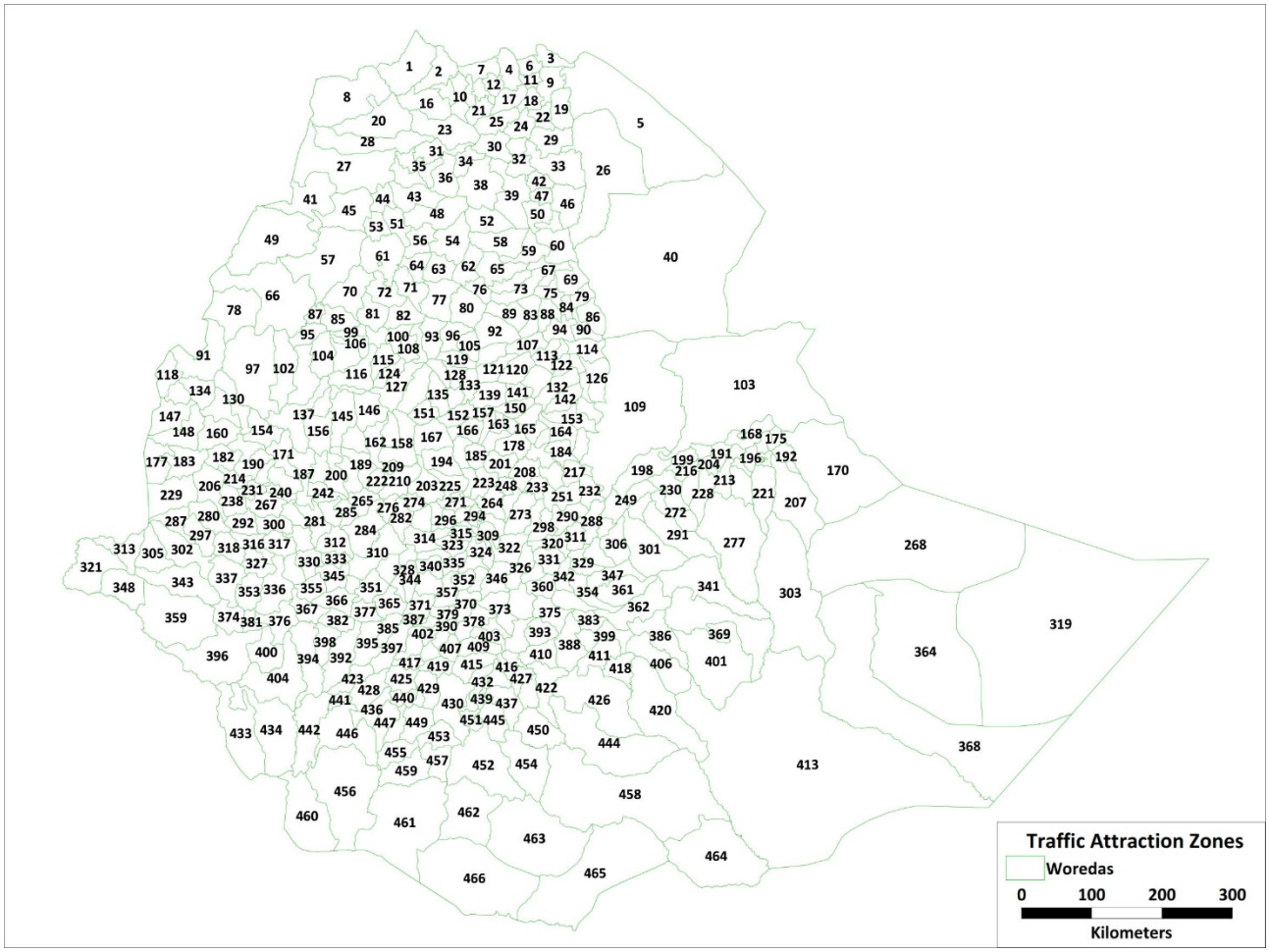
3 BUILDING THE INTEGRATED TRANSPORT MODEL OF ETHIOPIA

Full details regarding the definition of the traffic model for the current scenario were provided in the previous baseline report. This paragraph therefore provides a synthetic summary of the initial implementation phases of the model and its calibration with reference to the current scenarioPresent Transport Demand.

3.1 PRESENT TRANSPORT DEMAND (O/D ZONING)

The traffic analysis zones (TAZ) or origin/destination zones (both definitions are used in this study and they must be considered as synonyms) are geographically defined areas used for the identification of the poles generating and attracting traffic. TAZs are always defined in a conventional way, due to the fact that from the practical point of view the movements of passengers and freight are not originated or directed from/to specific points, but they are rather distributed over a pattern that is distributed over the territory on the basis of the actual distribution of population, production and handling sites, logistic centres, markets, etc. Zoning is therefore an usually acceptable compromise aimed to the representation of such transport demand as if it were concentrated in points of origin and destination and not distributed in micro-poles corresponding to individual homes, workplaces, production sites, etc. Clearly, the availability of statistics has a strong impact on the identification of TAZs. In our case, the smallest territorial units with available figures were represented by the woredas. The original intention of the consultant was to start the development of the traffic model by using aggregation of woredas as TAZs and then refining the zoning by splitting the macro-zones initially identified into smaller TAZs. The need for a good calibration of the demand model then prompted the consultant to use a woreda-based zoning, with some aggregation based on actual availability of data.

Figure 71: Traffic Attraction Zones (TAZs)



Source: Consultant's elaboration based on World Bank's data

The O/D matrices are, of course, matching the traffic analysis zones, therefore considering that in our case we have 440 TAZs the O/D (for both passengers and freight) will be basically 440 x 440 (representing the from-to daily demand from each zone to the remaining 439, plus the intra-zonal demand that is all on the main diagonals of the matrices). Further centroids were then added to represent the demand with neighbouring countries and external ports, thus bringing the o / d matrix to the dimensions 448 x 448. Seven (7) centroids were added respectively for the ports of Port Sudan, Massawa, Assab, Djibouti, Berbera, Mogadishu, Lamu and Mombasa, plus an additional centroid for South Sudan as only landlocked country bordering Ethiopia.

3.2 TRAFFIC COUNTS AND O/D SURVEYS

A campaign of traffic counts and O/D surveys was carried during the months of January and February 2021 in order to:

- Check for possible discrepancies between the traffic counts provided by ERA and used in the model and the current traffic flows, considering the exceptional nature of the current period, especially as regards the effects of the Covid 19 pandemic
- Collect samples of O/D pairs that can be used for recalibration or validation of the model used for the generation and attraction of traffic and the construction of the origin/destination matrices.

The counts were then carried out during the day on a sample of 15 sections, in parallel with the

origin / destination surveys. Only at Dewele Border with Djibouti the survey was extended during the night due to a contingent situation (temporary blocking of freight traffic during the day). The selected sections are presented inside the next table.

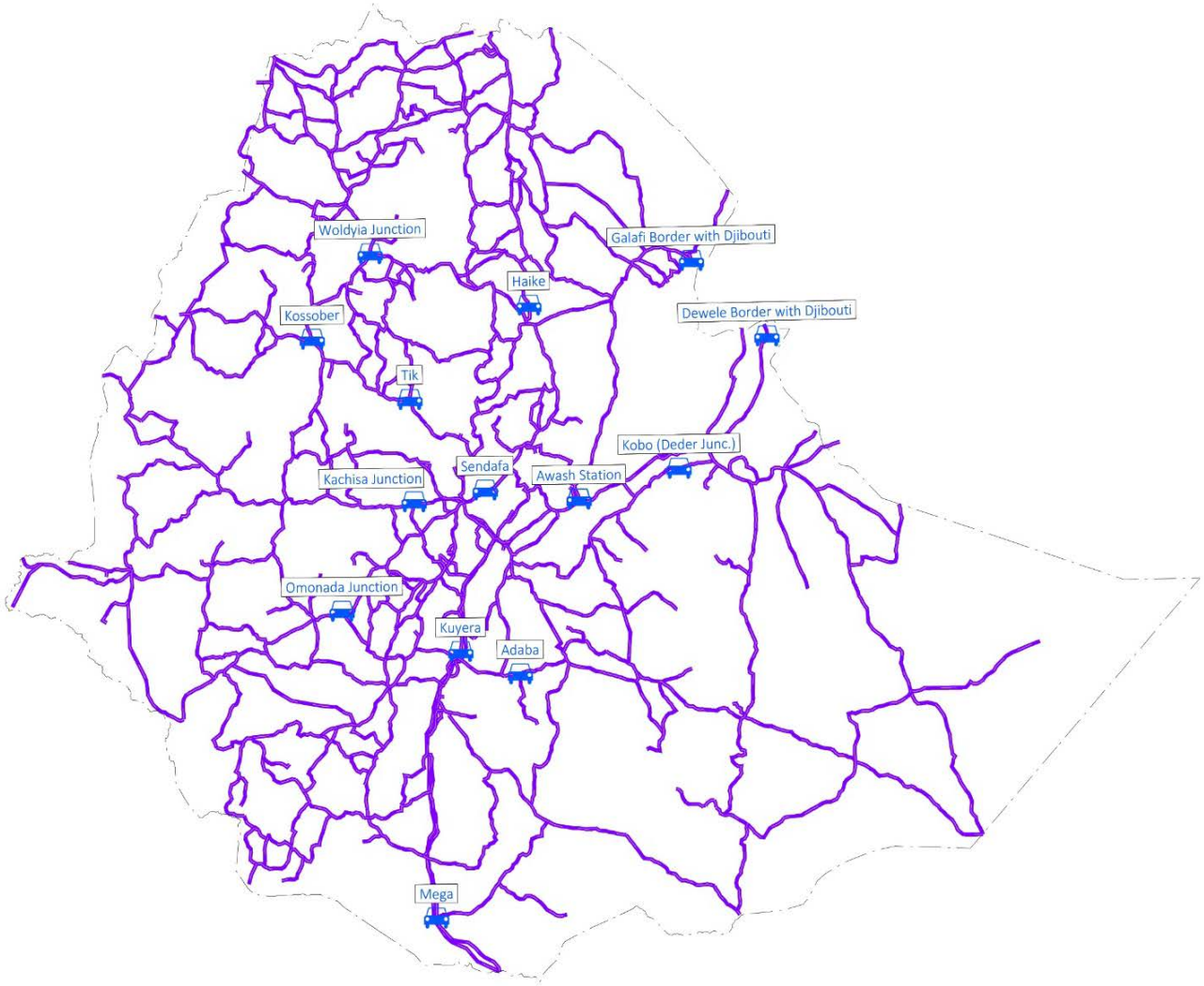
Table 44: Combinations of demand / offer scenarios considered inside the traffic assignments.

Station ID(*)	Location	Direction (to/from)		Total traffic 2018(**)
0701a	Kuyera	A	Bulbula	1781
0506a	Kossober	A	Burie	4006
0202b	Woldyia Junction	B	Addis Zemen	1025
0016b	Kachisa Junction	B	Ambo	7998
0502b	Tik	B	Debre Markos	1101
0001a	Sendafa	A	Addis Ababa	2104
0303b	Haike	B	Woldiya	1095
0601b	Awash Station	B	Mieso	3184
0601c	Awash Station	C	Gewane	3546
0802b	Omonada Junction	B	Jimma	790
0705a	Adaba	A	Dodola	1373
Galafi Bd.	Galafi Border with Djibouti			
Dewele Bd.	Dewele Border with Djibouti			
0604b	Kobo (Deder Junc.)	B	Kulubi	2690
1001a	Mega	A	Yabelo	592

(*) ERA code if available, (**) given as comparison.

The location of the above sections was chosen with the aim of having a sample of sections with different traffic flows at points possibly coinciding with ERA counting sections, in order to have a comparison. The next figure shows a map with the location of the above 15 stations.

Figure 72: Position of the 15 traffic counts and o/d survey stations



Note: two stations are overlapped at Awash and represented here as a single station

Traffic counts were carried out for 2 working, with an extension of an additional day during the Sunday for five sections out of fifteen, counting from 6:00 up to 20:00 hours (14 hours per day). The next table presents the amount of o/d interviews and the dates during which the surveys were carried out for each section.

Table 45: Number of o/d interviews and counting dates

Station ID	Location	Total interviews (freight & passenger)	Total interviews (freight only)	Total interviews (pass only)	Day 1	Day 2	Day 3
0001a	Sendafa	4,798	1,764	3,034	20/01/2021	21/01/2021	24/01/2021
0016b	Kachisa Junction	3,876	1,418	2,458	21/01/2021	22/01/2021	24/01/2021
0202b	Woldyia Junction	2,829	1,583	1,246	11/02/2021	12/02/2021	
0303b	Haike	1,725	506	1,219	28/01/2021	21/01/2021	
0502b	Tik	2,114	714	1,400	01/02/2021	02/02/2021	
0506a	Kossober	5,384	1,799	3,585	10/02/2021	11/02/2021	
0601b	Awash Station (to Mieso)	2,052	925	1,127	12/01/2021	13/01/2021	
0601c	Awash Station (to Gewane)	3,587	2,193	1,394	12/01/2021	13/01/2021	17/01/2021
0604b	Kobo (Deder Junc.)	3,797	2,172	1,625	18/01/2021	19/01/2021	24/01/2021
0701a	Kuyera	5,951	1,703	4,248	05/05/2021	08/02/2021	

Station ID	Location	Total interviews (freight & passenger)	Total interviews (freight only)	Total interviews (pass only)	Day 1	Day 2	Day 3
0705a	Adaba	2,226	661	1,565	09/02/2021	10/02/2021	
0802b	Omonada Junction	1,927	856	1,071	11/02/2021	12/02/2021	
1001a	Mega	925	339	586	15/02/2021	16/02/2021	
Dewele Bd. (1)	Dewele Border with Djibouti	1,409	1,398	11	14/01/2021	15/01/2021	17/01/2021
Dewele Bd. (2)	Dewele Border with Djibouti (night o/d)	466	462	4	*(additional counts)*		
Galafi Bd.	Galafi Border with Djibouti	1,547	1,536	11	14/01/2021	15/01/2021	
	TOTAL	**44,613**	**20,029**	**24,584**			

As presented inside the table above, the Consultant collected a remarkable number of interviews (see next paragraph), just under 45,000 of which 55% to drivers of passenger vehicles and 45% to drivers of freight vehicles.

3.2.1 *Resume of traffic counts*

The next three tables present a daily resume of the traffic counts.

Table 46: Traffic counts during day 1 (values in vehicles/day)

Station ID	Location	Motor cycles/ Bajaj	Cars/ Taxi	Utilities	Small buses	Large buses	Light trucks	Medium trucks	Heavy trucks	Articul. trucks	Others	Total
0001a	Sendafa	0	174	299	807	119	201	135	238	383	0	2356
0016b	Kachisa Junction	0	170	146	731	69	159	124	1114	231	0	2744
0202b	Woldyia Junction	0	33	106	419	131	134	211	216	139	0	1389
0303b	Haike	0	26	114	370	45	101	38	58	59	0	811
0502b	Tik	0	61	138	506	85	135	80	93	90	0	1188
0506a	Kossober	0	191	585	961	11	290	135	148	217	0	2538
0601b	Awash Station (to Mieso)	0	52	131	183	127	171	59	24	405	0	1152
0601c	Awash Station (to Gewane)	0	21	200	222	93	158	20	13	691	25	1443
0604b	Kobo (Deder Junc.)	0	61	211	438	84	249	75	48	471	0	1637
0701a	Kuyera	0	316	665	1009	198	341	124	116	344	0	3113
0705a	Adaba	0	66	146	484	49	101	44	82	88	0	1060
0802b	Omonada Junction	0	20	96	272	101	130	60	54	110	0	843
1001a	Mega	0	6	154	110	34	57	14	109	24	0	508
Dewele Bd. (1)	Dewele Border with Djibouti	0	0	2	1	0	0	0	0	523	0	526
Galafi Bd.	Galafi Border with Djibouti	0	0	32	2	0	27	0	0	957	0	1018

Table 47: Traffic counts during day 2 (values in vehicles/day)

Station ID	Location	Motor cycles/ Bajaj	Cars/ Taxi	Utilities	Small buses	Large buses	Light trucks	Medium trucks	Heavy trucks	Articul. trucks	Others	Total
0001a	Sendafa	0	137	286	660	106	166	182	306	451	0	2294
0016b	Kachisa Junction	0	152	130	632	58	126	108	1089	209	0	2504
0202b	Woldyia Junction	0	44	97	431	105	277	206	292	118	0	1570
0303b	Haike	0	35	115	511	58	89	40	74	71	0	993
0502b	Tik	0	65	123	420	53	111	66	85	87	0	1010
0506a	Kossober	0	181	477	1269	15	359	162	208	312	0	2983
0601b	Awash Station (to Mieso)	0	48	180	266	82	206	49	36	378	0	1245
0601c	Awash Station (to Gewane)	0	12	154	234	53	140	18	36	866	18	1531
0604b	Kobo (Deder Junc.)	0	63	214	167	34	298	78	21	628	0	1503
0701a	Kuyera	0	343	590	1028	183	318	111	100	353	0	3026
0705a	Adaba	0	27	127	674	31	117	54	80	101	0	1211
0802b	Omonada Junction	0	52	143	300	126	226	88	51	170	0	1156
1001a	Mega	0	9	108	126	28	36	15	97	34	0	453
Dewele Bd. (1)	Dewele Border with Djibouti	0	0	10	0	0	0	0	6	566	1	583
Galafi Bd.	Galafi Border with Djibouti	0	0	18	0	0	8	4	0	939	22	991

Table 48: Traffic counts during day 3 (values in vehicles/day)

Station ID	Location	Motor cycles/ Bajaj	Cars/ Taxi	Utilities	Small buses	Large buses	Light trucks	Medium trucks	Heavy trucks	Articul. trucks	Others	Total
0001a	Sendafa	0	117	239	531	14	102	109	205	62	0	1379
0016b	Kachisa Junction	0	99	50	254	20	64	62	28	92	0	669
0202b	Woldyia Junction	*not counted*										
0303b	Haike											
0502b	Tik											
0506a	Kossober											
0601b	Awash Station (to Mieso)											
0601c	Awash Station (to Gewane)	0	13	101	179	53	145	19	53	533	35	1131
0604b	Kobo (Deder Junc.)	0	24	106	206	44	84	53	14	225	0	756
0701a	Kuyera	*not counted*										
0705a	Adaba											
0802b	Omonada Junction											
1001a	Mega											
Dewele Bd. (1)	Dewele Border with Djibouti	0	1	0	0	0	13	0	0	460	1	475
Galafi Bd.	Galafi Border with Djibouti	*not counted*										

The next table present a comparison between traffic on working days and on Sundays. The amount of Sunday traffic is between 25% (Kachisa Junction) up to 86% (Dewele Border). Apparently there does not seem to be a rule on the holiday/weekday ratio, it being understood that the high number of vehicles found on Sunday at the Dewele border is easily explained by the fact that in this case we are dealing with a specific category of demand (international freight traffic).

Table 49: Comparison between traffic on working days and on Sundays (values in vehicles/day)

Station ID	Location	Average traffic (working days)	Vehicles counted during weekends	Working days/weekends
0001a	Sendafa	2325	1379	59%
0016b	Kachisa Junction	2624	669	25%
0202b	Woldyia Junction	1480	*not counted*	
0303b	Haike	902		
0502b	Tik	1099		
0506a	Kossober	2761		
0601b	Awash Station (to Mieso)	1199		
0601c	Awash Station (to Gewane)	1487	1131	76%
0604b	Kobo (Deder Junc.)	1570	756	48%
0701a	Kuyera	3070	*not counted*	
0705a	Adaba	1136		
0802b	Omonada Junction	1000		
1001a	Mega	481		
Dewele Bd.	Dewele Border with Djibouti	555	475	86%
Galafi Bd.	Galafi Border with Djibouti	1005	*not counted*	

The next table shows a comparison between the traffic counts carried out by the Consultant and those carried out by ERA during year 2018.

Table 50: Comparison ERA and Consultant traffic counts (values in vehicles/day)

Station ID	Location	Average traffic (working days)	Traffic counted by ERA (year 2018 – first cycle)	Traffic counted by ERA (year 2018 – third cycle)	Traffic counted by ERA (year 2018 – average first & third cycle)	% counted traffic / ERA average 2018
0001a	Sendafa	2325	2787	2104	2446	95%
0016b	Kachisa Junction	2624	7703	7998	7851	33%
0202b	Woldyia Junction	1480	1376	1025	1201	123%
0303b	Haike	902	859	1095	977	92%
0502b	Tik	1099	891	1101	996	110%
0506a	Kossober	2761	2736	4006	3371	82%
0601b	Awash Station (to Mieso)	1199	1029	3184	2107	57%
0601c	Awash Station (to Gewane)	1487	2195	3546	2871	52%
0604b	Kobo (Deder Junc.)	1570	1490	2690	2090	75%

Station ID	Location	Average traffic (working days)	Traffic counted by ERA (year 2018 – first cycle)	Traffic counted by ERA (year 2018 – third cycle)	Traffic counted by ERA (year 2018 – average first & third cycle)	% counted traffic / ERA average 2018
0701a	Kuyera	3070	3582	1781	2682	114%
0705a	Adaba	1136	517	1373	945	120%
0802b	Omonada Junction	1000	1843	790	1317	76%
1001a	Mega	481	534	592	563	85%

Some considerations should be done about the figures presented inside the table above:

- A comparison between traffic counts made in 2018 and traffic counts made at the beginning of 2021 would lead to hypothesize an increase in volumes. In fact, it does not seem to be like that, except for a few sections. The contraction in traffic could, however, be explained by exceptional circumstances linked to local conditions and the situation due to Covid-19 pandemic.
- Given the results presented in the previous table, the use of the official ERA data followed in the first calibration of the traffic model appears to be correct, since the traffic data prior to the current period appear to be less influenced by impromptu circumstances.

3.2.2 *O/D surveys*

As already mentioned at the beginning of this chapter, the Consultant carried out approximately 45,000 origin / destination interviews, of which 55% to passenger vehicle drivers and 45% to freight vehicle drivers. The most important results of these surveys are summarized in the following tables and graphs. It is important to point out that the totals of the counts do not coincide due to the deviation of some values considered unreliable, since they are probable errors of the field operators which in any case do not affect the completeness of the result. All totals (intended as the sum of freight and passenger vehicles) are just under 45,000.

The next table shows an overall summary of the collected data.

Table 51: Overall summary of the data collected during the o/d surveys

A. Vehicle type	Counts	%	% Among passenger or freight	Average no. of pass	Average load (tons)	Average frequency (days per week)	Average length (km)
1 Car/taxi	2328	5.2%	9.5%	2.4		3.1	233.7
2. L/Rover	6074	13.6%	24.8%	2.6		3.1	269.5
3. S/Bus	14330	32.1%	58.5%	15.3		1.4	130.9
4. L/Bus	1784	4.0%	7.3%	50.8		2.3	447.7
5. S/Truck	4867	10.9%	24.2%		1.2	3.2	279.9
6. M/ Truck	2369	5.3%	11.8%		2.3	3.4	305.8
7. H/Truck	2852	6.4%	14.2%		4.8	3.0	228.3
8. T & T	9994	22.4%	49.8%		22.1	4.1	931.7
Total	**44598**	**100.0%**	**100%+100%**				
Average (weighted)				**13.5**	**12.2**	**2.8**	

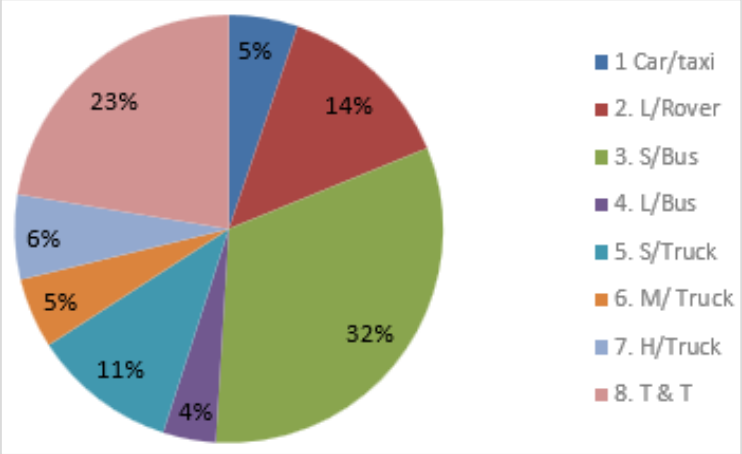
Some considerations on the data presented in the previous table:

- The average number of passengers is clearly influenced by the high average number of passengers in the minibus category. These represent 32.1% of all passenger vehicles. The high number is probably due to the practice of overload, which is clearly not a tolerable aspect in the medium / long term. Therefore, the consultant did not change the conventional average value of 6 passengers per vehicle used in the model.
- Similarly, there is an average load on freight vehicles of 12.2 tons, compared to the 9.6 used in the model (27% more). Also in this case, the value reflects the high number of heavy trucks (T & T, or truck and trailer) represented in the sample (49.8% of the total freight vehicles). Also in this case, it was preferred not to modify the value of 9.6 tons adopted in the model.
- The average distances are, like all other data, a consequence of what the drivers said. An ex-post analysis of the data collected (comparison between distances declared for the same origin

/ destination pairs) led to establish that this is a data on which drivers express themselves with the highest degree of subjectivity. Despite this, it is evident that the larger vehicles are those that travel the longest distances on average, a result that is quite obvious.

The next figure presents a pie chart with the data from the first column of the previous table (distribution of vehicles in the various categories).

Figure 73: Percentage distribution of vehicles under o/d investigation – A. Vehicle type

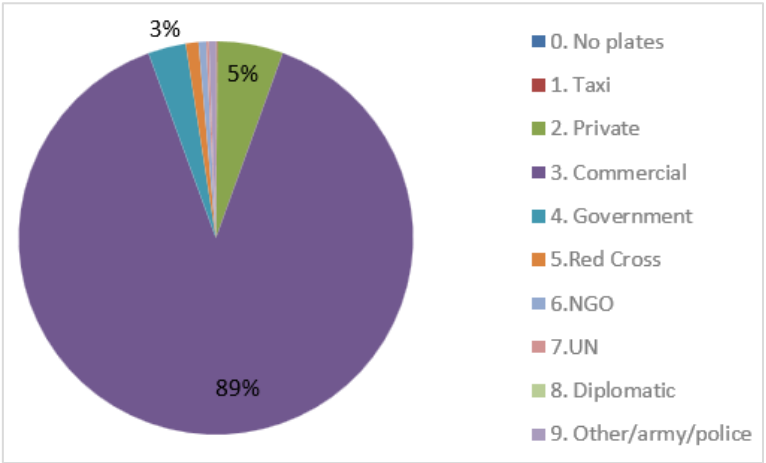


The following tables and figures show the type of registration of the vehicles under investigation. The "commercial" plate represents the vast majority of cases, with a percentage equal to 88.9%

Table 52: Registration of vehicles under o/d investigation.

B. Registration plate	Counts	%
0. No plates	7	0.0%
1. Taxi	55	0.1%
2. Private	2397	5.4%
3. Commercial	39665	88.9%
4. Government	1386	3.1%
5.Red Cross	464	1.0%
6.NGO	274	0.6%
7.UN	99	0.2%
8. Diplomatic	3	0.0%
9. Other/army/police	253	0.6%
Total	**44603**	**100.0%**

Figure 74: Registration of vehicles under o/d investigation – B. Registration plate



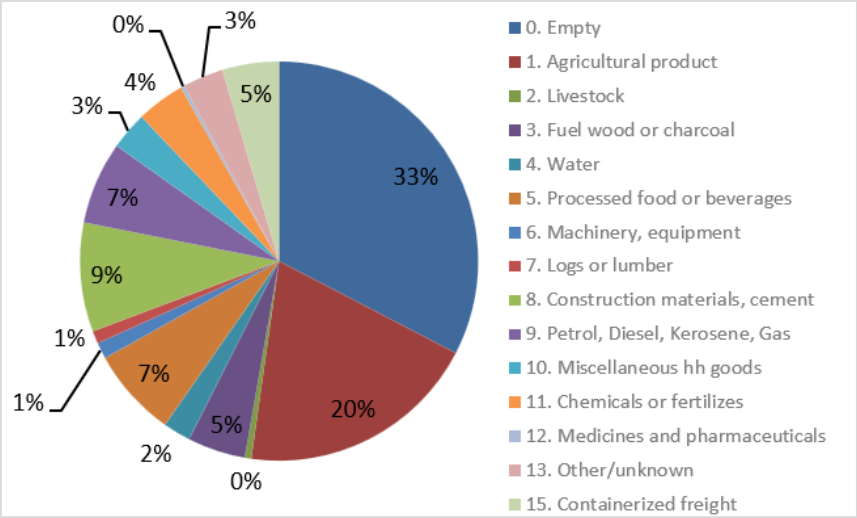
The next table and the next graph present the distribution of the product categories for the vehicles

under origin/destination investigation. Apart from the category represented by empty vehicles, it is evident that the relative majority is still represented by agricultural products (19.6%), followed by construction materials (8.8%). Containerized goods currently represent only 4.6%, but it is assumed that this type of goods is destined to increase over the years.

Table 53: Distribution of commodities' categories for freight vehicles under o/d investigation.

C. Commodity type	Counts	%
0. Empty	6515	32.6%
1. Agricultural product	3919	19.6%
2. Livestock	105	0.5%
3. Fuel wood or charcoal	941	4.7%
4. Water	450	2.3%
5. Processed food or beverages	1442	7.2%
6. Machinery, equipment	262	1.3%
7. Logs or lumber	205	1.0%
8. Construction materials, cement	1765	8.8%
9. Petrol, Diesel, Kerosene, Gas	1338	6.7%
10. Miscellaneous hh goods	609	3.0%
11. Chemicals or fertilizes	785	3.9%
12. Medicines and pharmaceuticals	56	0.3%
13. Other/unknown	665	3.3%
15. Containerized freight	919	4.6%
Total(*)	**19976**	**100.0%**

Figure 75: Distribution of commodities' categories for freight vehicles under o/d investigation–C. Commodity type



Finally, the next table and the next graph present the summary of the "purpose of the trip", as stated by the drivers of the passenger vehicles. It should be noted that the "work" and "business" categories alone represent 94.9% of the total. This is an expected result in a still low-income country like Ethiopia (the tourism category is represented only for 0.4%). However, these data must be read with caution, adding some considerations:

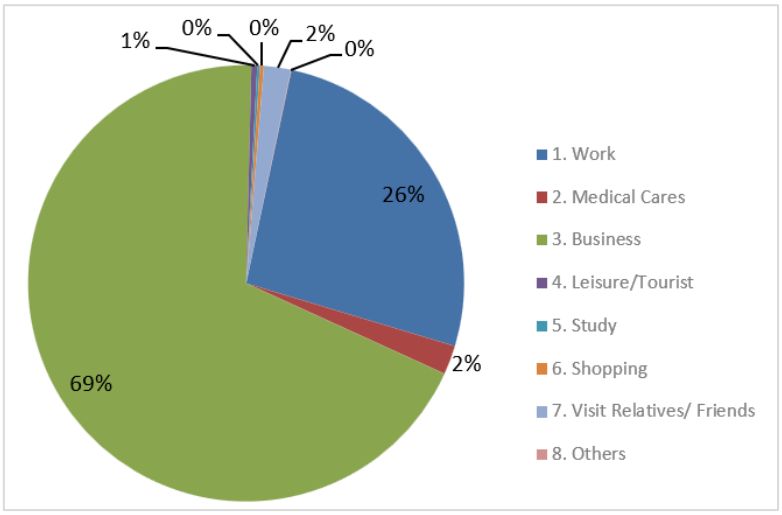
- Most of the stopped vehicles were vehicles for collective transport, especially minibuses, so the collection of this specific information through the driver may have given rise to partial distortions.
- As often happens in this type of survey, the categories "work" and "business" overlap each other, because the interviewees often confuse the two terms and there is often a tendency to use the second term instead of the first.
- In any case, and as already mentioned, the fact that for the moment there is a minimal share of passenger demand linked to occasions other than working ones is plausible. It should be noted

that the third category, albeit extremely distant, is that of medical care, which however is represented only by 2.2%

Table 54: Distribution of purposes for trip for passenger vehicles under o/d investigation.

D. Purpose of Trip	Counts	%
1. Work	6462	26.3%
2. Medical Cares	529	2.2%
3. Business	16839	68.6%
4. Leisure/Tourist	105	0.4%
5. Study	48	0.2%
6. Shopping	72	0.3%
7. Visit Relatives/ Friends	489	2.0%
8. Others	9	0.0%
Total	**24553**	**100.0%**

Figure 76: Distribution of purpose for trip for passenger vehicles under o/d investigation-



Finally, as regards the main aspect of the origin/destination investigations, it must be said that the 15 sections were able to intercept totally or at least partially 1735 o/d pairs. This served to a critical review of the production and attraction equations used in passenger and freight models, as will be specified in more detail in a specific technical document relating to the model.

3.3 PRESENT TRANSPORT OFFER

3.3.1 Road network graph

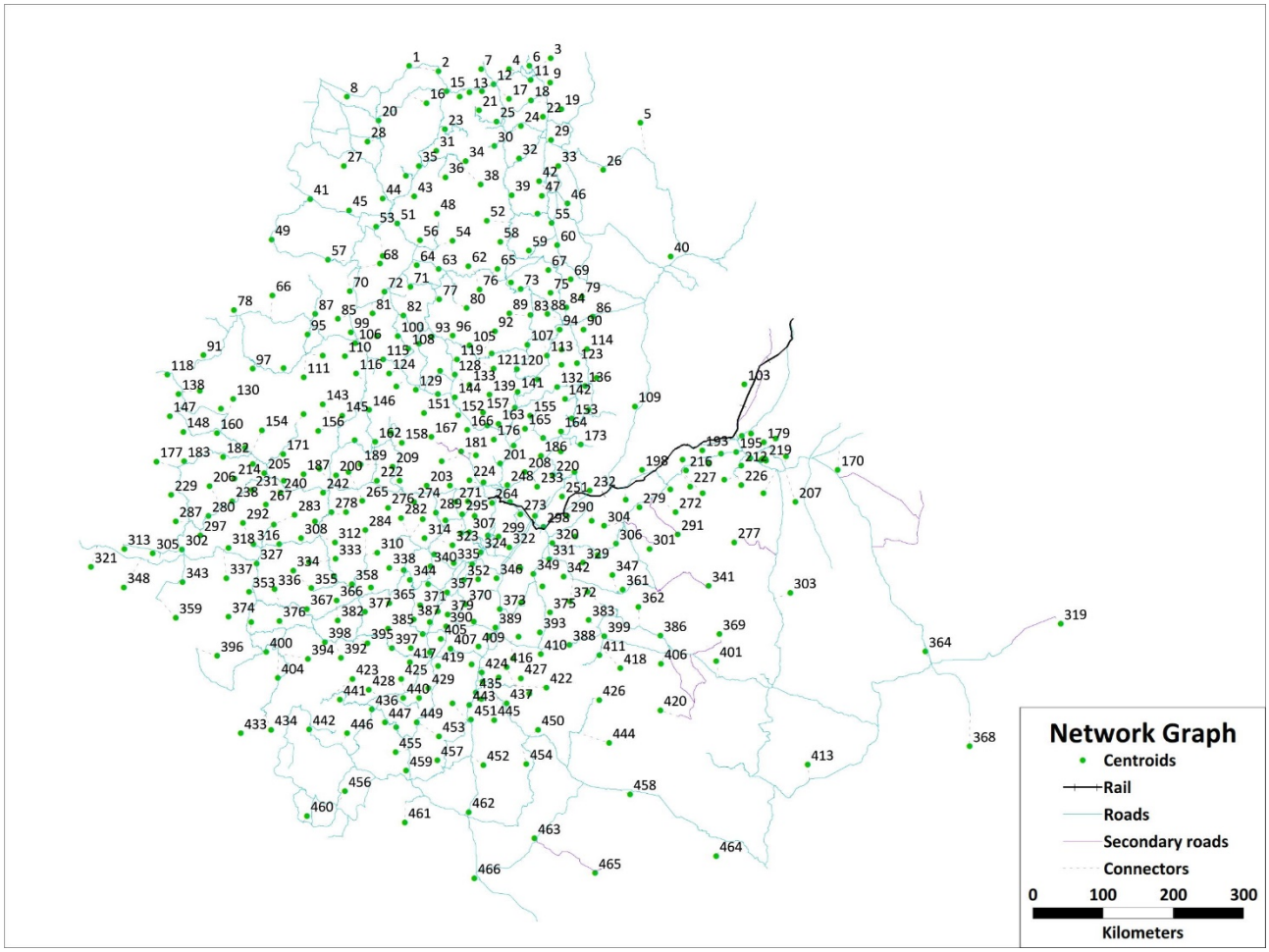
The road network graph was initially based on the GIS database provided by ERA. Nevertheless, a quite complex reworking was carried out because the ERA database did not have a “network graph” structure, but it was basically a map representing the road network with its technical characteristics. The Consultant had to optimize the GIS data to remove any redundancy of details and every aspect capable of having a topological impact on the graph. We must remember that in transport modelling GIS is used as graphical representation of a mathematical model that would otherwise be difficult for non-specialists to read, but that at the same time the topological characteristics of the graph must be respected in order to maintain the functionality of the model. This is the reason why ERA’s geographical data was subjected to an accurate check and readjusted based on functional needs.

The result was an initial network graph with 984 links (road segments) and 856 nodes. These figures do not include the additional nodes representing the so called “centroids” (see below) and the virtual links representing the “connectors” between the centroids and the remaining part of the network.

The total length of the road network included inside the network graph is 28,638 Km. In some cases,

additional links were included to connect some woredas that were not crossed by the main network. The length of the secondary road network is 1315 Km, to be added to the main network of 28,638 Km. The multimodal network graph is presented inside the next Figure 71

Figure 77: Network Graph



Source: Consultant's elaboration based on ERA and OpenStreetMap data

The figure above shows also the so-called “connectors”, that are those virtual links connecting the origin/destination zones with the real network. The Consultant proceeded as follows:

- the origin/destination centroids have been positioned on the geographical centre of gravity of each o/d zone
- the connection between the centroids and the rest of the network has been made with a single link (connector), so the number of connectors in this case is equal to the number of centroids
- as can be seen from the previous figure, the graph also contains the railway connection between Addis Ababa and Djibouti; the “connectors” were however forced to connect each centroid to the nearest road junction (it is assumed that the road mode is in any case the first or last used for the initial origins and final destinations)

3.3.2 Rail network graph and other modes of transport

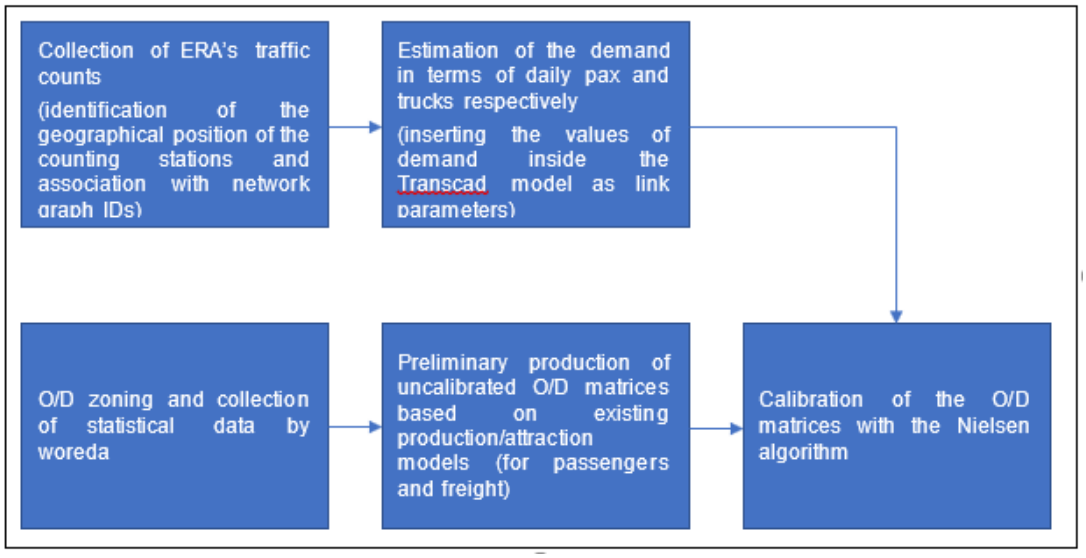
As presented inside the above figure, also the new railway between Addis and Djibouti was included inside the network graph, but this part of the graph was not “activated” during the calibration process, that was based only on ERA’s traffic counts. The network graph was then extended to include also the possibility of having a sort of “switch” in terms of routes from/to external maritime

ports due the activation of new access to foreign harbours. To do this, the graph included also external maritime routes. Also, these external links were not activated during the first calibration of the model.

3.4 MODEL REPRESENTATION & CALIBRATION

The calibration of the gravitational model was made on the basis of the traffic data available on the 431 links where ERA's traffic surveys are available. The algorithm for the recalculation of the O/D matrices was in this case the Nielsen's, which is typical of the Transcad model. The Nielsen model is a model developed in the 90s based on a bi-level approach which iteratively updates an existing O/D matrix through traffic assignments and step-by-step estimates of the matrix. In our case the existing O/D matrices were represented by the uncalibrated matrices temporarily assembled as described inside the previous paragraph. The next figure shows the logic process followed for the calibration of the model (for a better description of the initial o/d estimation see the Baseline Report paragraphs 4.2.2 and following).

Figure 78: Process followed for the calibration of the O/D matrix



The calibration produced an acceptable simulation of real traffic and validated the performance of the graph as a model representing the transport offer. As is done in these cases, the validity of the calibration goodness was checked by means of linear regressions based on the comparison between the flows assigned by the model and those relating to traffic counts on a Cartesian plane. The calibration was done using the aforementioned Nielsen algorithm and iterating through "all or nothing" assignments of the O/D matrices and produced two matrices (freight and passengers) both capable of satisfactorily simulating the current traffic (intended as traffic of the year 2018, as latest data available from ERA). The next 73 and Figure 74 show the comparison between assigned and counted flows respectively for passengers and freight. The R^2 is around 0.95 for both cases thus denoting a very good level of correlation.

Figure 79: Calibration of the passenger O/D matrix. Linear regression counted flows vs. assigned flows

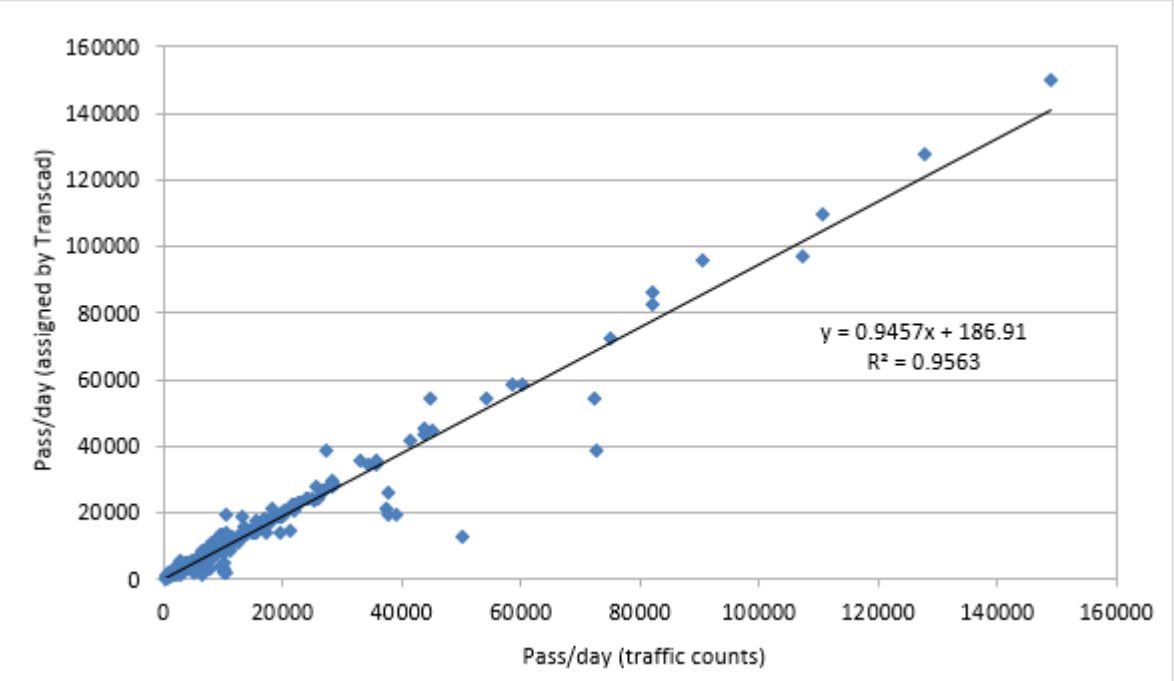
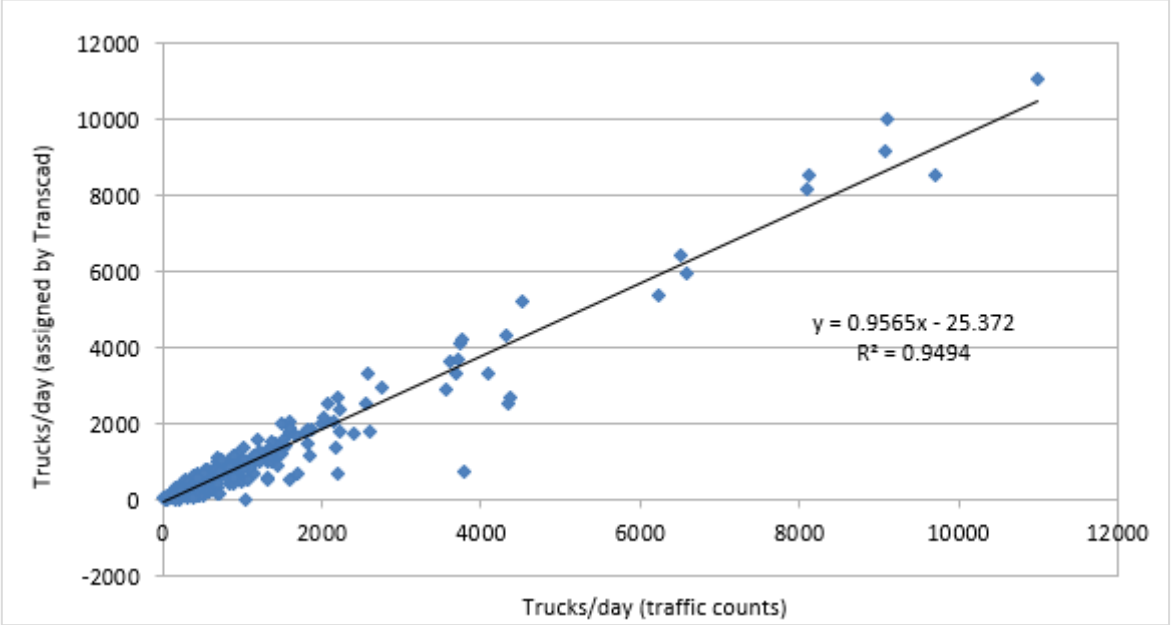


Figure 80: Calibration of the freight O/D matrix. Linear regression counted flows vs. assigned flows



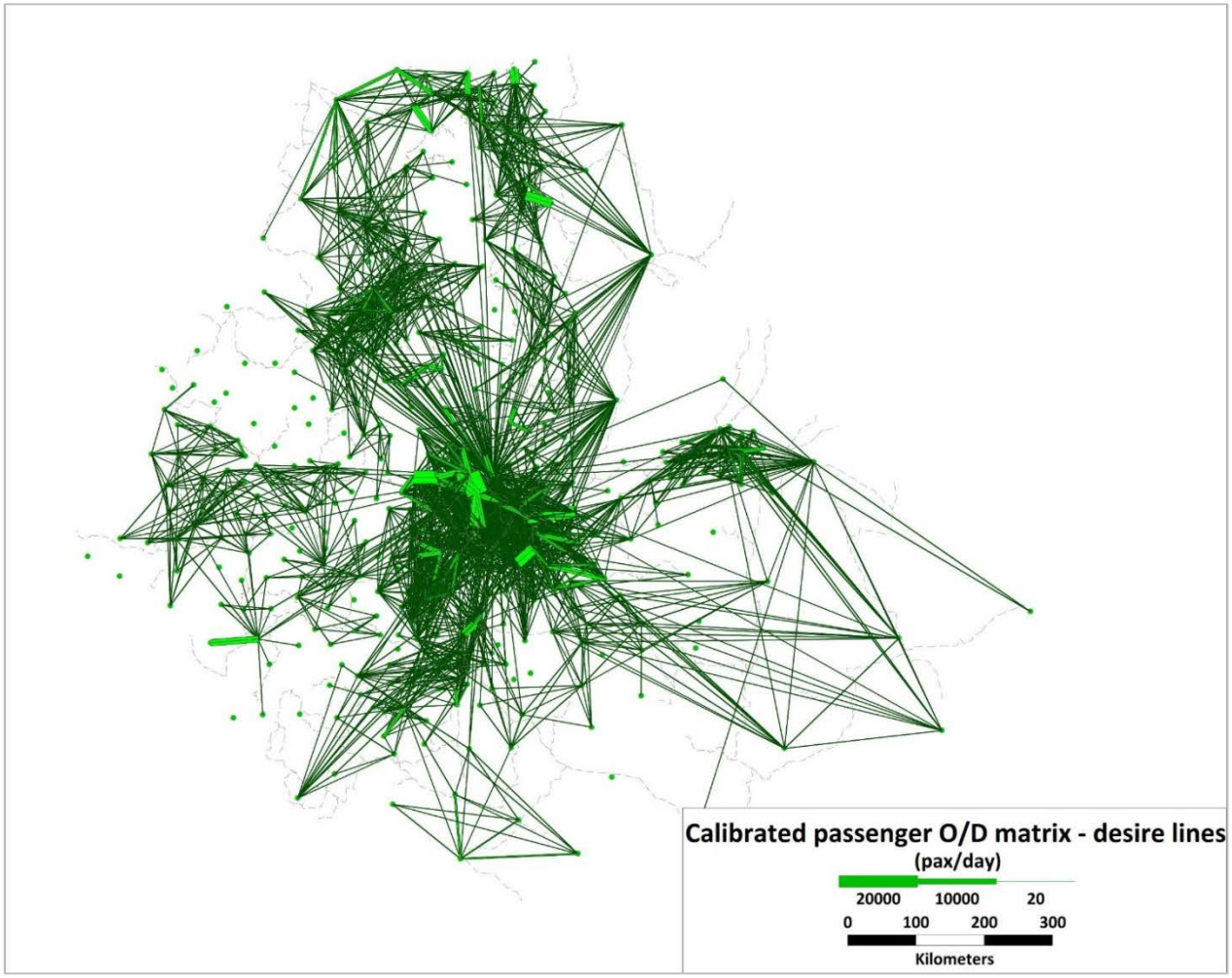
It must be observed that the calibrated O/D matrices present an increased number of trips in comparison to the uncalibrated, namely:

- As regards passengers: 2,564,592 passengers/day (calibrated) vs. 1,725,693 passengers/day (uncalibrated), with an increase of 48.6%
- As regards freight: 254,218 trucks/day (calibrated) vs 203,790 trucks/day (uncalibrated), with an increase of 24.7%

The increases are obviously a consequence of those components that were mentioned before: increase of GDP, industrialization, import/export flows.

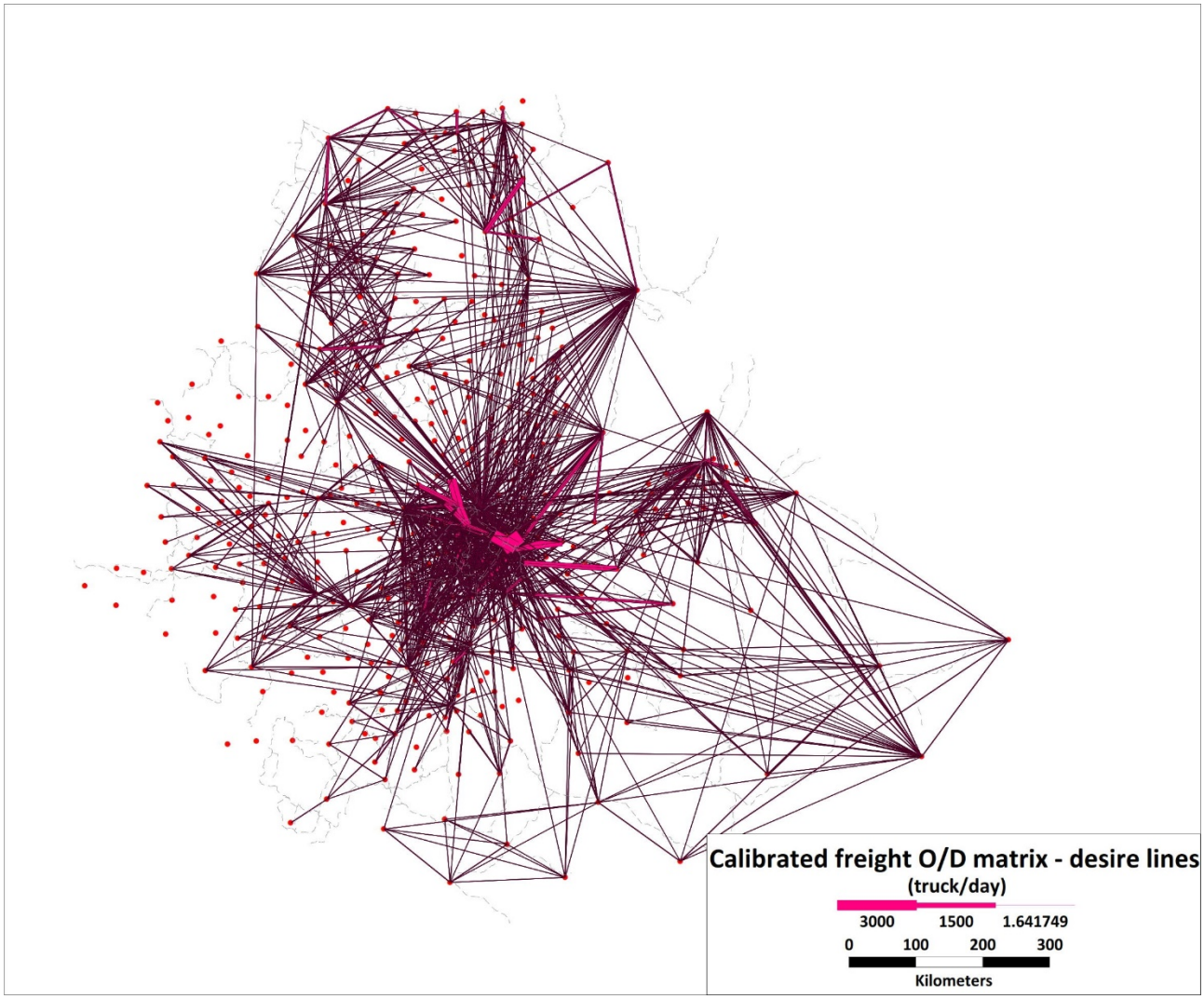
The distribution of the demand is presented inside the next Figure 75 and Figure 76 in the form of "desire lines", i.e. flow diagrams representing direct demand from centroid to centroid O/D as if that demand traveled directly from point to point without using the network. The efficacy of these diagrams lies in highlighting which are the major attractors and generators of traffic. As one can see, the urban areas, and above all the capital Addis Ababa, concentrate a large part of the demand, even if there is a slightly higher concentration around urban areas for passenger traffic, as it is logical to expect. It should be remembered that in representing these "desire lines" the marginal components of the demand have been deliberately excluded, i.e. below 10% of the maximum values (in terms of O/D flow) for passengers and below 5% for goods. This is to facilitate the readability of the graphs.

Figure 81: Desire lines for the calibrated O/D passenger matrix (marginal values not represented)



Source: Consultant's Transcad elaboration

Figure 82: Desire lines for the calibrated O/D freight matrix (marginal values not represented)



Source: Consultant's Transcad elaboration

Finally, the traffic flows assigned during the calibration process (those used for the comparison between assigned and counted flows – see previous Figure 73 and Figure 74) are presented in the flow diagrams of Figure 77 and Figure 78. The concentration around urban areas is shown also inside these diagrams, but with less emphasis.

Figure 83: Calibration flows for passenger demand

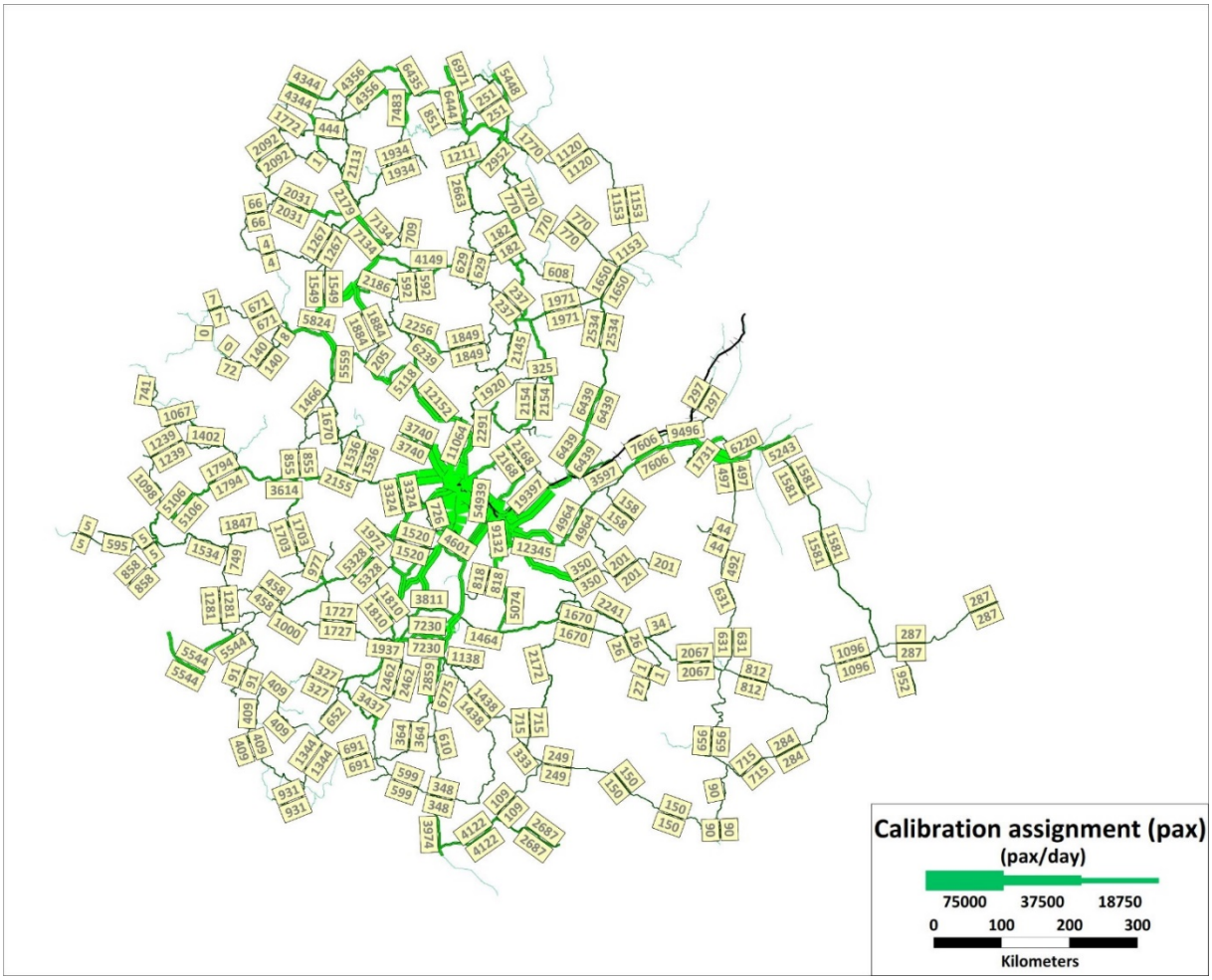
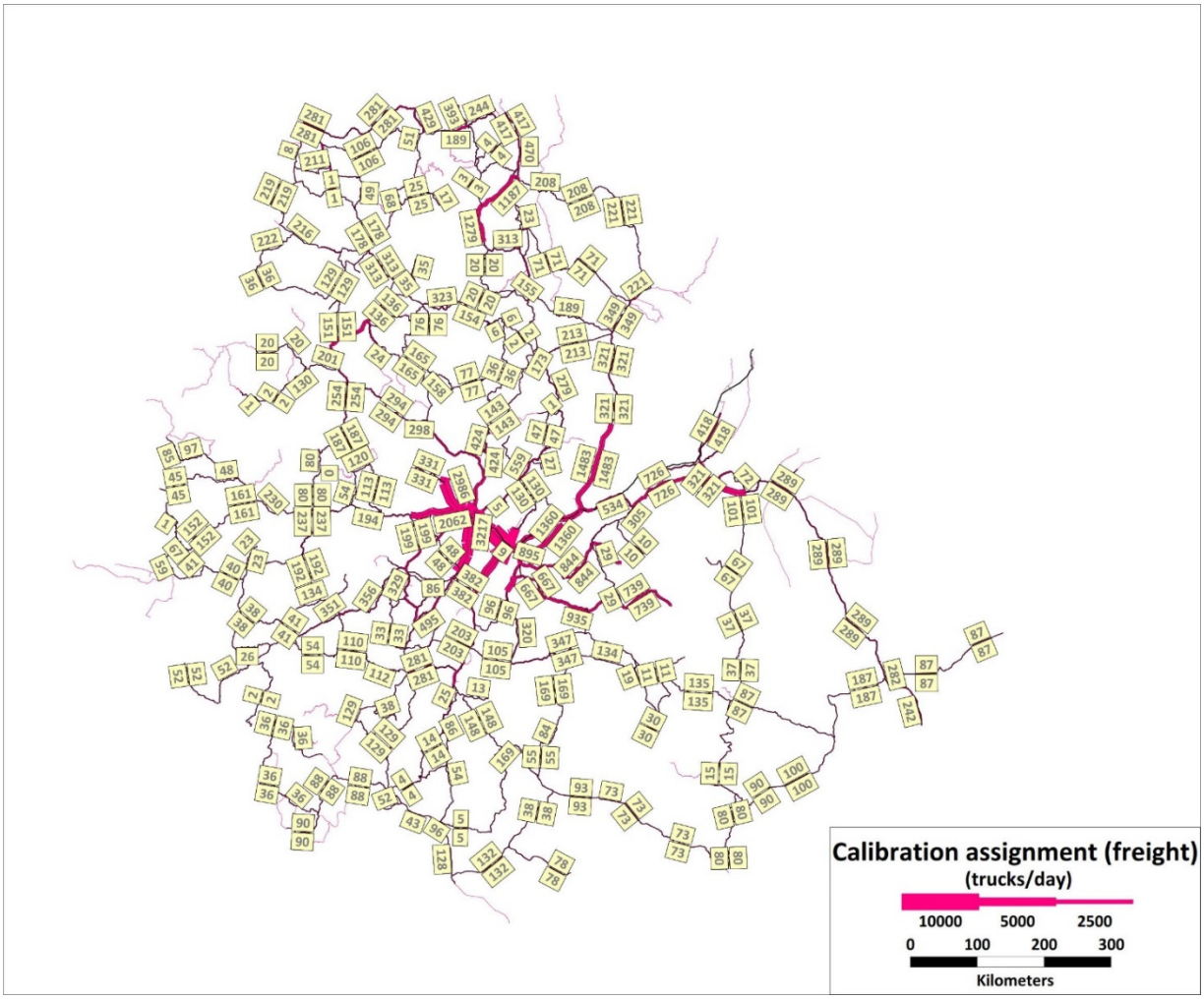


Figure 84: Calibration flows for freight demand



3.5 PRESENT TRANSPORT MODEL & LEVEL OF SERVICE

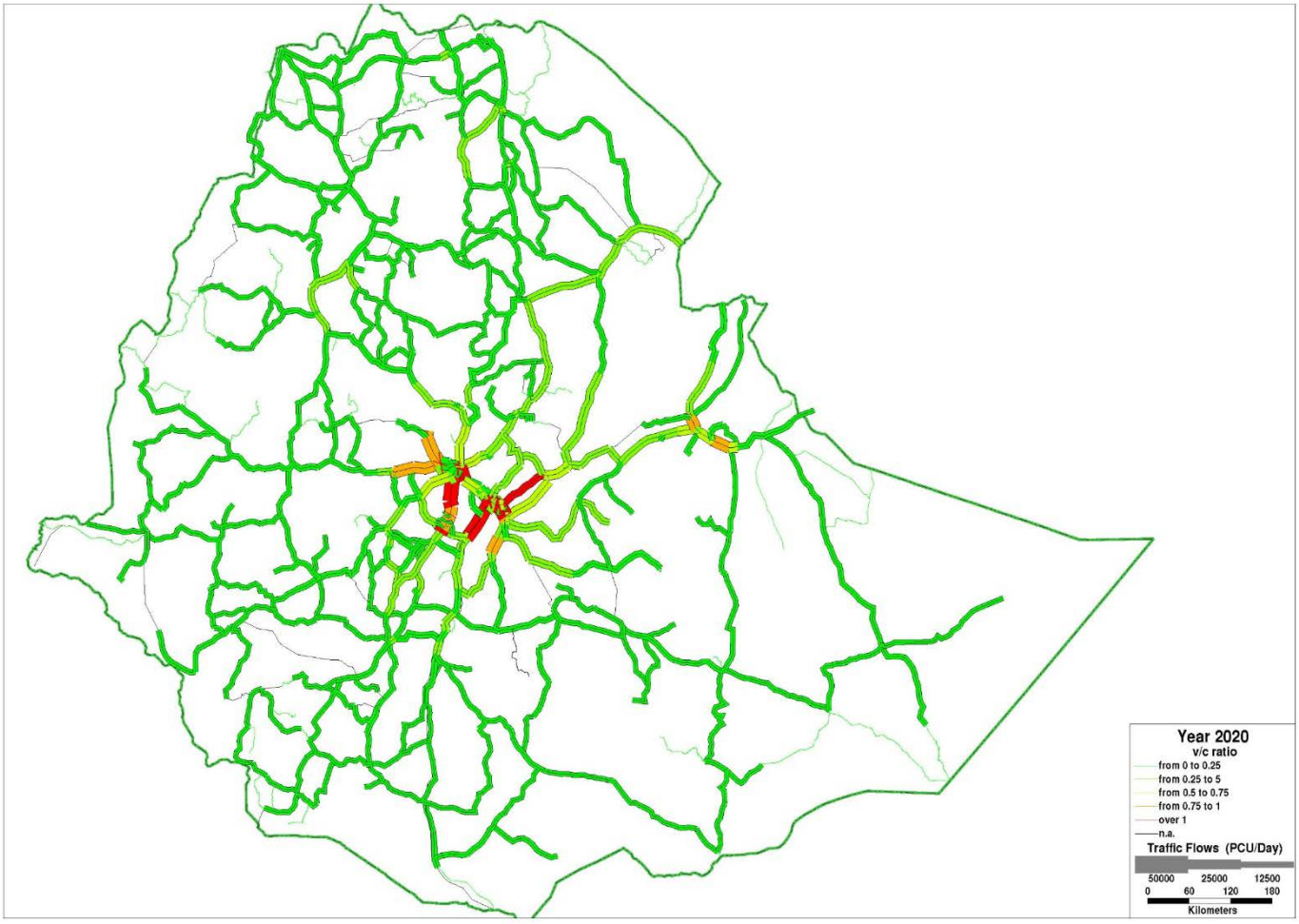
The Transcad runs following the calibration simulation were performed using a more complex approach, based on a two-stage traffic assignment: (1) in the first phase, the freight component was assigned using the average kilometric rate cost as a basic cost factor for road and rail, as well as the real or apparent costs of handling at sea terminals or road / rail and (2) in the second phase the passenger component is assigned in terms of equivalent vehicles, using the pre-assigned freight component as preload to better define the level of network congestion. In both cases, equilibrium algorithms were used. A specific technical document will detail these procedures separately.

The present levels of services were estimated only on the road network by using using an approach based on the relationship between flow and capacity. The concept of "service level", in fact, is generally specific to the road transport mode. In order to simplify, the following congestion levels were considered:

- between 0 and 0.25
- between 0.25 and 0.5
- between 0.5 and 0.75
- between 0.75 and 1
- higher than 1

The Figure 85 below gives a representation of the existing levels of service. It must be highlighted how at the moment capacity problems are present only around urban areas (Addis Ababa and partially Dire Daua). It should also be noted that the model tends, due to the combined effect of the traffic data used, the zoning adopted and the calibration method, to "expand" congestion on the sections entering/exiting the cities. This is an aspect that is being re-evaluated and will be corrected. The figure presents the levels of service with a chromatic scale. Links with colours from green until orange are under capacity level, while links in red are links that may become critical at the corresponding time horizon

Figure 85: Present 2020 levels of service on the road network



According with the Model assignments at present (year 2020):

- High level of congestions appears at Addis urban section, Alemgena – Tiya, Modjo – Ziway, Adama – Metehara, Adama – Dera;
- Moderate congestions in Holeta – Muger, Holeta – Ambo, Tiya – Butajira, Dera – Asela, DireDawa – Cinile and Harar – Babile.

4 ETHIOPIA DEVELOPMENT PLANNING

Following the main economic development plans elaborated in the different economic sectors are presented. It is assumed that their implementation will be completed in the thirty years of application (2020 – 2050) of the Transport Master Plan. The implementation of these development plans will bring substantial variation to the distribution of transport demand and has been reflected in the transport demand growth of each woreda where the plan is localized. The transport demand growth has been considered in the transport simulations at different time and scenario adopted.

4.1 ECONOMIC DEVELOPMENT PLANS

4.1.1 Ethiopia Recent Economic Performance

Ethiopia has enjoyed strong growth for over a decade, which has reduced poverty and raised living standards. Since 1990, per capita income in Ethiopia has increased by about 200 percent, reaching 869 US$ in 2019[25], while other development indicators saw remarkable improvement: for instance, life expectancy rose by about 10 years in a decade while infant mortality was halved. It is worth noting that Ethiopia made these strides while maintaining a relatively equitable income distribution.

Nevertheless, according to the IMF, the public investment-driven growth model has reached its limits. The model, driven by external borrowing by state-owned enterprises and diversion of resources towards infrastructure investment, has resulted in large imbalances.

External vulnerabilities have risen amid a rapid buildup in public debt over the past few years, especially from the public enterprises; significant exchange rate overvaluation, in part due to inadequate adjustments in macroeconomic policy settings; and persistent and widespread shortages of foreign exchange as imports for public investment remained high and goods exports disappointed while external debt servicing needs went up. Foreign exchange (FX) reserves cover less than 2 months of prospective imports despite significant foreign exchange rationing. External debt vulnerabilities also remain elevated.

To tackle these vulnerabilities, the authorities have recently unveiled an ambitious "*Homegrown Economic Reform Plan*", which takes a comprehensive approach to addressing imbalances and rebalancing growth, with three pillars:

1) Macroeconomic and financial sector reforms to correct FX imbalances, control inflation, safeguard financial stability while promoting intermediation, and ensure debt sustainability;
2) Structural reforms to ease institutional and structural bottlenecks to productivity and job growth, and
3) Sectorial reforms to address institutional and market failures in key strategic sectors.

The Plan builds on previously-announced reforms such as measures to privatize key SOEs and open up previously closed sectors of the economy to private sector participation. Key reforms envisaged by the Plan already in train include the decision to open up the telecommunications and sugar sectors to the private sector, strengthening the business and investment climate and phasing out measures of financial repression.

The economic reform drive is taking place against the backdrop of significant political uncertainty and heightened tensions**.** The government headed by Prime Minister Abiy Ahmed took office in April 2018 and embarked on a program of political reforms: it signed peace agreements with armed separatist groups, freed political prisoners, opened the space for political dissent and made peace with neighboring Eritrea. However, these changes have been followed by an increase in inter-

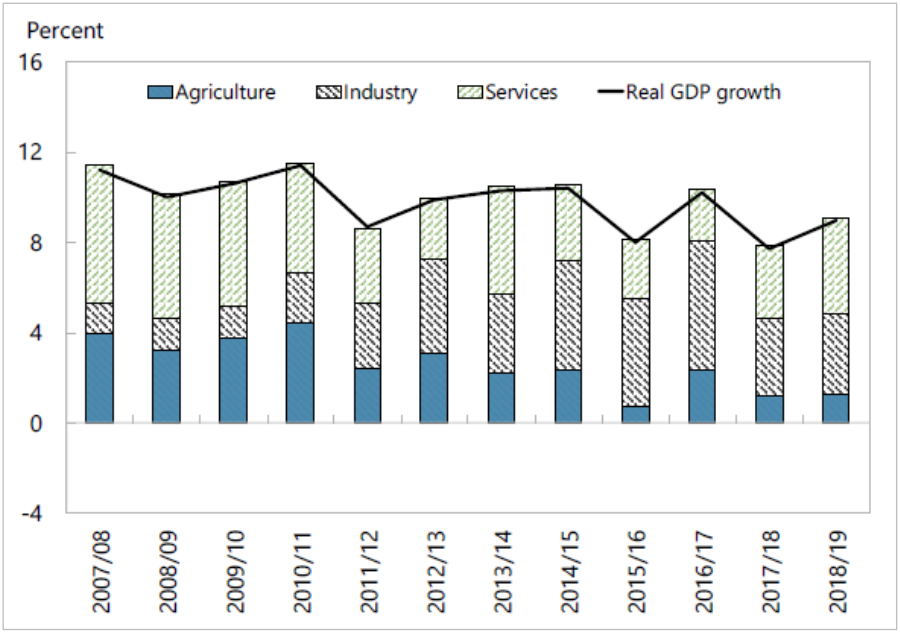
[25] World Bank, Sub Saharan Africa Macro Poverty Outlook, Oct 2020.

regional and inter-ethnic tensions, and violence. High-profile assassinations took place in June 2019 and millions of people remain internally displaced. Elections are scheduled to take place in August 2020 however, due to the particular situation created by the COVID-19 outbreak, they will likely be postponed to a later date.

Official data from the IMF showed robust growth in 2018/2019**:** real GDP grew by 9 percent, largely driven by the acceleration in the services sector.

On the supply side, industry and services continued to lead growth in 2019. Industry was driven by construction, notably for industrial parks and infrastructure investments. Structural transformation is under way but needs to accelerate.

Figure 86: Ethiopia – Real GDP Growth and Contribution by Sector



Source: IMF Country Report 20/29 – Ethiopia

While agriculture's share in GDP has fallen, the sector still employs more than 70% of Ethiopia's workforce. Manufacturing accounts for less than 10% of GDP. On the demand side, private consumption and domestic investment were the primary growth drivers in 2019, but domestic investment slowed, reflecting fiscal consolidation.

Monetary policy was tight but inflation remained in double digits in 2019 and above the 8% central bank target because of central bank advances to finance the fiscal deficit. Ethiopia's managed float exchange rate foresees a 5%–6% annual depreciation to adjust for inflation differentials with trading partners (The birr depreciated year on year by about 6.1 percent against the US dollar by end 2018/19). Moreover, Ethiopia's debt sustainability rating deteriorated to high risk in 2018 because of worsening terms of trade and the subsequent weak export performance.

4.1.1. Outlook and Risks

According the AfDB, the economic outlook is positive, and real GDP growth is projected to stabilize at 7.1% – 7.2% in 2020–21 due to ongoing political and economic reforms and normalizing relations with Ethiopia's neighbors. Growth should benefit from the Homegrown Economic Reform Program, which seeks to address macroeconomic imbalances and unlock structural and sectorial bottlenecks, improving governance of state-owned enterprises (SOEs) and strengthening institutional capacities.

As strategically important providers of public goods and services, state-owned enterprises (SOEs)

in Ethiopia have played a central role in driving the high investment and GDP growth rates over the past decade. The role of SOEs is far-reaching: these companies are active in key sectors such as industry, construction, finance, telecommunication, trade logistics, transportation, and energy. In particular, a large share of infrastructure investment such as building transport links, telecommunications facilities and energy generation infrastructure, was undertaken by the SOEs.

Measures to open key sectors to competition— notably transport, logistics, manufacturing, and telecommunication— will attract private investment, catalyze high value-added services, and boost competitiveness.

Transport investments, such as the Addis Ababa– Djibouti railway, and ongoing logistics reforms, including measures to improve first- and last-mile railway connectivity, will produce efficiency gains in trade and manufacturing. Ethiopia's public–private partnership framework will diversify the country's development finance sources, improve debt sustainability, and sustain growth-generating infrastructure investments.

Overdependence on unprocessed agricultural exports has contributed to persistent trade deficits. Foreign exchange shortages, unstable electricity supply, low access to credit, weaknesses in raw material supply chains, and shortages of skilled labor have hindered business growth and reduced production capacity utilization for manufacturing firms (57% in 2018 versus the targeted 68%).

Inefficient trade logistics have also slowed the development of a competitive manufacturing sector. Weak export growth and high debt-service ratios are depressing the growth outlook. Intermittent interregional conflicts could impede socioeconomic progress. Youth unemployment is high, particularly in urban areas (at 25%), requiring improvements in education quality to enhance employability.

According to the AfDB, Ethiopia will continue to be vulnerable to external shocks, even under a program scenario. As external vulnerabilities are expected to only improve gradually, shocks in the near term could have adverse effects on growth and stability.

Moreover, it is worth notice that the Ethiopian Planning and Development Commission (PDC) declared it is preparing Ethiopia's first-ever ten-year Perspective Development Plan. The plan, which will be finalized by June 2020, will encompass the period from July 2020 to 2030. This will enable it to line up with the Sustainable Development Goals (SDGs).

The ten years plan of Ethiopia, which is expected to be discussed at different levels before approval, also aims to reduce the current 19 percent Ethiopians living below poverty line to 7 percent. The plan also aims to reduce unemployment every year at least by 1 percent. Increasing access to clean drinking water to 100 percent after ten year is also mentioned in the plan.

Though the government plan for this year was to grow the economy by 9 percent, because of COVID-19 it is estimated to shrink by 3 percent to 6 percent, as stated by the Ministry of Finance.

4.1.2. Economic Development strategies

The main development agenda of the Ethiopian Government has been poverty eradication since 1991. Thus, macroeconomic and sector polices, strategies and programs have been geared towards addressing the poverty agenda. Over the last several years, the economy grew by nearly 10 per cent per annum, one of the fastest growth rates registered in the world. The economy is getting even bigger and complex largely attributed to this double-digit economic growth. Following the general and specific objectives mentioned in the different planning documents are analyzed.

The first Growth and Transformation Plan (GTP I) 2009/2010 - 2014/2015

The first Growth and Transformation Plan (GTP I) was articulated through four overarching objectives:

1) Maintaining at least an average real GDP growth rate of 11% per annum and attaining the Millennium Development Goals (MDGs) by 2014/15;

2) Expanding access and ensuring the qualities of education and health services and achieve MDGs in the social sectors;
3) Establishing conditions for sustainable nation building through the creation of stable democratic and developmental state;
4) Ensuring the sustainability of growth through maintaining macroeconomic stability.

One of the key features of the GTP I was the special focus given to infrastructure development. Large scale energy, transport and telecommunication infrastructure development programs were included in the plan.

The second Growth and Transformation Plan (GTP II) 2014/2015- 2019/2020

The second Growth and Transformation Plan (GTP II) covered the period 2015/16-2019/20. Accordingly, the Government as a developmental state is fully committed to mobilize the necessary resources including capacity for implementation of the Plan. Modernization in the development of the agriculture sector, expansion of industrial development with primary focus on light manufacturing, significant shift in export development is at the core of GTPII. GTPII is an important milestone towards realizing Ethiopia's vision of becoming a lower middle-income country by 2025.

The total investment required for GTP II is estimated at ETB 4.2 trillion (equivalent to USD 200 billion). About 55% of these investments are expected to be on-budget, of which 5.4% is expected from external loans. The remaining 45% will be off-budget, to be implemented by state owned enterprises (from their own revenue, domestic and external loans). Given the huge magnitude of the required financial resources, the GoE plans to significantly scale up domestic savings mobilisation.

The GTP II (2015/16-2019/20) has been formulated to carry forward the basis, objectives and strategic directions of GTP I. The achievements gained, challenges faced and lessons drawn from the implementation of GTP I were the bases for the formulation of GTP II. Nevertheless, GTP II has its own distinguishing features including the following:

1) Agriculture will remain the main driver of the inclusive economic growth;
2) Render the country a leader in light manufacturing in Africa and one of the leaders in overall manufacturing globally;
3) A clear set of targets must be established to measure and monitor productivity and competitiveness of the agricultural, manufacturing and modern tradable service sectors;
4) Emphasis is given to redressing macroeconomic imbalances;
5) Strategic policy framework which aims to properly manage and administer the construction industry and development projects, especially huge public projects such as dams, roads and railways;
6) Particular attention is given to sustainable urban development that aims to support the growth and transformation agenda;
7) Due emphasis will be given to the promotion of domestic private sector development in the manufacturing industry;
8) Emphasis on human capital capacity development supported by technology and innovation
9) Major emphasis is given to building a climate resilient green economy in the context of sustainable development.

GTP II has set out the following specific objectives:

1) Achieve an annual average real GDP growth rate of 11 percent within a stable macroeconomic environment and thereby contribute towards the realization of Ethiopia's vision of becoming a lower middle-income country by 2025, while pursuing comprehensive measures towards narrowing the saving-investment gap and bridging the widening trade deficit.

2) Develop the domestic engineering and fabrication capacity and improve productivity, quality, and competitiveness of the domestic productive sectors (agriculture and manufacturing industries) to speed up structural transformation;
3) Further solidify the on-going public mobilization and organised participation to ensure the public become both owners and beneficiaries from development outcomes.
4) Deepen the hegemony of developmental political economy by strengthening a stable democratic developmental state.

With this perspective, the pillar strategies of GTP II are built on that of GTP I complemented by additional pillar strategies that serve as foundation for sectorial plans. Therefore, in order to achieve the objectives of GTP II set out above, the following pillar strategies will be pursued.

1) Sustain the rapid, broad based and **equitable economic growth and development** witnessed during the last decade;
2) Increase the productive capacity and efficiency to reach the economy's production possibility frontier through concurrently improving **quality, productivity and competitiveness of productive sectors** (agriculture and manufacturing industries);
3) Speed up and catalyse transformation of the **domestic private sector** and render them a capable development force;
4) Build the capacity of the **domestic construction industry**, bridge critical infrastructure gaps with particular focus on ensuring the quality of infrastructure services through strengthening the implementation capacity of the construction sector;
5) Properly manage and administer the **on-going rapid urbanization** to unlock its potential for sustaining growth and structural transformation of the economy;
6) Accelerate **human development and technological capacity** building and ensure its sustainability;
7) Establish **democratic and developmental good governance** through enhancing implementation capacity of the public sector and mobilization of public participation;
8) Promote **women and youth empowerment**, ensure their participation in the development process and enable them equitably benefit from the outcomes of development;
9) Build **climate resilient green economy**.

4.2 SOCIAL DEVELOPMENT

4.2.1 Poverty and Social Context

Ethiopia has made significant headway in improving living standards in recent years. By 2016, Ethiopia had met 6 out of 8 of its Millennium Development Goals (MDGs): the proportion of people in Ethiopia below the poverty line has been halved; the prevalence of hunger and undernourishment has been reduced; access to education has expanded; the gap in enrolment between boys and girls has narrowed; under-five mortality has been reduced by two-thirds; and progress was recorded in reducing HIV/AIDS. Even on the two lagging MDGs—ensuring gender equality and improving maternal health— significant progress has been made. Ethiopia is also aiming to become a middle-income carbon-neutral economy by 2025.

The pace of poverty reduction in Ethiopia has been impressive and particularly so when compared to other African countries: In 2000 Ethiopia had one of the highest poverty rates in the world, with 56% of the population living below US$1.25 PPP a day, eleven years later, the percentage was less than 31%. Only Uganda has had a higher annual poverty reduction during this time.

In recent years, rapid macroeconomic growth in Ethiopia has translated into fast consumption growth, which has been mainly concentrated in urban areas. The differential distribution of the

gains from growth has had an impact on poverty alleviation: according to the latest World Bank assessment, the bulk of poverty reduction between 2011 and 2016 has occurred in urban areas. However, as poverty is concentrated in rural areas, this has led to a divergence in progress between urban and rural areas. In some regions, the poor have experienced negative consumption growth.

According to the latest World Bank Ethiopia Poverty Assessment (2020), the country has a traditional poverty profile. The poor tend to live in rural areas, in large households with high dependency rates, headed by an older and little-educated household head. They mainly engage in agriculture and casual labor force for their livelihood. In contrast to traditional wisdom, poor households are less likely to be headed by a woman than non-poor households.

Regional disparities in poverty are relatively low, meaning that the regional distribution of poverty largely reflects the regional distribution of the population: poverty rate is relatively higher in Tigray, Amhara and Benishangul Gumuz regions but most of the poor are concentrated in Oromia (38.3% of the country poor) which accounts for the 37.8% of the national population.

The main reason for the higher incidence of poverty in rural areas is low agricultural sector productivity, especially in in drought-prone lowlands. Less populous but drought-prone lowlands experience weaker coverage of those in extreme poverty, exacerbating inequality between agro-ecological zones.

Hence, to significantly reduce the high levels of rural poverty, concerted efforts, including innovative approaches, are needed to address agricultural sector structural problems. In the effort to address this challenge, the Government developed the Productive Safety Net Programme (PSNP), which provides conditional (on work), or unconditional cash or food transfers to targeted poor rural households during the lean season.

However, statistics from the World Bank confirm that only 13 percent of Ethiopia's poor are covered by the PSNP in 2016 and there would be significant benefits to substantially upscale the program to allow for a more universal regional coverage. Also, benefits are benchmarked on the results of local wage surveys, which have not been carried out in nearly 4 years. As a result, the real value of benefits are estimated to have been eroded by 30 percent on average in light of the high inflation. Similarly, the next stage of the UPSNP is to expand it to more cities targeting 1 million beneficiaries, and the government intends to increase its share of funding for both programs in the next 5 years.

4.2.2 Gender Equality

Ethiopia recorded about 40% improvement in its gender parity index in primary school enrolment from 1991 to 2014, and is near complete gender parity at the primary school level, for the government worked effectively to mainstream gender into its policies and programmes. At the secondary level, gender parity accelerated from 0.67 in 2007 to 0.82 in the same period. Adolescent birth rate, which is indicative of the rights of young women, fell from 109.1 births per 1000 women aged 15-19 in 2002 to 79 in 2013 (AfDB, Country Strategic Paper 2016-2020).

Women's access to credit and technical services has also increased tremendously. The data shows that 46.8% of the clients in Microfinance Institutions (MFIs) are women and about five million women have been organised into SMEs and hence accessed credit.

According to the World Bank *Ethiopia Gender Diagnostic Report 2019*, despite significant economic growth, however, women continue to face significant barriers in the workforce: women experience high rates of unemployment (50 percent), seasonal employment (37 percent), and temporary employment (13 percent). Women are also less likely than men to be paid for their work: over half of all women engaged in the agricultural sector, for example, receive no payment. Similar trends exist in other industries like small-scale manufacturing, where 58 percent of female workers are unpaid family workers, relative to 40 percent of male workers.

Furthermore, for women active in the workforce, their productivity lags behind that of men. Female

farmers have lower rates of agricultural productivity than their male counterparts, and in entrepreneurship, female-owned firms underperform those owned by men in an array of critical dimensions including profitability, survival rate, average size, and growth trajectory. In a study of small- and medium-sized enterprises in Ethiopia, researchers found that while female-owned firms account for only 44 percent of firms, they make up nearly 70 percent of failed businesses.

The unmet potential of women in the workforce is intrinsically linked to a lack of opportunities for women in education, health, and human rights. Women are less literate, suffer from poorer health outcomes, and have fewer basic rights than men. These wide and pervasive gender gaps hinder not only female livelihoods, but also the potential for poverty alleviation and growth on a national level.

Moreover, Ethiopia has made slow progress in realising its gender-based MDGs. Focus areas requiring greater attention to bridge gender disparities include improving maternal health service delivery, expanding women's economic opportunities, and increasing women enrolment in secondary and tertiary level education.

4.3 TRADE

Ethiopia's current account (CA) deficit is driven by a large goods trade deficit, that is partly offset by services trade, private remittances, and official transfers. The large trade deficit (10-year average of nearly 18 percent of GDP) reflects low and declining exports and a public-sector driven growth model that in recent years relied on debt-financed infrastructure development and fueled imports, which were supported by an overvalued exchange rate.

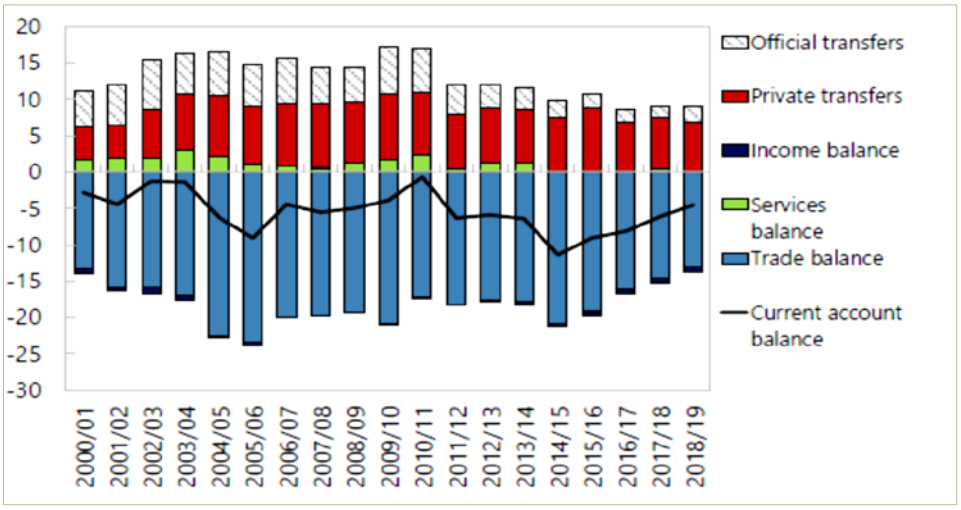
According to IMF, in 2018/19, goods exports declined by 6 percent from the previous year, marking the fourth year of annual decline in the last five years. As a result, share of goods exports to GDP has more than halved since 2013/14 to slightly below 3 percent of GDP. Ethiopia's goods exports/GDP ratio is very low compared to the average for Sub-Saharan Africa or for low-income developing countries. However, services exports have performed well in recent years, growing at an average rate of nearly 22 percent per annum for the last two years. At about 5 percent of GDP, services exports are nearly twice as large as good exports, thanks in part to the expansion of Ethiopia's civil aviation sector.

Imports have slowed rapidly in the last 2-3 years, with goods imports declining for three years in a row, resulting from reining in of external borrowing by the state-owned enterprises and a prioritization of public investment projects, as well as FX shortages which have curtailed private sector imports. The trade deficit/GDP ratio has improved to 12.9 percent in 2018/19 from about 21 percent in 2014/15 on declining imports as a much higher goods imports base more than offset the negative contribution from declining goods exports.

Ethiopia's weak export performance results from structural impediments that have impacted the private sector. Agricultural products, primarily coffee and oil seeds, account for a bulk of goods exports. The agricultural sector is plagued by low labor productivity and is vulnerable to natural disasters, such as drought and flooding. Thus, a large share of Ethiopia's export basket is exposed to supply shocks, coming from domestic production and/or global prices.

Manufacturing exports have grown at a fast clip in recent years, but from a very low base, and now account for about 12½ percent of goods exports. Insufficient and unreliable access to foreign exchange, credit, imported intermediate inputs, and unreliable electricity supply are often cited as the major constraints of doing business in Ethiopia.

Figure 87: Ethiopia Current Account Balance (% of the GDP

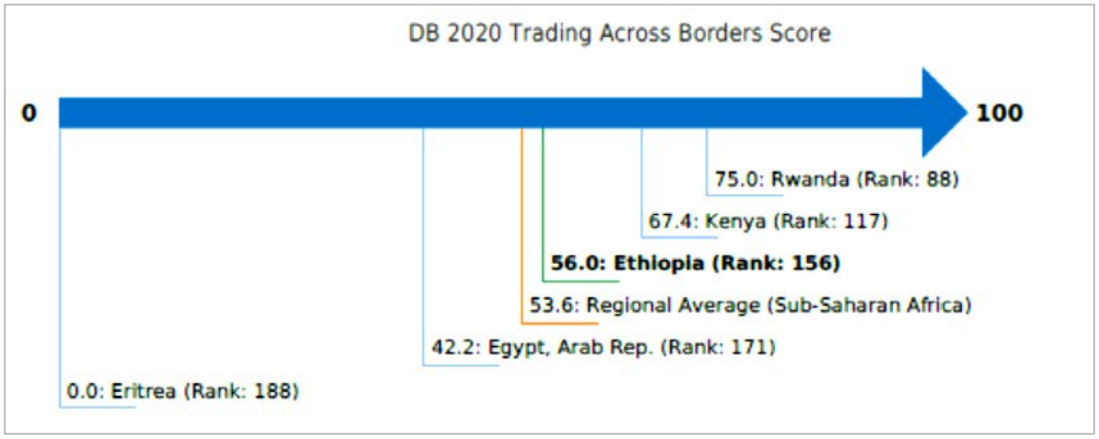


Source: IMF Country Report 20/29 – Ethiopia

From a **regional integration perspective**, Ethiopia is generally committed to regional integration, as it has ratified the Common Market for Eastern and Southern Africa (COMESA) Protocol. The country is also a member of Intergovernmental Authority on Development (IGAD) and is working for acceding to the WTO. It has also signed a Memorandum of Understanding and Transport Corridor Service Agreement with Kenya and South Sudan. Further, Ethiopia has bilateral investments, double taxation treaties, and protection agreements with 40 countries. However, the country's progress in enhancing regional trade has been generally slow.

In Doing Business 2020, Ethiopia ranked 156th of 190 nations in trading across borders, gaining 10 positions in only four years (it ranked 166th in 2016) and above the regional average of Sub-Saharan Africa. According to the World Bank ranking, administrative entry barriers (documentary compliance in import and export) are the major non-tariff barriers affecting Ethiopia's trade with COMESA members.

Figure 88: Trading across Borders in Ethiopia and comparator economies – Ranking and Score



Source: World Bank Doing Business 2020 – Economy Profile Ethiopia

Being a land-locked country, Ethiopia needs to significantly improve its trade and border logistics. In this context, the rail link to Djibouti could be better used to realize its full potential.

4.4 AGRICULTURAL DEVELOPMENT

Ethiopia has recorded fast economic growth over the past decade, with an average growth rate of 10.7% per year for the period ranging from 2003/04 to 2011/12. Growth reflected a mix of factors, including agricultural modernization, development of new export sectors, strong global commodity demand and government-led development investments. The GoE is currently implementing the second Growth and Transformation Plan (GTP-II) which sets a long-term goal of becoming a middle-income country by 2025. To achieve the set GTP objectives, the country has followed a "developmental state" model with a strong role for the government in many aspects of the economy. Agriculture remained a dominant sector and an important source of economic growth. According to official statistics, over the past 15 years the average agricultural growth rate has been close to 7% per annum.

Regarding agricultural development investment, concerted efforts have been made by both the GoE and development partners. A Second Agricultural Growth Program (AGP II) is being implemented with the assistance of the World Bank. The Agricultural Growth Program (AGP) is a clear example of this collaborative effort. AGP is a multifaceted investment program supporting agricultural productivity and commercialization focusing on high agricultural potential areas to address some of the key constraints to agricultural growth and thereby contribute to overall economic growth and transformation. It is a program approach and is viewed by Government as the key investment mechanism for development partners and government to collaborate on. The further growth of the agriculture sector is expected to feature prominently in the second Growth and Transformation Plan (GTP-II), currently under implementation. The Second Agricultural Growth Program (AGP II) would be aligned with GTP II, thereby contributing to the achievement of targets set for agriculture sector growth. The independent impact evaluations, studies and assessments conducted during the first phase have been used in designing the AGP II to improve implementation and maximize the overall impact of the program.

The Program Development Objective is "to increase agricultural productivity and commercialization of small holder farmers targeted by the Program and also contributes to dietary diversity and consumption at HH level." Alike the preceding Program, AGP II will also give due attention to the increased participation of women and youth. The program contributes to the higher-level goal of sustainable food security and agricultural transformation by developing untapped potential of well-endowed areas. AGP II will operate in 157 woredas selected from 7 national regional states and one city administration of the country which have the highest growth potential, primarily based on agro-ecological conditions and access to markets. The 96 woredas that were benefited from the AGP I interventions will also be the beneficiaries during the AGP II and this will further consolidate past achievements and strengthen capacities built during the second phase. In the second phase of the program, additional 61 woredas are included. The woredas are distributed among the following national regional states and city administration: Amhara, Oromiya, SNNPR, Tigray, Benishangul-Gumuz, Gambella, Harari and Dire Dawa city administration. The expansion into the new national regional states and Dire Dawa city administration would consist of two woredas in each of Benishangul-Gumuz and Gambella, and one in each of Harari and Dire Dawa.

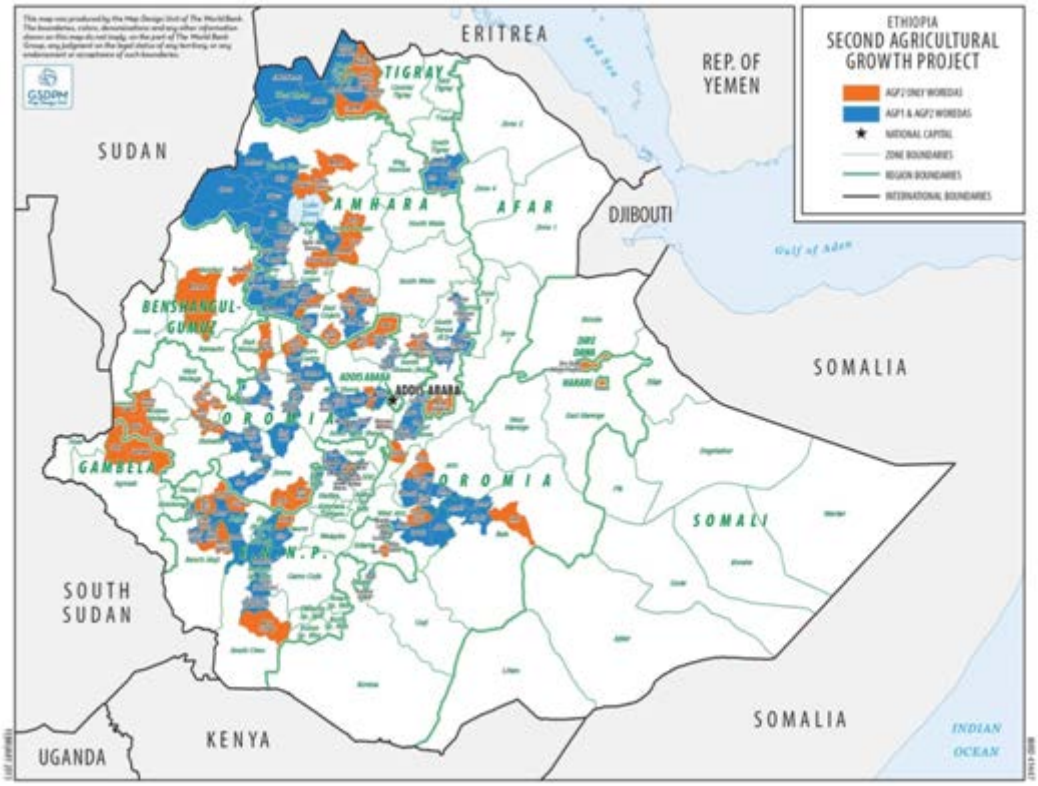
The project woredas are distributed among the following national regional states and city administration: Amhara, Oromiya, SNNPR, Tigray, Benishangul-Gumuz, Gambella, Harari and Dire Dawa city administration. The expansion into the new national regional states and Dire Dawa city administration would consist of two woredas in each of Benishangul-Gumuz and Gambella, and one in each of Harari and Dire Dawa.

Surplus Crop producing areas are mostly concentrated in Oromia, Amhara and Southern Regions.

The surplus producing woreda have been accredited with a surplus of traffic generating capacity, but the distribution of crops to the other woredas with food deficit create a volume of traffic which is already detected by the recent traffic counts. New agricultural development areas will anyway

create additional generation of traffic volumes.

Figure 89: Agricultural development areas



4.5 INDUSTRIAL DEVELOPMENT

The industrial development strategy postulated in the second Growth and Transformation Plan (GTP II) is centered on agricultural-based, manufacturing sector-driven and export-led development. The GTP pursues the growth through the export-driven industrialization strategy focusing on- labor- and capital-Intensive manufacturing industries, export-oriented and import substituting industries, contribute to rapid technology & know-how transfer, have broad linkages with the rest of the economy, and use Agricultural Products as Inputs (Agro-processing). The key strategic directions is the creation of **industrial parks** with small and medium scale industrial development; and large-scale industries with special emphasis all geared to poverty alienation & development. The manufacturing industries that have given due attention are agro-processing industries, textile and clothing, food and beverage industries, tannery and leather goods, pharmaceutical industries, chemicals and chemical products industries, paper and paper products, plastic industries, building materials, glass & glass products, metal & metal engineering etc. to mention a few.

In order to ensure a proper management of the industrial development, the Ethiopian Government came up with the Industrial Parks proclamation 886/2015 providing that industrial park can be developed by any profit-making public, public-private or private enterprise. This includes the Industrial Parks Development Corporation (IPDC), which is in charge of managing the development of large, medium and light industrial parks and the ministries of industry and agriculture, which are responsible for the integrated agro-industrial parks development. The investment is open to national, domestic and foreign investors. The industrial parks developers are entitled to develop their own industrial parks, either independently or through public-private partnership with IPDC.

With regard to large, medium and light industrial parks, IPDC is mandated as a facilitator of land bank and main infrastructure provider for private industrial park developers so as to realize the national industrialization agenda of the country in the coming years.

Two kinds of industrial parks are being developed: large, medium and light scale industrial parks on the one hand, integrated agro-industrial parks on the other hand.

4.5.1 Industrial Parks

Following is the present situation of industrial parks construction by the Industrial Parks Development Corporation (IPDC).

Table 55: Industrial Parks Developed

No.	Name of Industrial Park	Location of Industrial Parks	Eligible Sector	Amount of Land in hectare	Total Number of shades	Type and Number Of Sheds				Status of IP
						11000 m^2	5500 m^2	3000 m^2	Other type in m^2	
1	Bole Lemi-I	Addis Ababa	Apparel & textile	172	20	10	10		-	Operational
2	Bole Lemi- II	Addis Ababa	Apparel & textile	181	2 sheds & Serviced land	1	1	-	-	- Ready for sublease - Service land available
3	Kilinto	Addis Ababa	Pharmaceutical Hub	279	Serviced land					- Ready for sublease - Service land available
4	Hawassa Phase1-CycleI	Hawassa	Textile & Garment	140	37	12	22	-	3 special sheds (39,680 m^2)	operational
5	Hawassa Phase1-CycleII	Hawassa	Textile & Garment		15	5	10	-	-	operational
6	Adama	Adama	Garment, Textile & Machinery,	120	19	6	9	4	-	- operational - Factory sheds available
7	Dire-Dawa	Dire-Dawa	Garment, Apparel and Textile	150	15	5	6	4	-	- operational - Factory sheds available
8	Mekelle	Mekelle	Apparel & Textile	75	15	5	6	4	-	- operational - Factory sheds available
9	Kombolcha	Kombolcha	Apparel & Textile	75	9	2	7	-	-	operational
10	Jimma	Jimma	Apparel & Textile	75	9	-	4	5	-	operational
11	Bahir-Dar	Bahir-Dar	Garment & Apparel	75	8	-	8	-	-	operational
12	Debre-Birhan	Debre-Berhan	Garment & Apparel	100	8	-	8	-	-	- operational - Factory sheds available

Already operational is the Bole-Lemi, first industrial park developed by IPDC. An Export Processing Zone, it will be upon completion a "green" park, with more than 30 hectares of green areas being currently developed. *Bole-Lemi Phase 1 (156 hectares)* has started operations in 2014, with all pre-erected factories already rented-out to more than 12 different corporations. *Bole-Lemi Phase 2 (186 hectares)* is currently being developed in collaboration with the World Bank, and should include both serviced land (from beginning of 2016) and pre-erected factory sheds (from 4th quarter of 2016). In the future, a residential and recreational area adjacent to the site will also be developed.

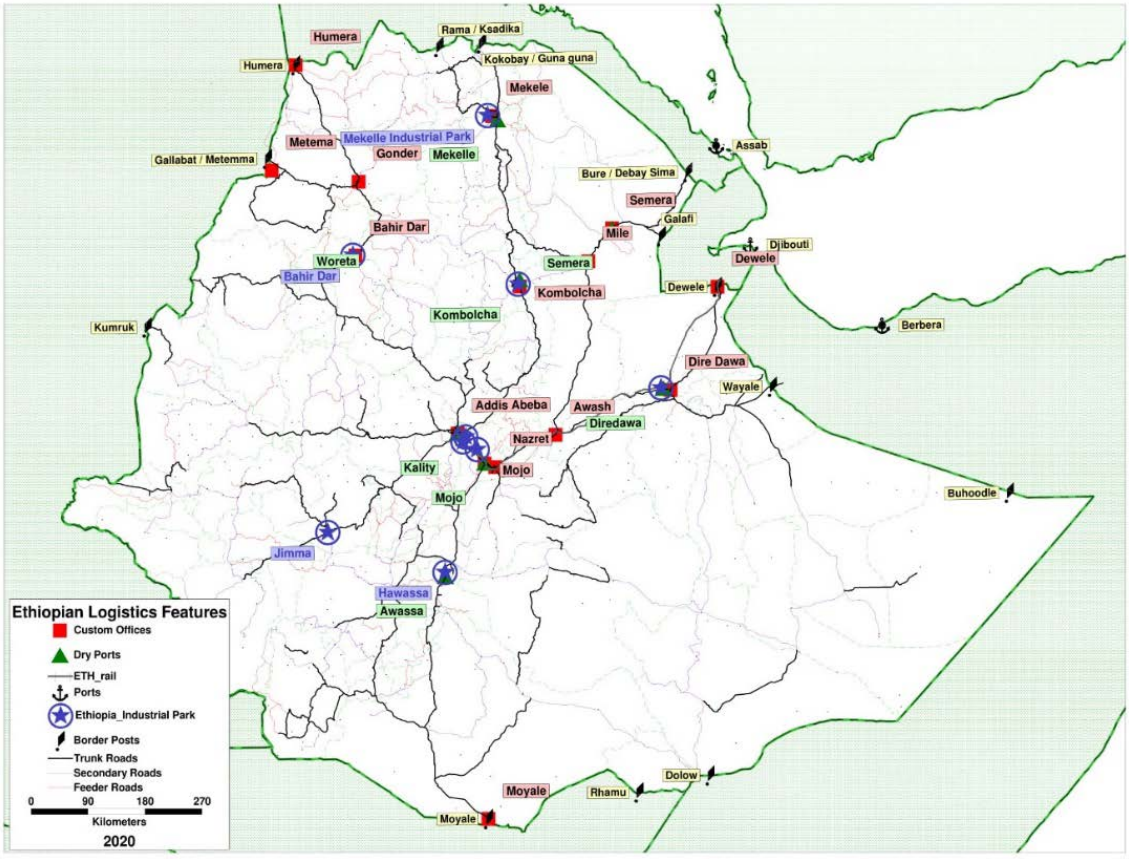
Addis Industrial Village was the first ever industrial park established in Ethiopia, in the 1980's, and it is currently undergoing heavy modernization, including a new management system. Geared toward domestic exporters, it comprises of 10 government-built factory buildings (11,000 m2) rented to investors, and 9 privately-built factory buildings developed on leased land. Covering 88 hectares of land, it is today at full capacity.

Located in the south of Addis Ababa, Kilinto is currently being developed as IPDC's second park in Ethiopia's lively, cosmopolitan capital. With a total size of 337 Ha, Kilinto will be a mixed-use

park and the number one destination for manufacturers in agro-processing, pharmaceuticals, electric and electronics products, wood and furniture, both for export and to serve local consumers. Kilinto will be developed in 2 phases in collaboration with the World Bank Group, with phase 1 on 153 Ha. Serviced land in Kilinto will be available from early 2016, with pre-erected factory sheds available from the 4th quarter of 2016.

IPDC's flagship project, Hawassa Industrial Park, is located 275 km from Addis in proximity to one of Ethiopia's premium holiday destination, Lake Hawassa. Hawassa Industrial Park will be upon completion a 300 Ha Eco-Park, centred on textile and garment products, and fully integrated to the city, in collaboration with the newly built Hawassa University. As an Eco-Park, Hawassa will be mostly powered by renewable electricity sources (hydro-electricity). The design and construction of Hawassa will be conceived around energy and water conservation principles – including maximization of natural lightning and natural ventilation, fitting of low consumption bulbs, recycling of rain water, and solar powered LED street lights - making it Ethiopia's first major eco-friendly development. In Phase 1 cycle 1, 100 hectares of land will be developed, and serviced land will be available as early as 4th quarter of 2015, with pre-erected factory sheds available from mid-2016. In parallel, the Government of Ethiopia is improving Hawassa's connectivity with the extension of the Addis-Adama highway to Hawassa the construction of a domestic airport, and the extension of the Addis – Modjo – Djibouti railway to Hawassa

Figure 90: Location of Industrial Parks



Other parks

IPDC will develop additional parks in Dire Dawa, Mekelle, Kombolcha, Adama, Bahir Dar and Jimma. With a final size ranging from 500 to 2000 hectares, each park will be developed in phases of 75–200 hectares, and will have its own specificities.

Dire Dawa is being developed as an integrated zone on the model of an international Special Economic Zone, and will be easily accessible from Djibouti by road and train as well as with daily flight from Addis Ababa.

Mekelle benefits from an already established industrial fabric − notably in textiles, leather and pharmaceuticals, and from a particularly dynamic business environment. A railway line linking Mekelle to Awash (located on the Addis-Djibouti railway) is currently being designed.

Kombolcha is located at a cross-road equidistant of major Ethiopian cities, making it an ideal destination for manufactured product for the domestic market.

Adama is one of the biggest cities of the Oromia region, currently a top destination for investors in medium and heavy manufacturing. Adama boosts excellent facilities for foreigners, including high quality hotels, and is already served by an express tollway to Addis. The planned railway Hawassa-Mojo-Addis will also stop in Adama.

Bahir Dar is a major domestic and international tourism destination and the capital of the Amhara region. It is served by daily flights to Addis Ababa. In 2002 it was awarded the UNESCO Cities for Peace Prize for its efforts in addressing the challenges of rapid urbanization.

Jimma is the largest city in south-western Ethiopia. Logistics connections to the rest of the country are currently being upgraded.

According to the IPDC upon going operational these industrial parks will help attract more foreign direct investment, stimulate export trade and create jobs for 10 million citizens. Moreover, they are expected to redeem the construction costs within 20 years. The industrial parks of Bole Lemi and Kilinto, already operational, are helping the nation to earn 20 million USD annually. In addition, some foreign companies have started developing their own industrial parks among which are Eastern Industrial Zone (Chinese), George Shoes cluster industrial park (Chinese/Taiwan) and Huajian Group shoes cluster Industrial Parks (Chinese).

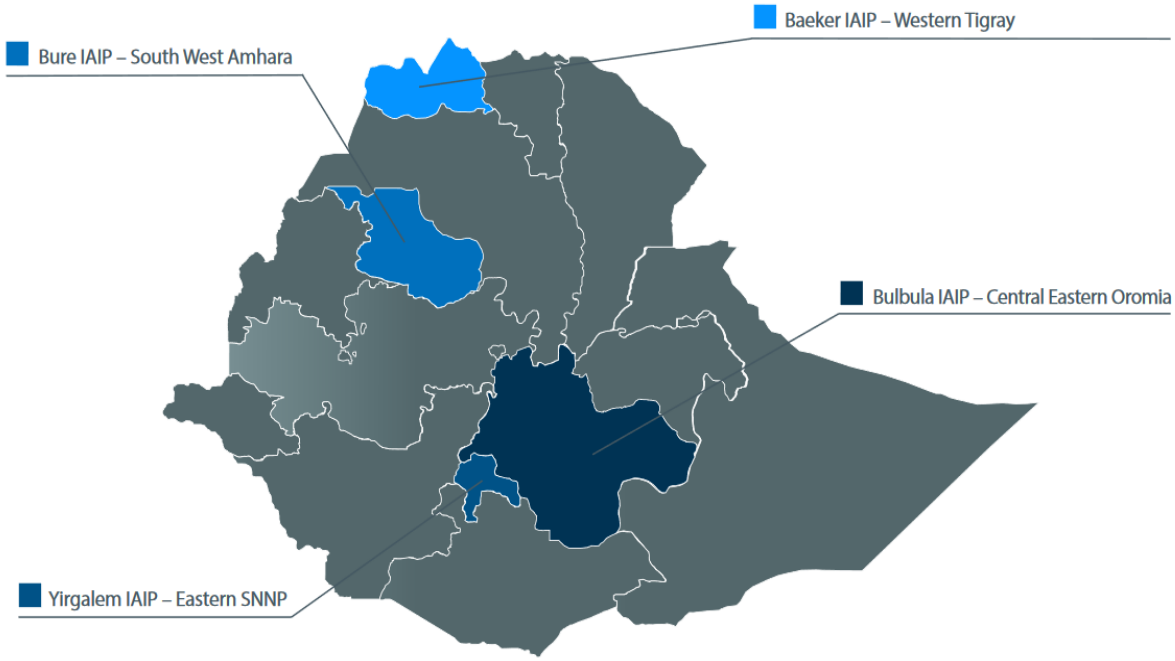
4.5.2 Integrated agro-industrial parks

The second type of industrial parks established in the country are the Integrated Agro-Industrial Park (IAIP) aiming at transforming the agriculture sector. IAIP is a geographic cluster of firms grouped together to share different infrastructure and to exploit the opportunities for joint buying, selling, training, extension services and other synergies. The business model of the IAIPs promotes efficiency of the commercial food supply chain. It is an end-to-end approach linking production to the market. The agro-industrial parks will be established within a 100-kilometer radius from input source and output market.

So far, 17 areas with agro-industrial potential (Agro-Industrial Growth Corridors-AIGCs) were identified across the country. Feasibility studies for the four pilot IAIPs are completed, commodities for processing in the IAIPs are identified (coffee, livestock, cereals, sesame, pulses, honey, fruit and vegetable), value chain analysis have been done and 1000 hectares of land attributed. AIGCs sites selected for the pilot development are located in the regions of Oromia, Gende Arba (Bulbula), Southwest Amhara, Bure, Eastern SNNP (Southern Nations, Nationalities and Peoples), Weynenata and Western Tigray.

According to the Ethiopian Ministry of Industry, the parks will incorporate companies engaged in exporting value-added agricultural products to the world market in addition to domestic companies, farmers and the youth which are the epicentres of agricultural commercialization. Upon completion, the agro-industrial parks will represent over 30 billion ETB (1.5 billion USD) in investments, and will create over 400 business opportunities and over 400,000 direct employments.

Figure 91: selected IAIPs



The following table shows the development of the Industrial and Agro-industrial parks built to date, in the process of opening and those under study and planning.

The following table shows the total of 23 industrial parks, 10 completed, 3 near completion, 4 starting construction and 6 under planning.

Table 56: Industrial Parks in Ethiopia

No	Name of Industial zone	Location	Distance From (km)		Progress	Organizer	Construc-tor	Main Industry	Size (ha)
			Addis	Djibouti					
1	Estern Industry Zone	Oromia Dukem	80	860	Completion in 2014 and Operational	Chinese Jiangsu Qiyuan Group		Garment	50
2	Bole Lemi Industrial Park 1	Addis Ababa	-	860	Completion in 2014 and Operational	Government, WB funds	23 Local companies	Garment	157
3	Hawassa Industrial Park	SNNPR	275	998	Completion in 2016 and Operational	Government, WB funds foreign fovernment funds	CCECC	Garment	400 (100 ha in phase 1)
4	Mekelle Industrial Park	Tigray	760	750	Completion in 2017 and Operational	Government, WB funds	CCECC	Garment	1000 (75 ha in phase 1)
5	Kombolcha Industrial park	Amhara	363	480	Completion in 2017 and Operational	Government, WB funds foreign fovernment funds	CCECC	Garment	750 (75 ha in phase 1)
6	Adama Industrial Park	Oromia	74	678	Completion in 2018 and Operational	Government	CCECC	Garment	2000 (102 ha in phase 1)
7	Jimma Industrial Park	Oromia	346	1200	Completion in 2018 and Operational	Chinese Huajin	CCCC	Shoes, coffee	1000 (60 ha in phase 1)
8	Debre Birhan Industrial Park	Amhara	170	895	Completion in 2019	Government	CCCC	Garment	75
9	Bahir Dar Industrial Park	Amhara	578	985	Completion in 2020	Hong Kong Hop Lun	CCECC	Garment	1000 (75 ha in phase 1)

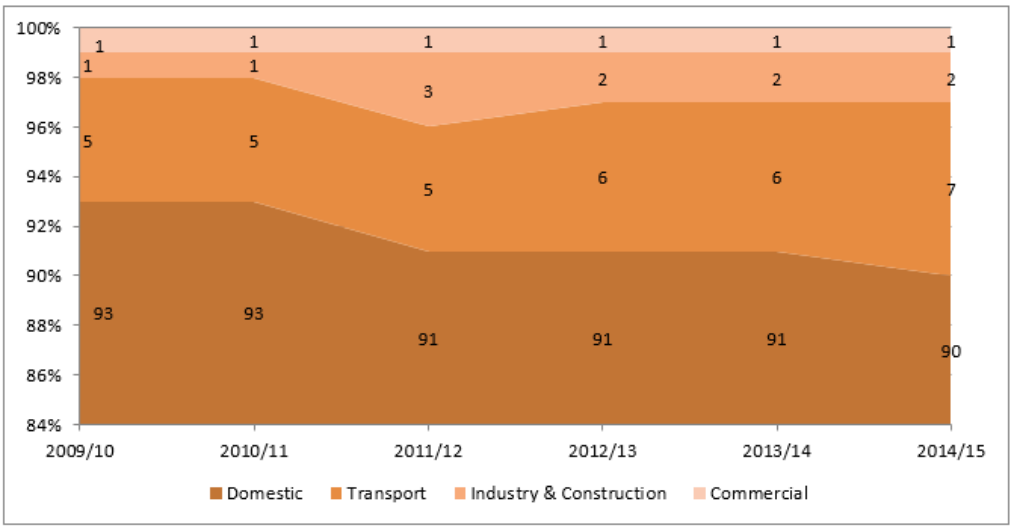
No	Name of Industial zone	Location	Distance From (km)		Progress	Organizer	Construc-tor	Main Industry	Size (ha)
			Addis	Djibouti					
10	Arerti Industrial Park	Amhara	105	860	Completion in 2021	Government	CCCC	Construction products, Home appliance	100
11	Bole Lemi Industrial Park 2	Addis Ababa	-	860	Nearing completion	Government, WB funds	CGCOC	Garment	107
12	Kilinto Industrial Park	Akaki, Addis Ababa	-	860	Nearing completion	Government, WB funds and Chinese funds	CTCE	Pharmaceuticals, medical equipment	279
13	Dire Dawa Industrial Park	Dire Dawa	445	380	Nearing completion	Government	CCECC	Assembling Garment, Foods	4000 (150 ha in phase 1)
14	Aysha Industrial Park	Somali	620	150	Under Planning	Government			
15	Arlines and Logistics Park	Addis Ababa	-	863	Under Planning	Government		Transportation	200
16	Kingdom Linen Industry Zone	Dire Dawa	515	400	Under Planning	Chinese Shejiand Jinda Flax		Linen	
17	Bure Integrated Agro-Industrial Park	Amhara			Starting construction	Government		Agriculture processing	154,99
18	Bulbula Integrated Agro-Industrial Park	Oromia			Starting construction	Government		Agriculture processing	263
19	Yirgalem Integrated Agro-Industrial Park	SNNPR			Starting construction	Government		Agriculture processing	108,8
20	Baeker Integrated Agro-Industrial Park	Tigray			Starting construction	Government		Agriculture processing	150,92
21	Adama Industrial Park 2	Oromia			Under Planning	Chinese company		Garment	
22	Semera Industrial Park	Afar			Under Planning			Garment	
23	Assosa industrial park	Benishangul-Gumuz			Under Planning			Garment	

4.6 ENERGY

The transport sector is the second largest consumer of energy, after the household consumption. Energy demand of the transport sector is entirely met by petroleum-based fuels, but with the introduction of railway transportation, electricity is making significant dents in transport energy mix in the near future.

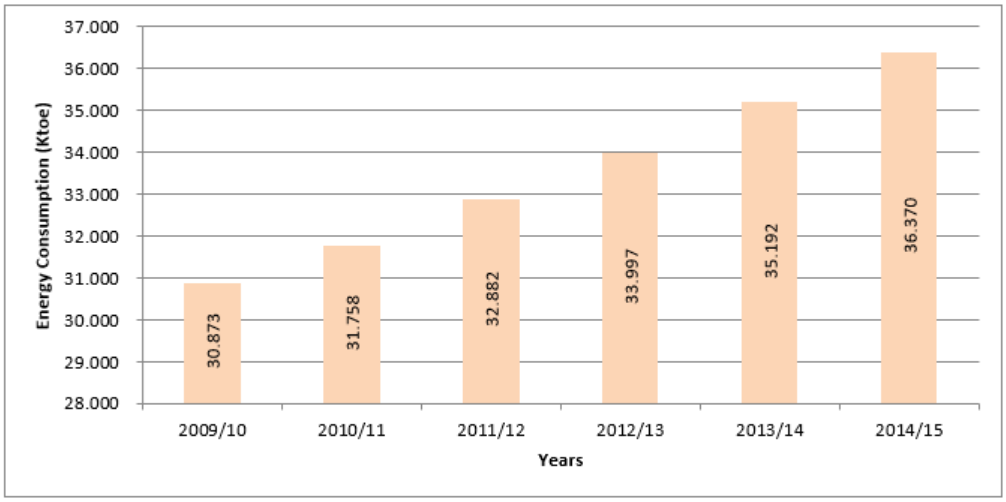
Mainly as a result of the economic recovery during the past two decades, sectoral energy consumption showed some dynamism, i.e., energy consumption in the domestic sector fell by three percentage points while that of transport and industry sectors grew slightly by one to two percentage points between 2010 and 2015; and final energy consumption was also growing at about three percent annually during the same period (following figures).

Figure 92: Final Energy Consumption (%) by Economic Sectors Between 2009/10 and 2014/15



(Source: Energy Balance 2014/15)

Figure 93: Total Annual Final Energy Consumption (Ktoe) Between 2009/10 and 2014/15



(Source: Energy Balance)

As a result of the economic recovery during the past two decades, energy consumption in the domestic sector fell by three percentage points while that of transport and industry sectors grew slightly by one to two percentage points between 2010 and 2015. The final energy consumption was also growing at about three percent annually during the same period.

Ethiopia's electricity generation is dominated by hydropower, in spite of the fact that Ethiopia is endowed with renewable energy resources including solar, wind and geothermal. As of June 2017, 98% of electricity generation comes from hydropower (90%) and wind energy (8%). In a bid to mitigate risks and vulnerabilities associated with hydro mono-culture, Ethiopia is moving fast towards diversifying its electricity generation mix from wind, and more recently, solar and geothermal.

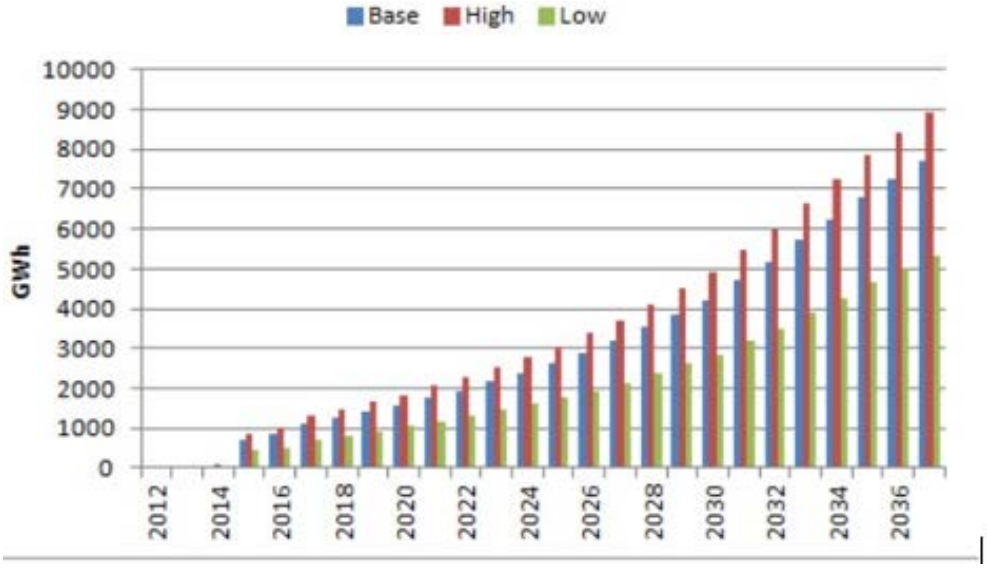
Ethiopia envisions to become a regional energy superpower of Eastern Africa, due to its massive renewable energy resources coupled with the GoE's unwavering commitment to develop the sector and capitalize on its comparative advantage. Ethiopia is already exporting electricity to Djibouti and the Sudan and it intends to reach out and export to more countries including Kenya, Tanzania,

Malawi, Rwanda and even Yemen in the short to medium term.

Ethiopia's Universal Electrification Access Program (UEAP) has significantly improved connectivity and access rate, making significant gains in improving electricity (grid) access (connectivity, from about 6% in mid-2000s to 23% in 2017) to its growing population (2.5% p.a.) over the past decade. Despite declining annual connection rate, total household connectivity to the national grid grew from 1.1 million in 2006 to about 2.4 million households, but the majority of its citizens (about 67%) are currently without access to electricity.

The new National Electrification Program (NEP) aims to reach universal electricity access by 2025 in accordance with the GTP, but this task is not easy, due to the sheer number of unelectrified households coupled with the cost of electrifying villages and households in geo-spatially scattered rural settlements and hard-to-reach deep rural areas (the last mile). Recognizing formidable challenges that such an ambitious electrification program would entail, MoWIE has prepared a comprehensive National Electrification Program Implementation Roadmap (NEP – IRM) in 2017. The NEP – IRM adopts what could be known as a ***'twin-track'*** strategy to rural electrification, i.e., concurrent on-grid and off-grid electrification.

The following figure shows the expected increase of power consumed by the railway transport.



4.6.1 Petroleum products Import

There is a strongly growing need for refined oil imports (diesel, gasoline and kerosene) to the Ethiopian metropolitan areas. This demand was covered in 2016 and 2017 by ~500 tank trucks daily leaving the Port of Djibouti towards Ethiopia. Plans to substitute the truck transport by 110 tank wagons on the newly built Addis Ababa–Djibouti Railway didn't arrive in reality in 2017. Also transported by road is bioethanol. The bioethanol production plants have road access but are usually located in remote areas so that tank trucks need to be used. The demand of import of refined oil imports is rapidly growing (15% per year) and today (2021) an estimated number of 900 trucks daily are estimated.

A multi-fuel pipeline (HoAP - Horn of Africa Pipeline) was designed in 2016 and to be built until 2019 over 500 km–600 km from Djibouti to the existing Awash storage facility. But no action was taken and the project has been shelved. Another opportunity is represented by the oil pipeline proposed by the United Arab Emirates connecting Eritrea and Ethiopia, starting from the Eritrea's port city of Assab to Ethiopia's capital Addis Ababa. Landlocked Ethiopia began extracting crude oil on a test basis from reserves in the country's southeast and could need access to ports for exportation.

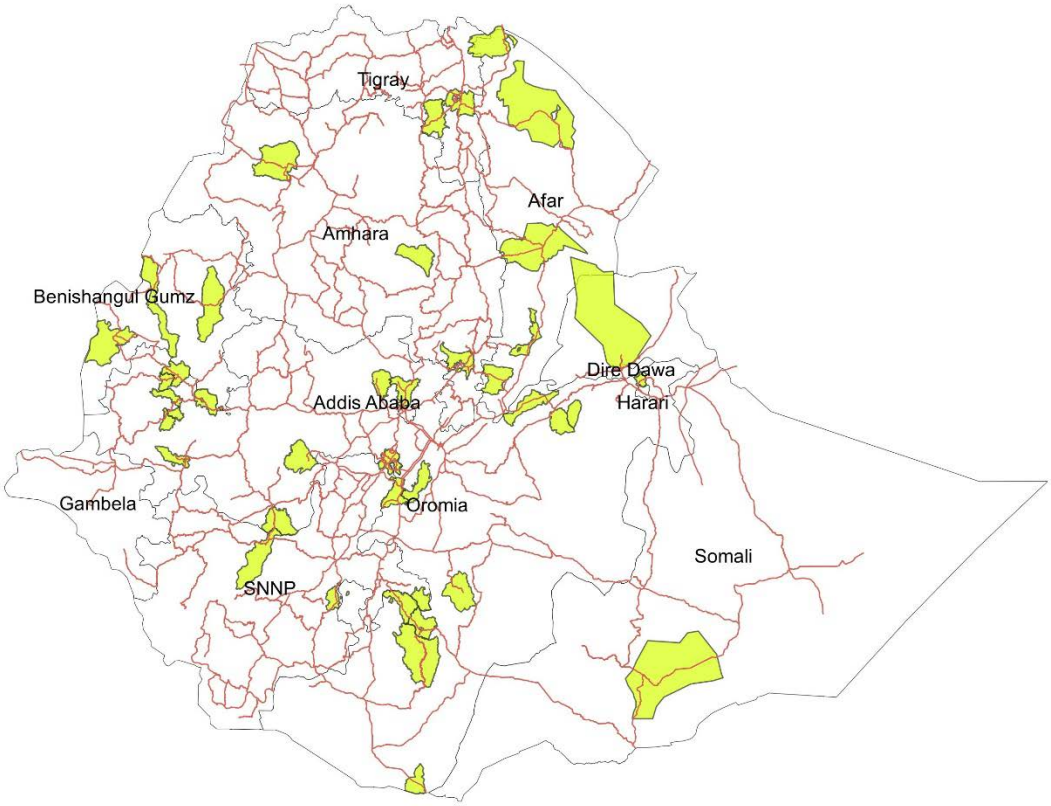
4.7 MINING DEVELOPMENT

Mining could represent an important sector for Ethiopia economy, but today accounts for only 1% of GDP. Gold, gemstones (diamonds and sapphires), and industrial minerals are important commodities for the country's export-oriented growth strategy. Mining for gold is a key development sector in the country. Gold export, which was just US$5 million in 2001, has recorded a large increase to US$602 million in 2012

The Ethiopian Geological Survey of the Ministry of Mines and Energy (MME) with assistance from UNDP and private companies have assessed the mineral and petroleum resources of Ethiopia. The resources discovered in different regions of the country are mainly gold, tantalum, phosphorus, iron, salt, potash, soda ash, gemstones, coal, geothermal and natural gas, apart from many industrial and construction materials. Other mineral resources are platinum, niobium, copper, nickel, manganese and molybdenum; marble is found extensively in most parts of the country.

Gold has been exploited since ancient times. Large ore-based gold mines are the Lega Dembi (the largest mine in the Sidamo province of southern Ethiopia and Sakaro, which have been mined by private companies; the amount of gold produced by these mines is reported to be about 5 tons per year. In the Western and Northern Greenstone Belts of the country (finest mining reserve in gold mining), orogenic mines have been located.

Figure 94: Mining Existing Potential Site Woredas



Tantalum is mined at the Kenticha Tantalite mining. It is found in the pegmatic rocks of the Southern Greenstone Belt. Tantalum is used in making all electronic devices such as mobile phones, cameras, computers and so forth; and its mining programme is the sixth largest in the world. Kenticha mines has resources to the extent of 9,000 tonnes of processed potash which could be extracted over the next 15 years. This mine also produces quartz, feldspar, kaolin and dolomite used in industries

Gas fields are located in the southeastern part of the country at Calub, Hilala and Genale gas fields in the Ogaden Basin. The gas resources potential of these fields has been assessed as 4.6 Trillion Cubic Feet (TCF) Precambrian to Recent period rock formations are found suitable for use in construction and in industrial use.

Potash has gained some of the greatest interest.95% of the world's potash is mined for use in fertilizers, while the rest is used for feed supplements and industrial production. The Danakil Depression is calling out for exploration. Danakil lies at the junction of three tectonic plates, and was formed as a result of the African and Asian continents moving apart. This caused rifting and volcanic activity, resulting in its complex and alluring geology.

Phosphate. There is a very high demand for phosphate in Ethiopia, due to its importance as a fertilizer. Importing fertilizers is prohibitively expensive and therefore extensive exploration has been conducted in recent times in Bikilal in the west and Melka Arba in southern Ethiopia.

Good prospects have been made for **Sapphires, Emeralds, Opals**, and also for **Graphite, Lithium, Petroleum, Oil Shale, Coal deposits, Bentonite, Diatomite and Gypsum**

4.8 TOURISM DEVELOPMENT

Ethiopia has a wealth of natural and cultural resources, with some unique cultural and natural features that set it apart from other African destinations. In the last decade, international arrivals to Ethiopia have shown a positive trend, reaching nearly one million in 2017. However, growth has been fueled mainly by the increase of international tourism worldwide, improved air connectivity and a dynamic economy that generates many business trips.

There are opportunities for growth, but more proactive commercialization is needed and Ethiopia appear still lagging behind other East African destinations that have developed a more competitive tourism industry and attract higher numbers of international tourists.

Apart from the two main tourism routes in Ethiopia: **Northern Historic Route of monuments** (Lalibela, Aksum, Gondar, Lake Tana monasteries and the source of the Blue Nile) and the **Southern Route**, including cultural and natural attractions of the lower Omo Valley, National Parks, Rift Valley Lakes (Langano, Hawassa and Chamo.), specific areas that offer potential to increase the number of visitors is the following:

- MICE Tourism in Addis Ababa (Meetings, Incentives, Conferences, and Exhibitions)
- Cultural Heritage Based Tourism Products, like Harar, Gondar, Lower Awash Valley, where the skeleton of Lucy was found, source of Nile in Bahir Dar, Origin of coffee routes in the southwest
- **Trekking** in - Simien Mountains, Bale Mountains, Mount Yossef;
- **Rock Climbing** in *Gheralta* in Tigray and the *Bale Mountains* in the Southeast.
- **Water-Based Activities** - The Blue Nile, *Omo* and *Baro* Rivers are important for white water rafting with their own diverse tourism activities. The boat service between Bahir Dar and Gondar along Lake Tana that is currently used as a public transport by the local communities could be included to enhance and differentiate some tourism circuits;
- **Thermal Tourism,** like the great potential for Wellness and Spas tourism in "Filwahas" or the different hot springs in Addis Ababa; Sodere, Wondogent, Yrgalem, Alaba, Kemise and Fentale
- **Bird Watching** - Top bird watching areas, for instance, *Lake Tana, the Rift Valley Lakes (Abijatta-Shalla, Chamo Hawassa, Chamo, Ababya, Chewbahir) the lower Omo Delta, Goba-Yabello and Bale*, Nechisar and Mago National Parks are some of the Important Bird Areas (IBA) in the country that are visited by many birdwatchers;
- **Running in Ethiopia.** Distance running has produced many champions in Ethiopia;
- **Community Based Tourism** - There are numerous communities based eco-tourism initiatives and associations flourishing all across the country;

Great Adventure Desert Expeditions, like the Danakil Depression and Erta Ale volcano in the Afar region.

4.9 SPATIAL PLANNING

Recent spatial planning activities in Ethiopia are concentrated in corridor development planning, along the main regional connection, giving attention to the different economic comparative advantages and the need for regional integration. The implementation of the development corridors will substantially increase the transport demand of goods and passengers. Following is the description of the planning approach and of the different development corridors.

4.9.1 Urban, Territorial and Corridor Planning

In the international practice of spatial planning, the concept of "corridor" has been mainly understood at the macro scale, as a trans-national and trans-continental axis, functional to the circulation of large flows of people and goods on the market as well as to the integration of local, national and international economies in longer value chains. This perspective has been translated into policies focused on infrastructural interventions aimed at the rapid and safe connection of large metropolitan centers and production areas to ports and airports, without particular attention to the surrounding affected territories. This also happened in Ethiopia with the Addis Ababa-Djibouti railway, a major infrastructure which crosses vast regions without delivering significant local benefits on the way.

However, it is also possible to trace the existence of corridors in urban practice and history on all continents, intended on a more limited territorial scale: sometimes at a metropolitan and regional level, which not only focuses on infrastructural and transport aspects but looks at the corridor as an important device for urban growth and local development. In this case, the corridor becomes an axis whose easy accessibility stimulates and increases the dynamism of society and the economy.

As already clear from the Inception Report and subsequently the Baseline Studies delivered in September 2020, the Consultant intends to adopt a similar urban development and public transport framework, whose strategies are in line with (and at the same time validate and adapt) the hypotheses defined in the report “Unlocking the power of cities in Ethiopia”, launched in 2015. In this study, the optimal scenario emerged from the combination of some of the features of four different spatial and economic growth scenarios for Ethiopia such as:

A. Primary City	Addis Ababa continues to grow into a dynamic, multi-functional and cosmopolitan megacity
B. Polycentric network	A network of regional secondary cities emerges to support Addis Ababa.
C, City Clusters	Large and dynamic metropolitan areas develop in two clusters: one in central Ethiopia around Addis Ababa and one in the north of the country.
D. Regional Distribution	Addis Ababa devolves greater power to the regions, regional capitals take on many of the urban functions that Addis Ababa formerly held.

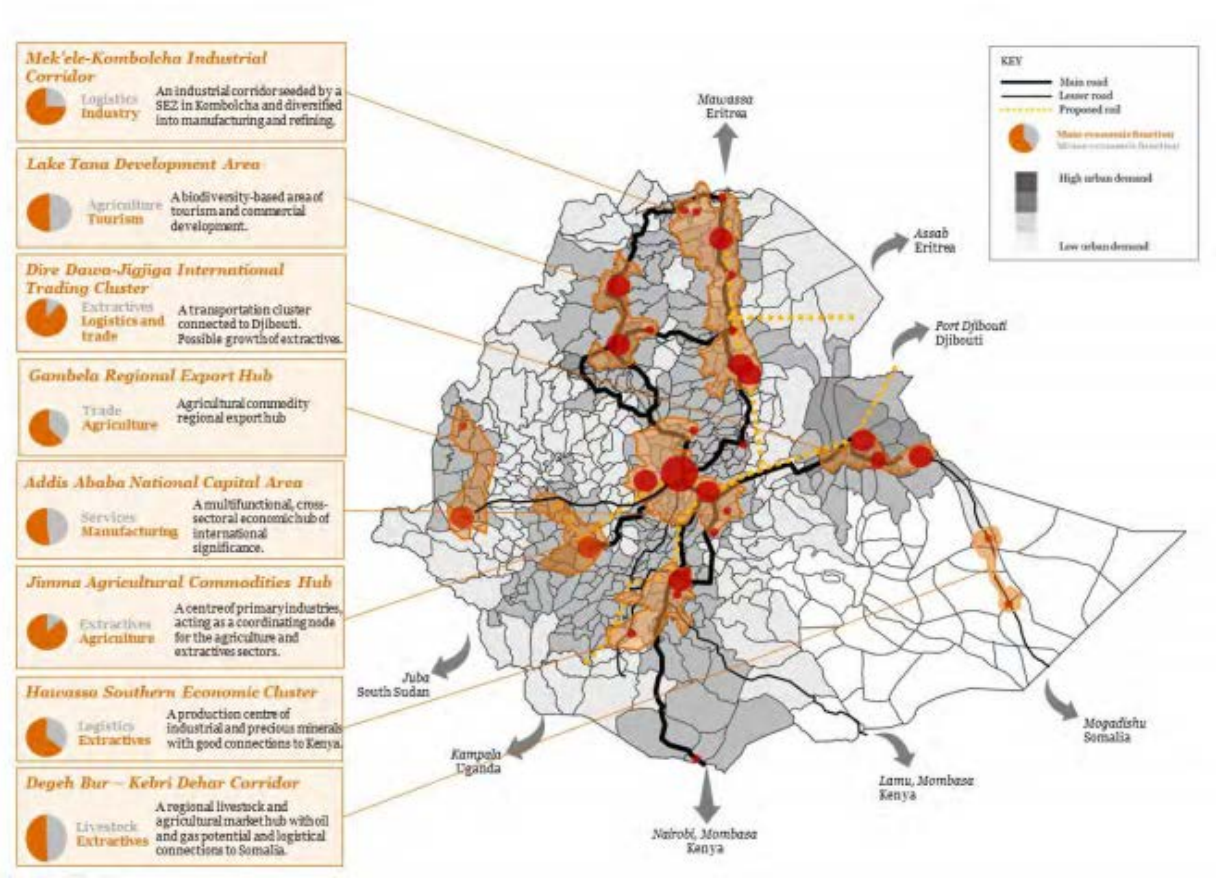
The optimal scenario suggested in fact a poly-clustered spatial development pattern, based mostly on scenario B and C but adopting some contributions from A and D as well. It outlined three recommended strategic directions for growth:

- **Unlocking the potential of secondary urban growth centres** by harnessing the economic efficiencies offered by enlarged ‘second cities’ that can diversify and accelerate growth. To ensure a future balanced growth, the Government needs to invest in a network of cities distributed across regions that will improve links with international and regional markets. This will diversify the economic activity and distribute wealth across the country.
- **Agglomerating and connecting economic functions**. Clustering economic activity brings additional value to economic activity: the location of these clusters should help to strengthen the value chain (raw materials, manufacturing, supply chains and trade).

- **Targeting the development of a compact, connected and resilient urban network**. As outlined in the work of the Global Commission on the Economy and Climate, a well-managed urban growth based on dense, mixed-use urban neighbourhoods can improve economic efficiency and climate and environmental performance and can enhance resilience, all at a low cost. The same principle applies to the national urban plan and highlights the value of key supporting infrastructure in delivering Ethiopia's Climate Resilient Green Economy.

The synthesis of these guidelines for territorial, urban and therefore transport development has led to the identification of the following 8 development corridors which form the backbone of a network encompassing the whole national territory.

Figure 95: Ethiopia Development Corridors



This network takes into account and merges together land use, spatial planning and mobility at a regional and national level. The 8 corridors (with the exception of Addis Ababa which is de facto a metropolitan city) are described in detail in the following sections.

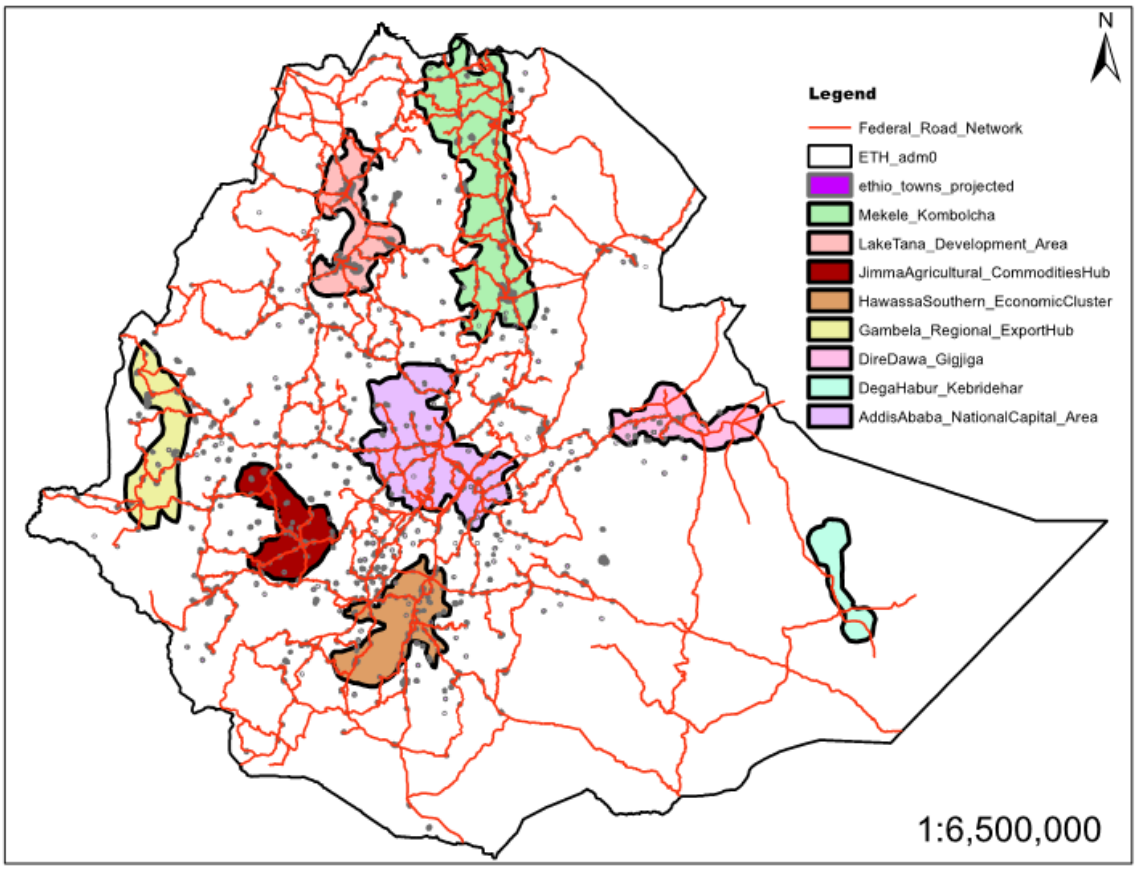
4.9.2 The Development Corridors

Gaps in transport efficiency, a fragmented logistics supply chain, restrictive trade facilitation and weak coordination mechanisms have hampered the creation of an effective and efficient transport corridor that might eventually evolve into a successful trade and economic corridor. Efforts made thus far by government institutions are directed on an ad-hoc basis, and measures have been taken to address the challenges on the ground. As a result, Ethiopia is affected by very high transaction costs resulting in their low levels of competitiveness in the local, regional and global markets. Establishing an economic corridor demands a comprehensive strategy that aims at improving and

enhancing investments in transport in the region. This improvement made by introducing transport corridors promotes further economic growth and development, thus helping the countries to address the challenges of poverty and others. Therefore, bridging the gaps and enhancing the efficiency of the transport and economic corridor is critical to improve trade competitiveness and diversify exports.

Selective policy measures such as developing a joint long-term regional corridor development plan, harmonizing policy and regulatory frameworks and undertaking major reforms in establishing a joint corridor management entity should be the focus of the strategy. The high dependence of Ethiopia's economy from the transport corridor need a reliable and sustainable strategy to maintain the momentum of economic growth, breed a conducive environment for the business communities and reliable transport system. This must come forward with greater urgency and commitment to developing the corridor for long-term use.

Figure 96: Ethiopia's Urban Development Corridors

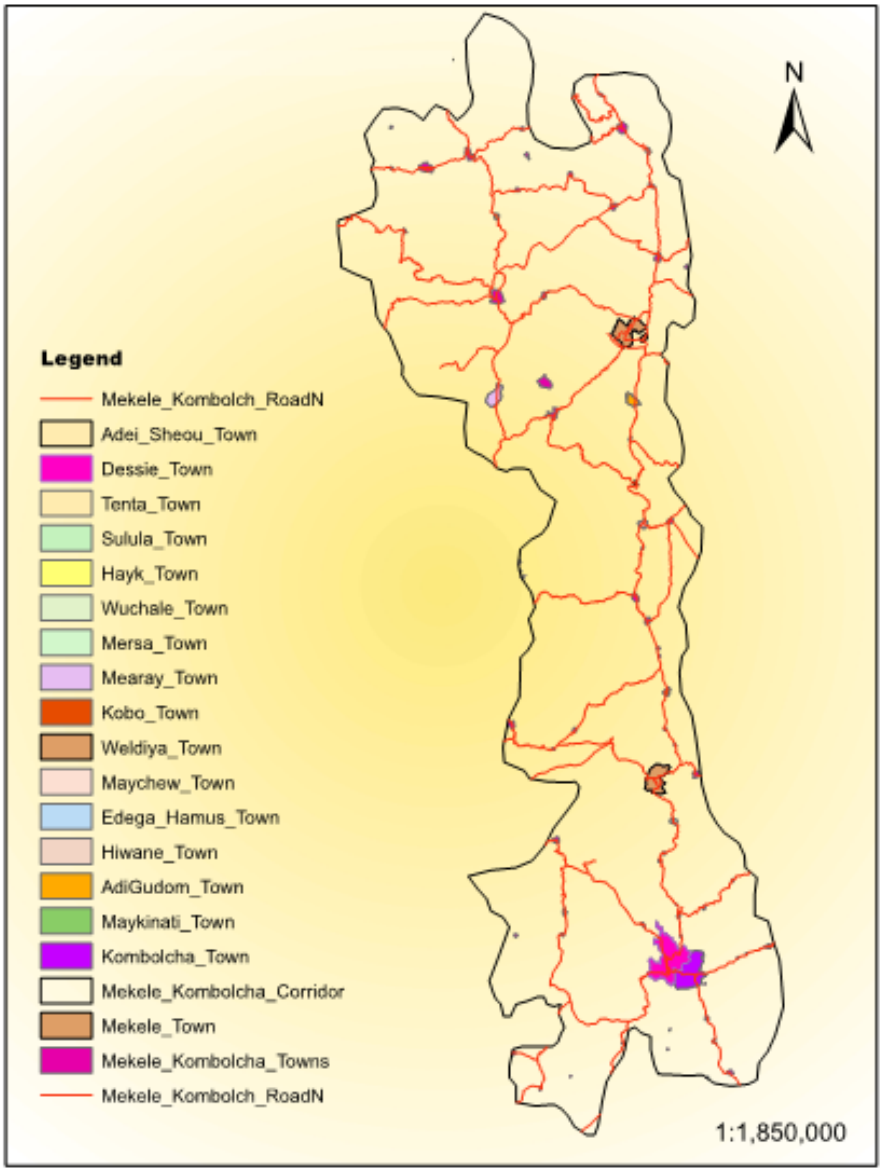


MEKELE-KOMBOLCHA INDUSTRIAL CORRIDOR

Ethiopia expects many industrial parks that are under construction currently to be ready in this corridor. The Mekele-Kombolcha corridor is mainly an industrial corridor. The major industrial parks are Kombolcha and Mekele industrial parks. The construction of shades in Mekele and Kombolcha industrial parks have been completed and fabrication process in progress to ultimately deliver the shades to the investors. In this corridor, the parks which were being constructed are expected to create job opportunities for more than 50,000 people.

Kombolacha and Mekele industrial parks are among the 10 parks the Ethiopian Government aims to construct within 5 years. About 70-80 percent of the industrial complexes to be built in the industrial parks in different parts of the country is allotted for textile, garment and apparel sector while the rest is for pharmaceuticals, electronics, food processing and machinery equipment among others.

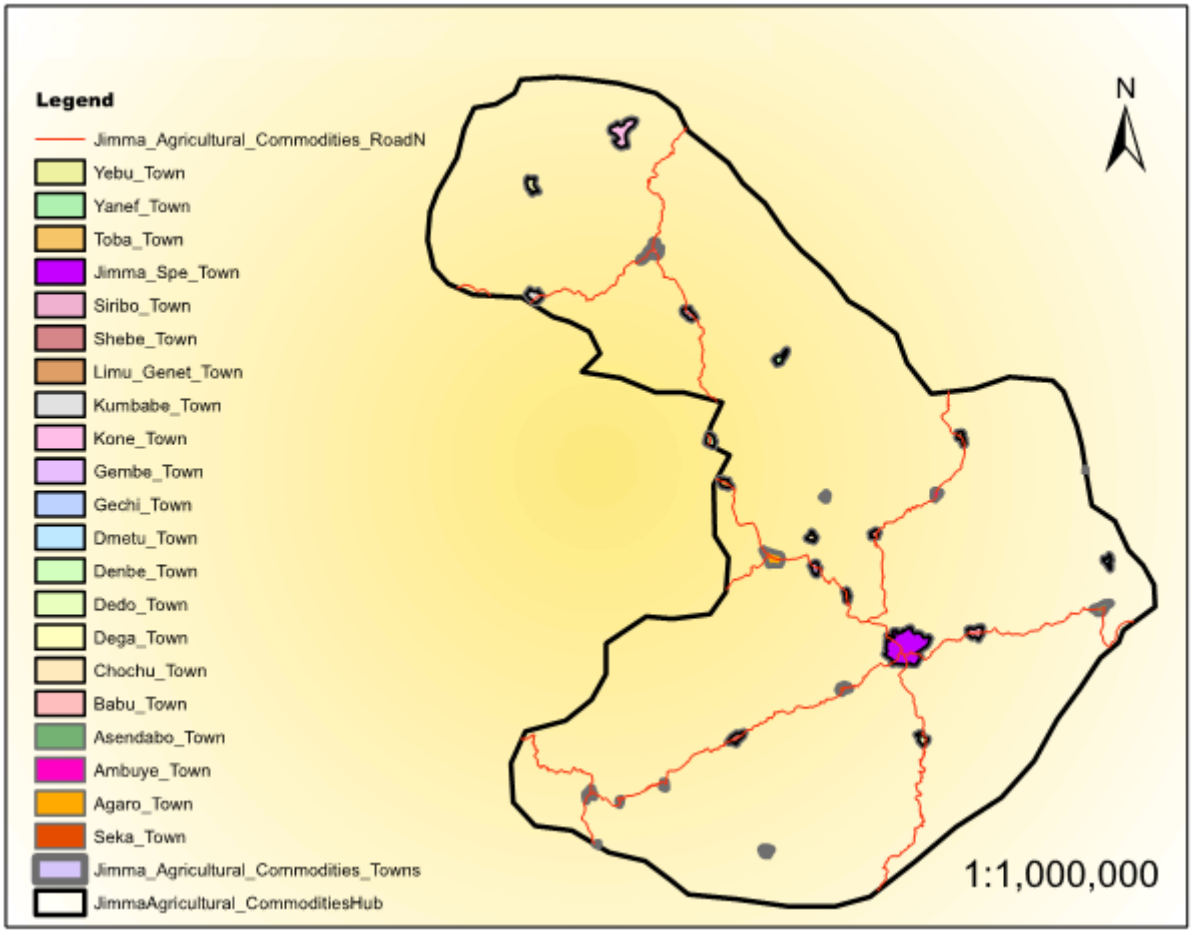
Figure 97: Mekele Kombolcha Corridor



JIMMA AGRICULTURAL CORRIDOR

The corridor in which the town of Jimma is located is one of the zones of the Ethiopian Region of Oromia. Jimma is bordered on the south by the Southern Nations, Nationalities and Peoples Region. The highest point in this zone is Mount Maigudo (2,386 m). Towns and cities in Jimma include Agaro, Genet,seka and Saqqa. The town of Jimma was separated from Jimma Zone and is a special zone now.Jimma Zone is divided in to 13 weredas (hosting a total population of over 2.2 million) with an agro-ecological setting of highlands (15%), midlands (67%) and lowlands (18%). The zone is one of the major coffee growing areas of Oromia region well-endowed with natural resources contributing significantly to the national economy of the country. Major crops grown, other than coffee, are maize, teff, sorghum, barley, pulses (beans and peas), root crops (enset-false banana and potato) and fruits. Teff and honey production are another source of cash after coffee. Enset is a strategic crop substantially contributing to the food security of the zone and is especially important in Setema and Sigimo weredas (highlands). Jimma Zone reliably receives good rains, ranging from 1,200 - 2,800 mm per annum. In normal years, the rainy season extends from February to October. For the last four years, however, various adverse conditions have threatened the food security of the zone.

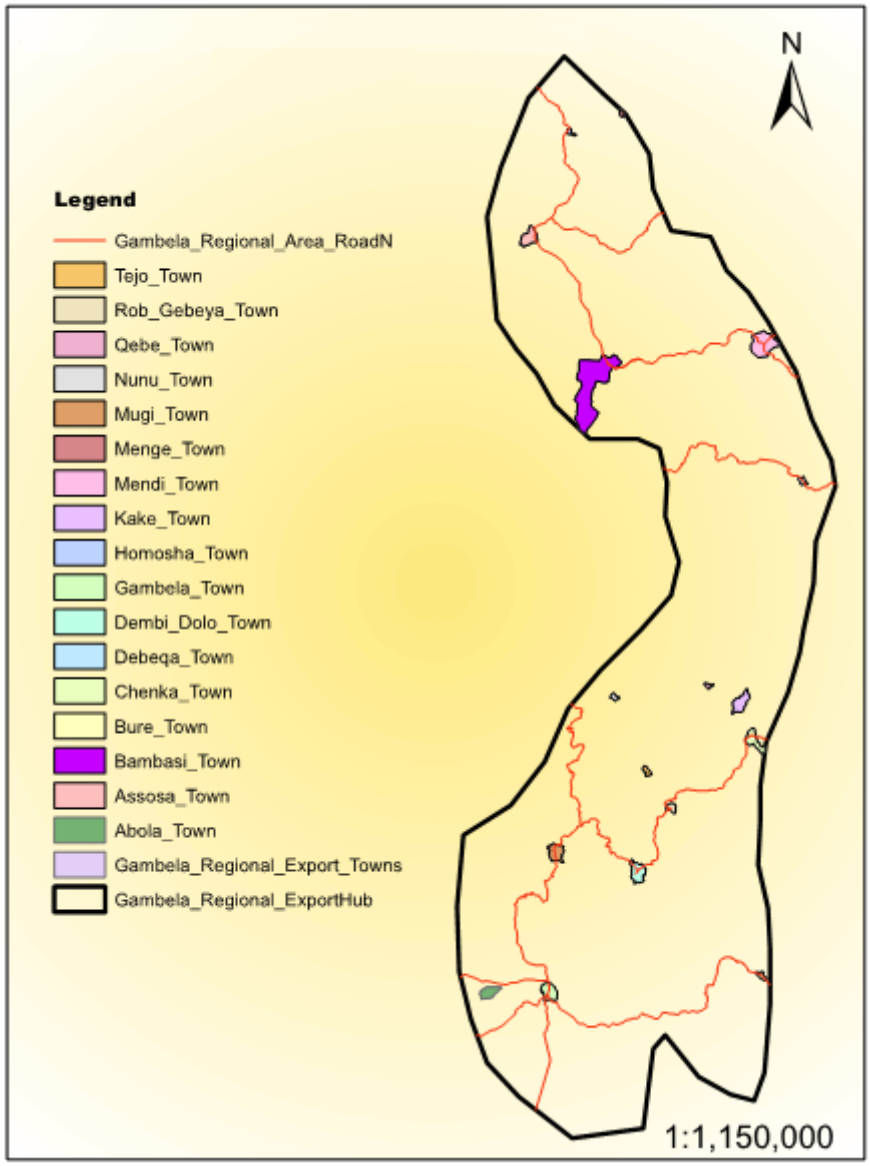
Figure 98: Jimma Agricultural Commodities Corridor



GAMBELA EXPORT CORRIDOR

The Gambela Region covers 2,978,200 hectares and has a population of 307,096, according to 2007 Ethiopian census data. The area is the focus of a drive by the Government of Ethiopia to attract foreign investors to its agricultural sector through tax holidays, duty-free imports of machinery, easy bank loans and cheap land. In Gambela 42 percent of the total land area is either being marketed for lease to investors or has already been awarded to investors. Ethiopian environmentalists have stated that alternative economic uses such as tourism have not been explored, arguing that Gambela has the same potential as the Serengeti and Maasai Mara as a tourist destination.

Figure 99: Gambela Regional Export Corridor



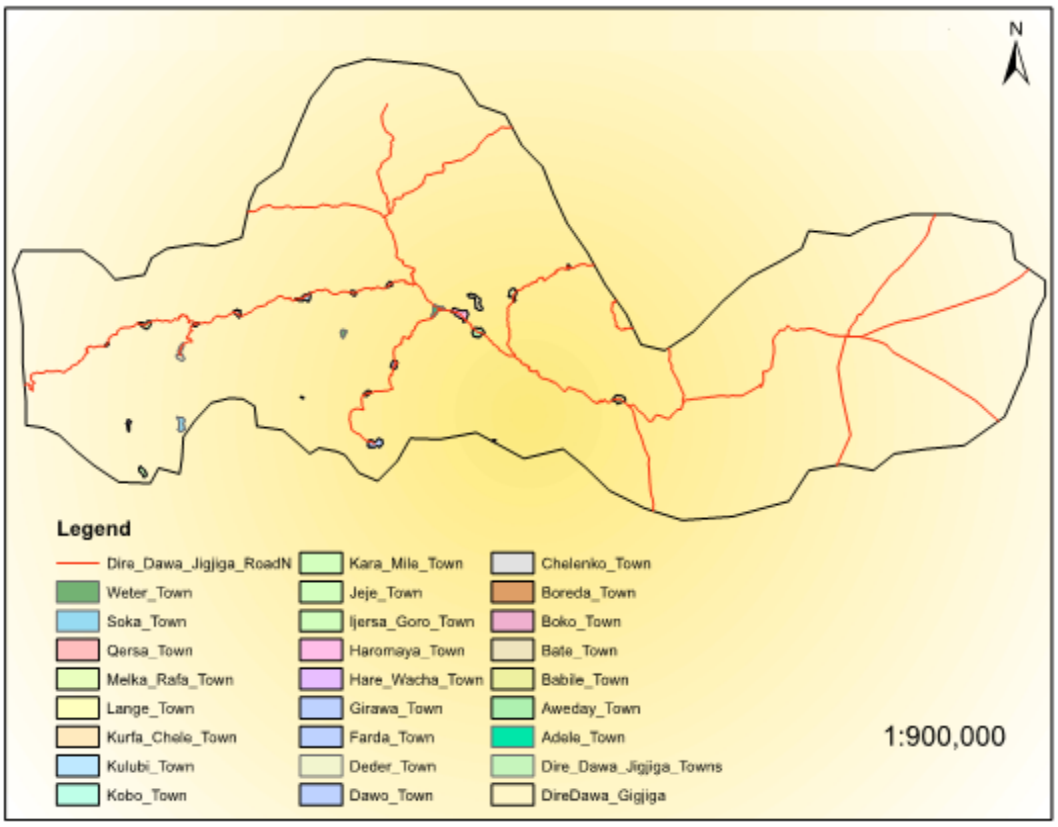
DIRE DAWA- JIJJIGA TRADE CORRIDOR

This corridor is mainly a pastoral economy and livestock trade form a critical platform for economic interdependence linking Ethiopia's Somali Region to Djibouti, Somaliland and Puntland. Ethiopia's Somali Region provides a major share of livestock exports. Its people are tied through kinship and trade to neighbouring countries, but this also creates the potential for political stresses and conflict in a region that is both politically volatile and environmentally harsh.

As well as contributing significantly to the economy of this corridor, the livestock trade plays a significant role in determining government revenue. The fortunes of Djibouti, Berbera and Bosasso ports have fluctuated rapidly in the last twenty years and Djibouti has recently emerged as a new player, benefiting from this corridor advantage.

The Dire Dawa -Jijiga economic corridor development could be a key long-term strategic cooperation framework that neighbouring countries' governments have to design and implement. The economies of both countries are so interdependent on this corridor that any challenge that one faces is immediately replicated in the other, and in terms of development as well. The economic potential of the Addis Ababa-Djibouti economic corridor is thus immense.

Figure 100: Dire Dawa Jigjiga International Trading Cluster Corridor

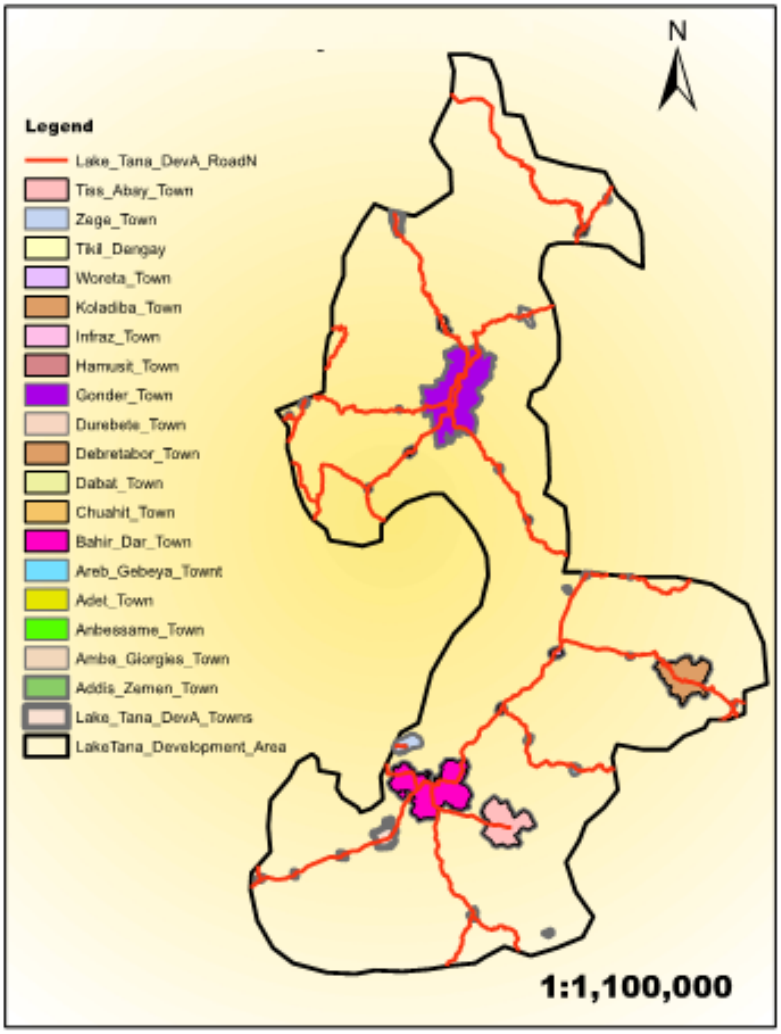


LAKE TANA AGRICULTURAL DEVELOPMENT AREA

The Lake Tana development corridor is located in the Amhara National Regional State approximately 563 km northwest of Addis Ababa in the north-western part of Ethiopia. The development area comprises Lake Tana, the largest lake in Ethiopia, the main source of the Blue Nile, which provides important ecosystem services. The area is a hotspot of biodiversity, internationally known as an Important Bird Area and is of global importance for agricultural genetic diversity. The area is characterized by an enormous heterogeneity of land uses and natural ecosystems. This fertile region in the north-west of the country has a cultural history going back thousands of years and blends natural and cultural heritage in a unique way. Ancient churches and monasteries have grown around Lake Tana, and many rare animal and plant species use the lake and the surrounding wetlands as a habitat. Unfortunately, the area is threatened by intense resource use, pollution and urbanization.

Out of the 2,031,820 inhabitants of this development corridor, approximately 15,000 are living on the islands of Lake Tana. The area includes an array of rural settlements, as well as the city of Bahir Dar, which supports traditional land-use patterns. Agriculture (of which most is subsistence farming) forms the backbone of the economy with most of the other sectors (i.e. trade, fishing and tourism) being dependent on its strong backward and forward linkages. More than 2 million people live in the corridor with the Amhara people being the most populous in the area.

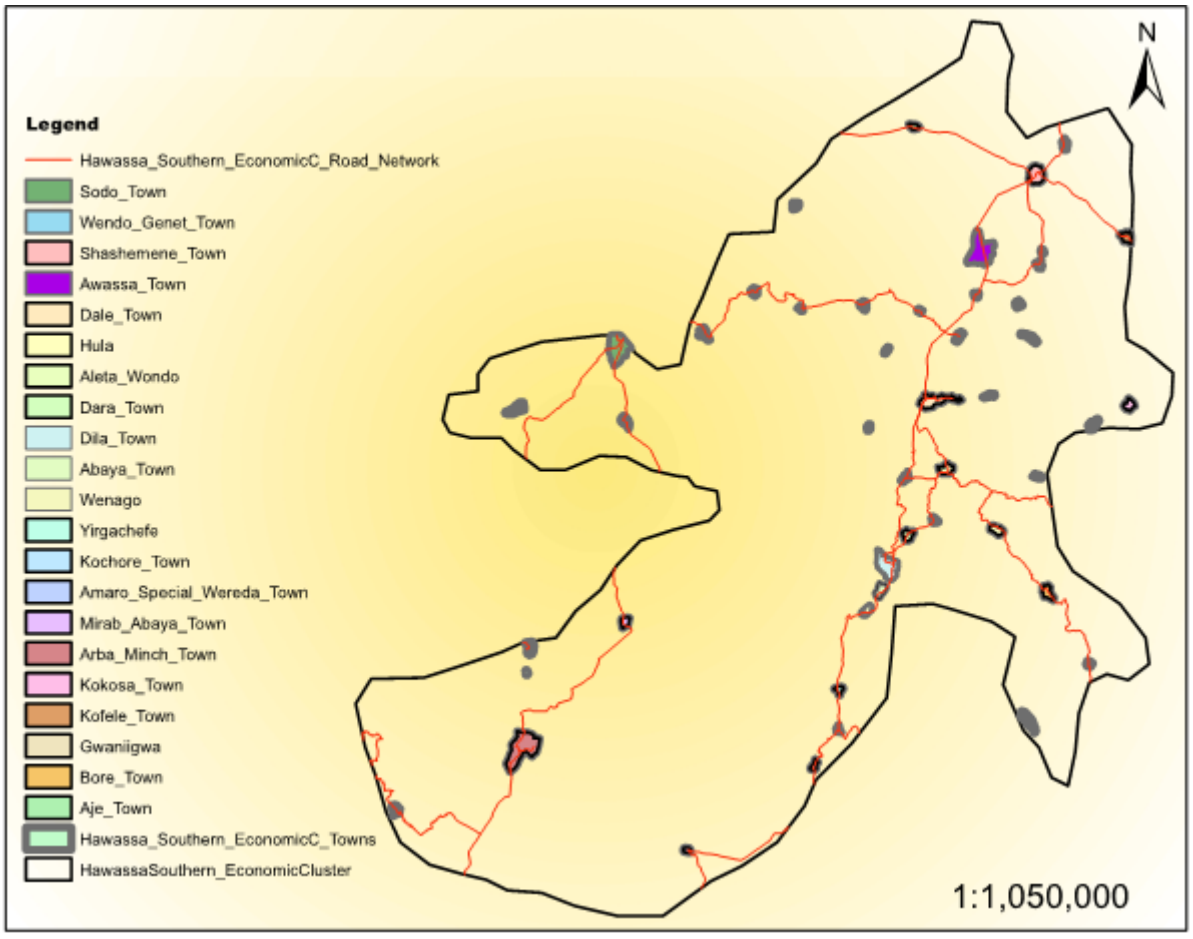
Figure 101: Lake Tane Development Area



HAWASSA ECONOMIC DEVELOPMENT CORRIDOR

Hawassa was capital of the former Sidamo. It is the major town in this corridor. It became the capital of the Southern Nations, Nationalities, and Peoples' Region. When the Sidama Region was formed in June 2020, the city became part of that region. Awasa currently serves as the capital of both the Sidama Region and the Southern Nations, Nationalities, and Peoples' Region. Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia, this zone has a total population of 258,808, of whom 133,123 are men and 125,685 women. While 157,879 or 61% are living in the city of Awassa, the rest of the population of this zone is living in surrounding rural kebeles. Awasa will continue to serve as the seat of government of the Southern Nations, Nationalities, and Peoples' Region for two national electoral cycles, after which the regional government will move to a city within the region's boundaries. It is located 273 km (170 mi) south of Addis Ababa via Bishoftu, 130 km east of Sodo, and 75 km north of Dilla. It lies on the Trans-African Highway 4 Cairo-Cape Town.

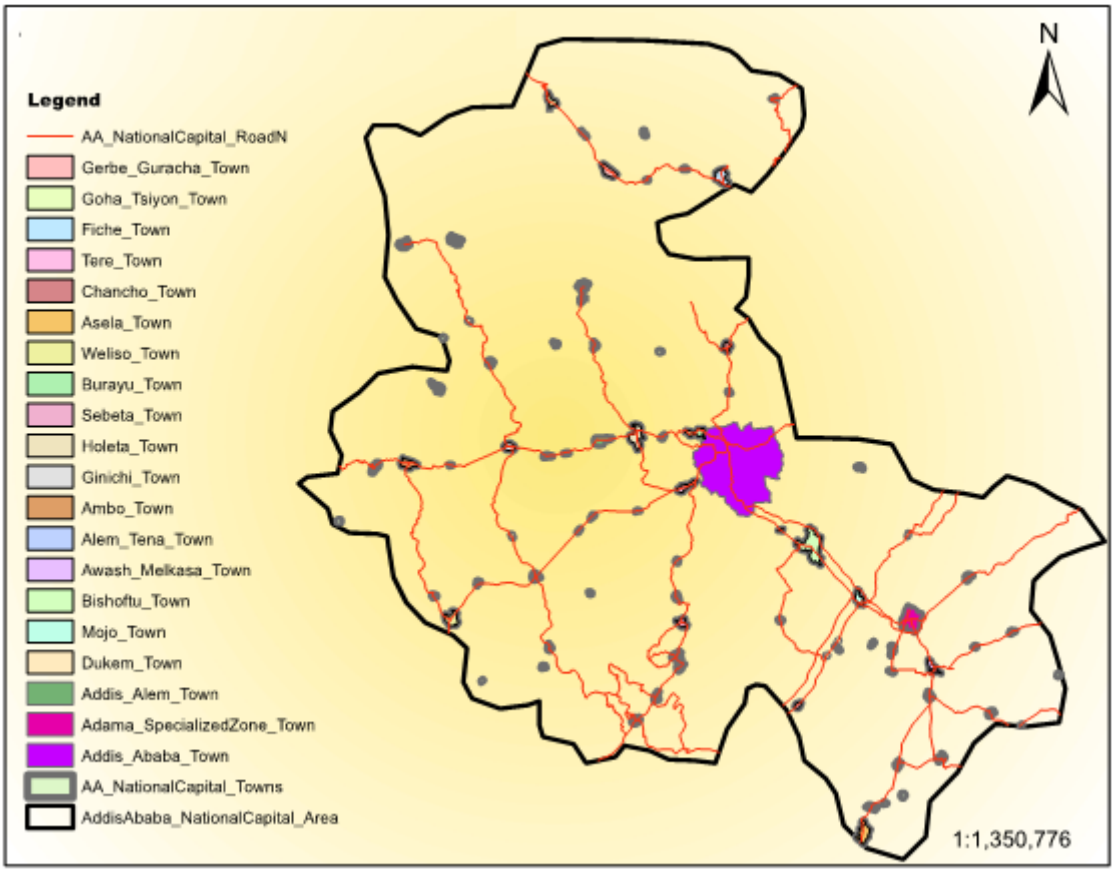
Figure 102: Hawassa Southern Economic Cluster Corridor



ADDIS ABABA AND THE SURROUNDING TOWNS

Addis Ababa is organized through smaller units called woredas, or sub-cities. Depending on the size of the city, the woredas are further divided into kebeles. Both are formally independent administrative units. Hosting 30 percent of the urban population of Ethiopia, Addis Ababa, the capital of Ethiopia and the diplomatic center of Africa, is one of the fastest growing cities on the continent. Currently, Addis Ababa is divided into ten administrative sub-cities. Its population is currently thought to be 4 million. Its geographic location, combined with its political and socio-economic status have made it a melting pot to hundreds of thousands of people coming from all corners of the country in search of employment opportunities and services. Both are formally independent administrative units. The landscape of Addis Ababa, Ethiopia, is rapidly changing due to population and economic growth as well as significant public housing investment. The city's overall density (built area/person) decreased between 2006 and 2016 from 109 people/ha represents rapid urban expansion of approximately 2% per year to 98 people/ha. In 2006, the overall density (built area/people) of Addis Ababa, Ethiopia, equalled 109 people per hectare. In 2016, the overall density of Addis Ababa, Ethiopia, equalled 98 people per hectare. Therefore, the overall density of the city decreased between 2006 and 2016.

Figure 103: Addis Ababa National Capital Corridor



DEGEHABUR KEBRIDEHAR PASTORALIST CORRIDOR

This transport corridor is found in Somali Region of Ethiopia. It consists of nine zones and 52 districts (woredas). Based on figures from the Central Statistical Agency in 2005, Kebri Dahar has an estimated total population of 100,191 of whom 51,327 are men and 48,864 are women. Based on figures from the Central Statistical Agency in 2007, Degehabur has an estimated total population of 30,027 of whom 16,474 are men and 13,553 are women. Livelihoods in Somali Region are primarily based on both pastoralism and crop farming or agro-pastoralism. Most households are also engaged in other income generating activities including trade in commodities. The region also receives significant remittances from abroad. Somali Region is one of the most underserved regions in terms of access to essential services and is characterized by a high level of food insecurity and vulnerable livelihoods. The socio-economic infrastructure has been recently strengthened through the building of schools, clinics, veterinary health posts and roads. The region, however, still remains one of the poorest in Ethiopia, with limited capacity to fully operate and maintain public services and with frequent occurrence of droughts and floods that have had major impacts on the food security and livelihood situations.

5 TRANSPORT SECTOR DEVELOPMENT

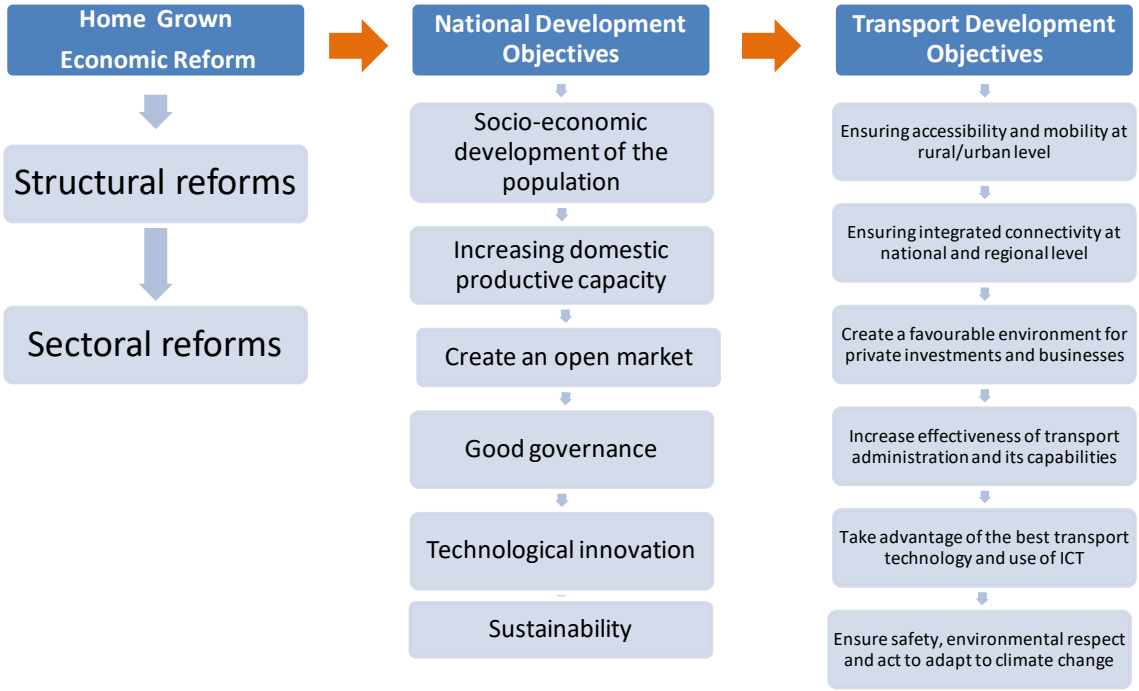
The Ministry of Transport and related transport agencies are conducting a wide and coordinated planning activity in the various modes of transport, in full compliance with the general economic development plans set at the Government level. Following the already planned actions and measures are reported for each mode of transport. These actions are considered inside the wider spectrum of interventions foreseen in the present transport plan.

5.1 TRANSPORT POLICY MEASURES IN THE MOT TEN-YEAR PLANNING

This paragraph aims at describe the part of the transport planning process based on the elaboration and implementation of measures of different kind, commonly defined as "policies". These measures have to be conceptually distinguished by those based on the construction of physical infrastructures as described in the following paragraphs.

In the previous chapter the national planning framework has been described. Two documents are the starting point for the overall planning process: the UN 2030 Sustainable Development Agenda and the Home-Grown Economic Reform Programme. According with the HGER two main groups of measures (structural reforms and sectoral reforms) together are aimed at increase the productivity of the country and enhance its resilience to economic fluctuations. In the following figure is depicted a logical framework of the transport planning policies: within the figure are listed the objectives, at national and transport level, that can be stated in order to implement of the general policies declared in the general documents mentioned above.

Figure 104: The logical planning framework of the transport sector in Ethiopia



Coming to the planning documents issued by the MOT (namely, the National Transport Policy of Ethiopia, the Transportation Sector's Ten-Years Development Plan and the Transportation Sector's Five-Years Development Plan) it is easy to see that the transport development objectives listed above have been reframed to define the strategic pillars of the long-term transport planning (TYP).

These pillars are the basis of the actions and planning measures in the transport sector and concern both issues specifically linked to transport infrastructures and related services, and the principles of

sustainability of the national transport system. Furthermore, a transversal component underlying transport policy concerns the institutional management and regulation capacity of the sector.

In the framework of a developing economy the pillar "Transport infrastructure Expansion and administration" refers to the development and management policies of a fast-growing infrastructure. This means considering not only the actions relating to investments in infrastructure but also the definition and implementation of all the measures related to manage and maintenance it, including the financial issues.

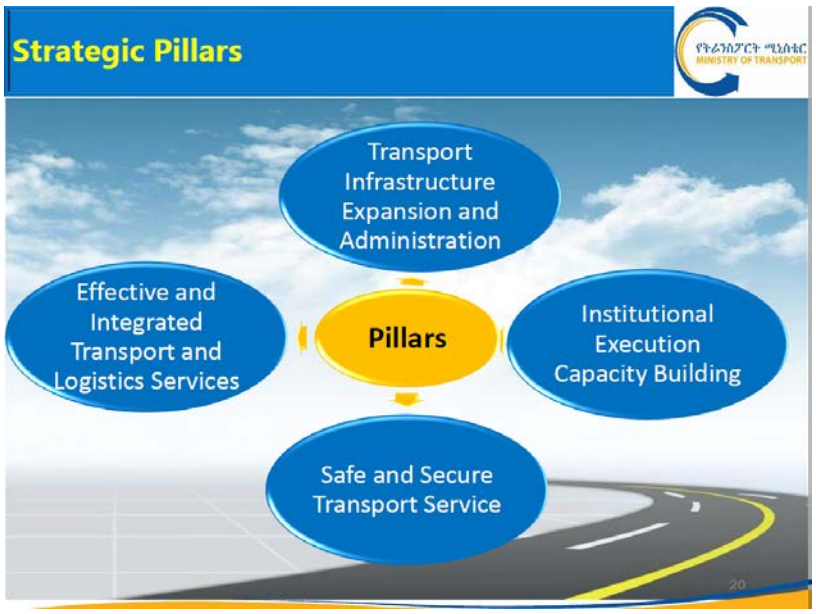
In the pillar "Effective and integrated transport and logistics services", the main keywords are "effectiveness" and "integration". In the Ethiopian context, with a low level of private motorization, this means making possible to provide services to as many people as possible. In this way the concept of accessibility shifts from the physical connection, assured by the infrastructure, to the service providing.

Besides effectiveness and integration, transport services must be safe and secure. The third pillar "Safe and secure transport service", means to design and provide services according to the concept of sustainability, that is to have an early looking at social and environmental impacts of transport activities in order to adopt the most suitable solutions to minimise the effects of the increasing mobility both for passengers and goods.

The last pillar concerns the institutions in charge of administrate and regulate the sector. The pillar "Development of institutional execution capacities" is aimed at make the institutions (and, in a wider sense, all the transport stakeholders) effective and qualified both to manage and achieve the goals of the sector.

These pillars have been summed up in the figure below.

Figure 105: The strategic pillars of transport policy in Ethiopia



Source: Transport sector's Ten years perspective development plan (2013-2022 EC) -august 27th, 2020

Each of the pillars has implementation policies (literally "implementation strategies") which have been set out in the TYP and which concern all modes of transport. As described synthetically in the figure above these policies covers all the issues related to the development and management of the transport system in Ethiopia. They need to be described in detail to understand the route that the government of Ethiopia wants to give to the development of the country's transport system. The policies are listed in the table below.

Table 57: TYP Implementation Strategies

PILLARS	TYP IMPLEMENTATION STRATEGIES
ENSURE AN INTEGRATED, EQUITABLE AND ACCESSIBLE TRANSPORT INFRASTRUCTURE	› Implementing the Transport Master Plan › Developing Express Roads through PPP › Develop Transport & Logistics Centers with Regional, City Administrations, Government and Private Sector Participation › Engage local contractors & consultants in feasibility studies, designing and construction of Railways projects
ENSURE AN INTEGRATED, EQUITABLE AND ACCESSIBLE TRANSPORT SERVICE	› Implement Incentivized System for Mass Transports › Implement Non-Motorized Strategies › Ensure Integration Among Urban Transport Modes › Enhance cross-border public transport Services with Neighboring Nations › Implement the National Aviation Policy › Enhance the Structural & Operational state of Transport Operators
ENSURE A SAFE TRANSPORT SERVICE	› Develop & Implement the Road Transport and Road Safety Policy & Strategy › Establish a Regulatory Authority for the Railway Sector › Enforce the Safety Standards of the International Maritime Organization › Enforce the Safety Standards of the International Air Transport
ENSURE AN EFFICIENT AND RELIABLE LOGISTICS SERVICE	› Implement the National Logistic Strategy › Implement Seaport strategy › Implement demurrage law › Organizational structure and system setup for Corridor development and management
IMPLEMENT CLIMATE RESILIENT TRANSPORT INFRASTRUCTURE AND SERVICE	› Implement a transportation sector strategy for climate change; › Implement a non-motorized transportation strategy; › involve global environmental organizations working on climate change; › Implement environmental protection initiatives involving the community and the private sector
IMPROVE THE EXECUTING CAPACITY OF THE SECTOR	› Establish an incentive mechanism to expand the mass transport service › Improve transport sector training Institutions capacity through establishing partnership with higher educational institutions › Establishing a corridor development and management system › Engage Global Partners and the private sector working on Climate Change and Environmental Protection › Setting up Institutional arrangement to achieve transport Sectors Mission

Source: Transport sector's Ten years perspective development plan (2013-2022 EC) -

In order to have a better comprehension of the scope of the policies stated by the Government it is interesting to examine some implications of the pillars issued in the TYP.

Ensure an integrated, equitable and accessible transport infrastructure

In this case two dimensions must be taken in account. The first one is related with the physical existence of the infrastructure, that is the long run process undertaken by the country to progressively build a modern transport system based on a multimodal network of infrastructures (road, rail, dry ports, airports and ports connections). An equitable accessibility means to provide physical connections to the population, giving the ability to move throughout the country.

The second dimension is directly linked with the new role assigned by the HGER and by the TYP, to the private sector. This sector is called to contribute in a decisive way to new transport investments and business undertaking, flanking the public enterprises in the effort to satisfy the increasing transport demand. Following this approach, access to infrastructures needs to be ensured on an equitable and fair basis in order to ensure a level playing field between the operators, irrespective of their public or private nature. This, in turn, means to revise a monopoly-based legal framework, as the present national regulatory framework, into a different framework based on an open market scenario.

This should mean, for example:

- ensure an open and fair access to all the public networks or infrastructures as railways, dry ports, airports, to the operators aiming at provide services (opening of services' market providing);
- ensure a third-party approach for the sectoral regulations' activities, avoiding that regulatory task being managed by market operators, not private nor public.

Ensure an integrated, equitable and accessible transport service

This statement is similar to the previous one, in fact infrastructure and services are the two sides of the same coin. Here the physical dimension is not the infrastructure but the service, accordingly the above statement means to make possible the providing of transport services to the most part of the population (basically to the whole population).

Following the HGER'S statements, to make possible an adequate increase of services provides not only a direct public intervention is needed but also a private one. As for infrastructures, also in this case the intention is to make possible to supply services on fair terms by public and private service operators, avoiding those monopolistic positions hinder private initiative.

Besides the considerations stated above for infrastructures, this means, for example:

- free access to the provision of freight and passenger transport services (road sector, logistics sector, railway operators, airlines operators, inland waterways service operators) in terms of authorization / licensing process;
- setting the level of passenger fares (in all sectors) consistent with citizens' ability to pay and introduce compensation schemes for service operators;
- improve the regulatory framework on competition and the institutions in charge of safeguard competition principles.

Ensure a safe transport service

This means that measures concerning safety have to be put in place, or enhanced whether in force, for each sub sector specially for, but not limited to, the road one. Suitable actions must be carried out for both design and maintenance processes for: infrastructures, vehicles, equipment. The same approach applies to people working in the transport sector, as knowledge and skills of working force must include a safe approach in the working environment. This implies processes based on periodical review of personnel's capabilities, exactly as maintenance acts for the physical components of the transport system.

Besides the single components, the production processes of transport services have to be reviewed to ensure level of safety aligning in the medium term to common international standards. One of the intermediate steps of this process is the implementation of the third-party actor in charge of safety rules design and implementation for each sector. This latter issue is of particular importance when the opening of the markets will be implemented, because it is a main part of the fair functioning of the markets itself.

Moreover, given the main role of the road sector, a strong stakeholders' engagement in implementing safety policies is requested. Institutions must ensure a uniform enforcement of safety rules and guarantee the implementation of technical tools which make it possible. On the other hand drivers' training and licensing system must be oriented to incentivise safe and proper behaviours.

Ensure an efficient and reliable logistics service

Since logistics are of enormous importance to the country, the policy to be adopted must be able to quickly overcome the weaknesses clearly highlighted by the analyzes conducted by the government.

The efficiency and reliability of a complex logistics chain such as the Ethiopian one are closely

linked to the opening of the market along all the links in the chain. The new and enhanced role of private operators calls for a reframing of the public operator's role (ESLSE) in order to make it compete with new services providers aiming at invest and make business in the sector.

In terms of policies this means ad adjustment of the regulatory framework in order to make possible the providing of services and the ancillary activities linked to the service providing.

Besides the regulatory side also a new commitment to the public enterprise is called. Here the point is the duty of the government to review and redesign the role of ESLSE: no more a de facto monopolistic actor doing everything but service provider focused on the tasks clearly defined and assigned by the public shareholder.

The dimension of services' reliability is also strictly connected with the capabilities of the working force and professionals within the sector. This means to involve in a capacity building action not only the business side of the sector but also the involved public institutions: MOT, EMAA and Ministry of Revenues for customs issues.

Implement climate resilient transport infrastructure and service

This pillar is connected with the overall impact of the transport system, both for infrastructure and services providing. It has to be noted that in the past years Ethiopia paid a particular attention at this issue aiming at became the African leader in this field.

The policies' dimensions involved here seems to be at least three: energy, technology and behaviours. The energy mix of transport services' production is decisive for the impact of the transport system, this means, given the present and future role of road in satisfying the transport demand, to tackle a transition to a less impacting energy mix.

This, in turn , calls for a strong injection of technological innovation in the transport system, as is demonstrated by the worldwide transport scenario which is rapidly shifting towards new mobility issues based on new clusters of technical solutions for vehicles, monitoring systems and also infrastructures.

The third dimension is the human factor that means the behaviour of transport stakeholders (institutions, citizens, companies). Here the point is the variety of the Ethiopian society, going from the young and trained citizens of cities to the elder inhabitants of country's peripheral woredas.

Tackle with the above challenges means to implement both "a transportation sector strategy for climate change" and a "non-motorized transportation strategy" able to lead the country in a long transition towards a different transport system. This will have significant impacts, among other things, on the national automotive industry but also on the energy sector, which is committed to making Ethiopia not only independent in production but also a net exporter of green energy to Africa.

Improve the executing capacity of the sector

The capacity of transport institutions to execute effectively the actions/measures to be implemented is one of the pivotal abilities to ensure a successful planning process.

Execution capacities are strictly linked with two dimensions: a clear definition of the institutions' mission and a coherent dimensioning of personnel, both in terms of number and skills.

The mission's definition has to be adapted to the changing conditions of the transport system, which is not static but evolves dynamically as, for instance the case of regional road authorities whose role (and tasks) increase as the density of the network increase.

To face this change a specific process is necessary to monitor during time the coherence of the institutional architecture, looking at task’s assignments, interfaces among different institutions and, furthermore, to the border from public duties and private initiative. The development of the above

dimensions allows public institutions to implement suitable tools or specific provisions needed to carry out the established plans. It is the case, for example, of the incentive schemes and of the systems to manage the transport corridors.

The analysis of TYP and FYP, together with the interviews conducted, enlightened the adequacy of the planning process to design the transport's investment program for each sub sector. A detailed description of planned investments is provided in the following paragraphs. As policy measures are concerned, the analysis of the aforementioned documents shows a similar structure of the process.

The sub-sectoral authorities / agencies, according to their functions, present programs and strategies to the Ministry of Transport. It is interesting to note that the development of programs or strategies is often linked to the numerous technical assistance programs financed both by the government and by leading international financial institutions. In general, these programs carry out an assessment of the situation to the involved stakeholders and institutions, providing policy suggestions, strategic guidelines, intervention plans.

The official planning documents present specific areas devoted to "Program and Strategies" and "Organizational administration capacity, policies and strategies". The documents quoted are as follows[26]:

"(7.1) Programs and Strategies

- Integrated transport master plan
- National logistics strategy
- Non-motorized transport strategy
- Blue economy strategy
- Mass transport expansion strategy
- Automotive industry expansion strategy
- Road sector master plan
- Roads' functions level research (road classification)
- Woreda transformation initiative program

(7.2) Organizational administration capacity, policies and strategies.

- Transport policy
- Aviation sector policy
- Road sector policy
- Railway sector policy
- Road transport policy
- Logistics sector policy
- Road property management policy
- Express way policy
- Railway safety regulation
- Public transport rule/regulation

It is easy to see that the number of specific policy documents or strategies to be implemented is very large. Furthermore, as each of the implementation plans will require not only a budget, but also time, staff and organizational efforts, it is easy to understand that this very broad set of tasks that must be coordinated and verified by the Ministry can likely lead to difficulties in carrying out these activities.

This leads the reasoning on the aforementioned governance model (see figure in Chapter 2.1.1) based on the control chain 'Ministry → Authority → Public Enterprise'. Looking at this axle and given the resources managed by the concerned bodies, it is rather clear that the ability of the MoT to design policies and check its implementation is not fully effective. On the contrary, the bigger

[26] TYP Chapters 7.1 and 7.2, English version, November 2020.

part of work is centered on the couple Authority → Public enterprise, which, depending on the sub-sector, can be focused on one or another organization.

The transport minister has of course the role to direct and coordinate these bodies but does not has an adequate organization to do it practically. For this key role, the Minister has as a governance tools essentially the power to nominate the top managers of the Authorities (and in some cases of the public-owned enterprises) and the powers coming from usually being personally Chairman of the Board. The MoT structure, in itself, is not directly involved in the discussion about the strategic decisions of each Authority, and the offices does not have the key knowledge to engage a dialectic relationship with a specific Authority or Public Enterprise.

The weak technical and economic capacity of the ministerial structures to make independent review or investigations about the choices to be done, makes this decisional center depending from the Authorities and the Public Enterprises. Moreover, out of the three main transport public enterprises, ERC, EAL Group and ESLSE the two latter are not under the MoT supervision but under the PEHAA (the former Ministry for Public Enterprises).

In terms of ability and skills of the work force, a recent assessment conducted within a World Bank technical assistance program, identified some critical gaps to be filled related to fast turnover of the employees, low level of wages (absolute and compared to the authorities' salary level) and training possibility.

Coming back to the several policies and strategies included in the official planning documents, as the number and qualification of MoT employees is currently low, the risk of lack in both coordination and monitoring of all these sectoral / horizontal policies is real. In addition to this risk, the current situation of the MoT has certainly influenced the absence of a priority ranking in the list of declared policies, so that the leading role of the Ministry is less effective than required.

5.1.1 Main critical issues

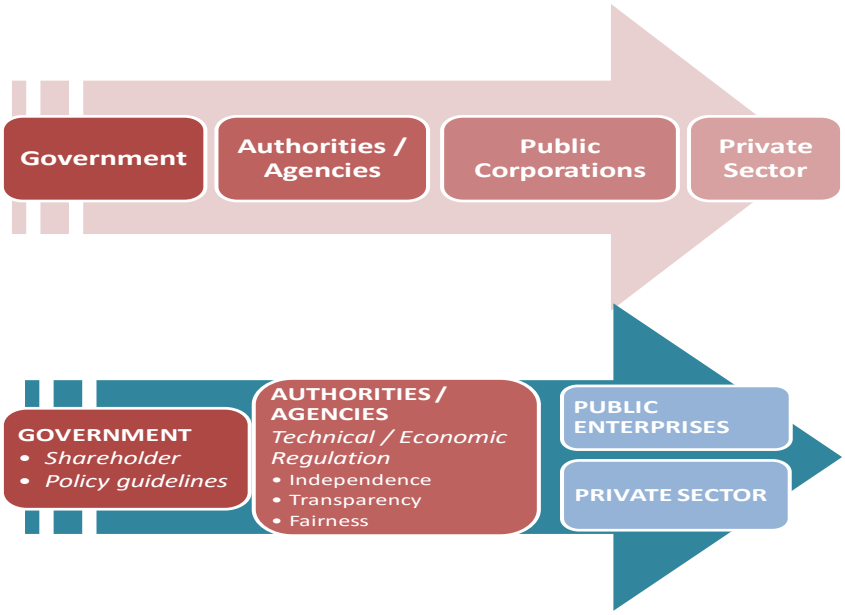
The analysis of the main policies and measures included in the official planning documents for the transport sector highlighted some critical issues. A detailed description of these problems has been made in the Reference Report, a concise listing is provided below:

- Governance and capacity building issues.
- Role of the private operators in the sector development.
- Growth of the sector and strategy of industrial development.
- Policies to develop the international transport connections.

The issues above have to be framed within the HGER, which undoubtedly marks a discontinuity with respect to the public intervention model adopted up to now. The new Government's Agenda design a stronger role of the private sector and calls for different tools from the simple direct action of public enterprises, which led the public action in the long growth period of the country during the last decades. The participation of private operators is essential due to the lack of public resources which are foreseen to be set below the level needed to cover the country's investment efforts because of budget constraints.

This scenario is assumed as one of the main drivers of the Ethiopia's future economic environment; its deployment in the transport sector will have very important consequences for all the sectors' stakeholders. Following the scenario, the intervention model on the transport sector will change as described in the figure below.

Figure 106:The new model of intervention on the transport sector



It is easy to see that, differently from the previous model, public and private companies are at the same level. This has a number of important implications on the governance of the sector and also on the economic relationships among the different stakeholders.

In fact, though the GoE undertaken a real path of openness of the economy to private forces, the true direction and the speed of this policy are not yet completely defined. The measures defined so far (from PPP policy and schemes implementation, to new private investments' openness) seem oriented towards requiring the contribution of private capitals more than the skill of managerial operators.

In a sector which has a residual role of the private sector, or at most limited to ancillary or medium-small sized activities, the entry of private investors on large-scale projects (air, rail or logistics sector) can follow two paths: the sale of the public monopolistic company or the dismantling of the monopoly itself through the opening of the market. In fact, it is difficult to imagine, that a private operator decides to make important financial effort without controlling (at least partially) the business activity.

To say it in other words, any project that envisages the significant entry of private operators, especially foreign ones, in the sectors covered by public enterprises, alternatively passes through a privatization (of the company) or the liberalization of the concerned sector. It is the case of aviation, railways and logistics. At the moment it does not seem that, in this respect, the Government has adopted a clear position, though some progresses in logistics sector could suggest that the path is open towards a positive evolution.

This issue is really crucial for the future developments of the country because any step towards market solutions means to give up the traditional instrument of direct control of the economic environment which is a powerful (but sometimes poisoned) way to lead the country. On the other hand, giving to private forces the freedom to invest and undertake would enhance the country's ability to growth and, by adopting the suitable regulatory framework (more complex than the direct intervention), would boost the development of Ethiopia towards the desired targets.

Furthermore, the governance of the transport sector will have to take into account this increased role of the private sector. And it will have to do so with a rather varied situation in which, despite the clear success in the sector's growth and in the correspondent development of the institutions in charge to manage it, there are still many gaps to be filled, especially at the local level.

The first issue to be underlined on this topic is that of the ability of the institutions to carry out properly all the tasks assigned. This is particularly evident at local level in which the setting of the

local authorities, the tasks assigned and the skills of the apical personnel show relevant gaps. This is particularly the case of the road sector which has many local public authorities, being the most important part of the transport activities of the country.

Also, at national level gaps and deficiencies exists which are more concentrated in maritime and logistics, and railway sectors. Here, besides the need to reinforce the number and the skills of the authorities' personnel, the unbalances between the authorities and the public enterprises are important. For railways the specialised directorate within the MoT is at an early operational stage, while the sectoral authority is in the way to be established. In the Logistics and Maritime sector, which is of paramount importance for the country, the authority did not succeed in introducing a higher degree of efficiency in the sector, also because of a non-collaborative behaviour of the public enterprise.

At the apical point of the sector, the MoT suffers of lack of personnel and gaps in skilled professionals' figures and need to undertake a program of strengthening of its workforce, both at quantitative and qualitative level.

A general process of reinforcement of knowledge and skills of the public employees it is certainly one of the main actions to be undertaken to make the transport sector's institution able to tackle the challenges in the medium and long-term perspective.

Among these challenges, as stated above, the creation of a favourable environment for private operators in investing and managing transport activities seems to be the main issue. On this topic the different speed of the country's development, at national and local level, calls for a twofold strategy in the capacity building strategy. On one side to operate to build and consolidate the basic skills at local level, focusing interventions on Regional States' authorities (both RRAs and RTAs). On the other side to both reinforce the ability of the weaker institutions at national level and to prepare a new set of skills suitable to cope with the issues arising from the privatisation/ liberalisation dynamics. The latter require the ability to manage the tools of economic regulation of activities at a higher level than what has been practiced in the country so far, to ensure coexistence between public and private operators and the country's attractiveness for investment.

At the same time, relevant issues like port diversification, cross-border interoperability and the sector's role in the industrial development of the country are important to rise the ability of the national transport sector to serve the increasing demand that will take place with the economic and demographic growth of Ethiopia. These issues address the horizontal level of the transport sector's governance, which requires to have a clear picture of the interdependencies of the sector both in terms of economic development and in term of international relationships.

5.2 MINISTRY OF TRANSPORT PLANNING ACTIVITY

This paragraph describes all the planning initiatives already taken by the Ministry of Transport and contained in the *Five Years Development Plan*, in the *Ten Years Development Plan* and the *Transport sector's 10 Years Perspective Development Plan (2013-2022)* publicly presented on 27 August 2020 by the Minister of Transport. The latest documents represent the future development of Ethiopia's transport infrastructure system.

The Ethiopian transport system is the backbone of the country, as well as ensuring the mobility of entire economic sectors, proper functioning can accelerate growth:

- 5.3 million hectares of extensive farming plan;
- Manufacturing Industry's Economic Contribution may raise from 6 to 17%;
- Tourism Sector's Contribution to the national economy may raise to $23 Billion;
- Mining Sector's Contribution to the national economy may raise to $17 Billion;

5.2.1 Road sector planning

As part of the previous programs of the Growth and Transformation Plan, road infrastructure expansion,

upgrading and regular and periodic maintenance were undertaken. According to the sector's indicators, the total length of road construction in the country, including the summer season roads, was planned to increase 215,000 kilometers (145%) from 145,350 km (68%) during the second phase of the GTP period.

Accordingly, the density of Road Density in km/1000 km2 has increased from 100.4 in 2007 to 132.1 in 2012; Also, Road Density in km/1000 population has increased from 1.23 to 1.42. At the same time, travel from a nearby winter road is reduced from 5.2 km (1 hour to 40 minutes) to 4.5 km (1 hour 30 minutes). On average, summer roads were reduced from 36.6 percent to 26.7 percent over 5km. In addition, the average level of traffic increased from 70% to 72%, while the average distance covered by federal roads increased from 17.2 million kilometers a day in 2007 to 35.3 million kilometers.

Performance growth was not achieved for all sectors, for example the URRAP projects performance is low, with only 18,902 kilometers (21%) of the 90,000km planned. In terms of maintaining road resources, the Authority, Regional Rural Institutions and URRAP Roads have reduced the maintenance performance by only 38% due to lack of regular and timely maintenance. This has affected the efficiency of the transportation service, the cost of vehicle and road maintenance, and overall economic social activity. The main reason for this shortcoming is the gap between the necessary funds of 7.5 billion birr planned for road maintenance and those available of 2.9 billion ETB (38.7%). The International Standard indicates that 2.5-5% of the total road construction resources should be spent on road maintenance. Accordingly, the country has to allocate between $ 4.3 and 6 billion ETB for road maintenance costs over the past five years, excluding URRAP roads, which currently accounts for only 2.9 billion ETB. This indicates that only 56% of road funding is covered.

According with MoT FYP - Five-Years Development Plan (2013-2017), the Goal 1 is to increase the total road coverage of the country from 121,000 km to 165,000 km, through 4,429 km of new road construction, 568 km of highway, 9,218 km of gravel roads and develop 29,747 km of the Universal Rural Road Access Program (URRAP). At the same time the plan includes 13,416 km of roads to be improved and rehabilitated and a program of periodic and routine maintenance over 266,509 km. The plan will be implemented through a Road policy and master plan, identifying the Road Functional Classification, improve the Road Fund information system and distribution, using alternative funding sources and private investors, community participation and appropriate budgetary allocations for URRAP roads and implementation of Woreda Transformation Initiative program.

Following, is shown the list of road projects included in the 5 Years Development Plan:

Table 58: Ongoing projects - Road development sector

No.	Ongoing projects	Length	Owner of the project	The location of the project	The time it was started (Ethiopian calendar)	Time to Complete (Ethiopian calendar)	Contract Amount Million Birr
Road development sector							
1	Sansusi-Tatek-Kela	14	ERA	Oromia	6/22/2017	12/22/2019	737.00
2	Jimma-Agaro Dedessa River	80	>>	Oromia	1/1/2019	5/30/2022	1,307
3	Ambo-Gedo	65	>>	Oromia	7/1/2017	7/12/2020	484.00
4	Meki-Ziway	37	>>	Oromia	5/9/2016	2/8/2020	1,748.00
7	Ziway-Arsi Negele	57	>>	Oromia	2/23/2018	11/30/2021	937.00
8	Arsi Negele -Awassa	52	>>	Oromia	3/7/2018	9/7/2021	1,020.00
9	Tikur Weha-Awassa	12	>>	Oromia+South P.	11/9/2017	11/8/2019	589
10	Debark-Zarima Limalimo Alternative Road	69	>>	Amhara	1/1/2019	12/30/2022	2142
11	Chiko-Yirga Chefe	60	>>	South People	4/24/2017	6/4/2019	787
12	Iteya-Robe-Seru	76	>>	Oromia	5/8/2017	5/7/2020	1324
13	Ginchi-Km 59	59	>>	Oromia	4/21/2017	1/20/2020	898.3
14	Muke Turi-Kokeb Mesk	58	>>	Oromia / Amhara	5/23/2017	2/7/2020	768.6
15	Kokeb Mesk-Alem Ketema	50	>>	Amhara			1696
16	Melkasa-Sodere-NuraEra-Metehara Junction	94	>>	Oromia	6/27/2017	6/27/2020	1203
17	Tulu Bolo-Kela	80	>>	Oromia+South P.	10/15/2017	4/15/2021	1310
18	Mentamir-Metehbela-Metehara	82	>>	Oromia and Amhara	10/18/2017	4/18/2021	1097
19	Gashena-Bilbila	105	>>	Amhara	2/12/2014	6/25/2020	1723

No.	Ongoing projects	Length	Owner of the project	The location of the project	The time it was started (Ethiopian calendar)	Time to Complete (Ethiopian calendar)	Contract Amount Million Birr
20	Bilbila-Sekota	100	>>	Amhara	1/12/2015	1/12/2019	2041
21	Iste-Simada	52	>>	Amhara	2/21/2019	2/21/2022	1925
22	Azezo-Gonder	13	>>	Amhara	9/14/2018	9/13/2020	872
23	Jinka-Vilage 1	53	>>	South People	2/5/2016	4/1/2018	1373
24	Sodo-Km 70 (Dinke 2)	85	>>	South People	5/14/2018	5/14/2022	1036.2
25	Km 70-Sawela (Dinke-Sawela)	76	>>	South People			1020
26	Tercha-Chida Harar-Kombolcha-Ehadersa Goro-Fungabira	58	>>	South People	4/1/2017	10/1/2020	1166
27	Bombas	98	>>	Oromia	12/13/2018	12/12/2021	1772
28	Robe-Gasera-Giner Lot 1 (Robe-Gasera)	60	>>	Oromia	11/1/2017	10/30/2020	770
29	Gasera-Giner	61	>>	Oromia	12/9/2018	12/8/2021	842
30	Gedo-Menebegna	80.5	>>	Oromia	3/26/2014	3/25/2017	979
31	Ambo-Weliso	62	>>	Oromia	3/9/2015	1/1/2019	1294
32	Gore-Tepi	140	>>	Oromia	11/3/2018	5/30/2023	4468
33	Tepi-Mizan	48	>>	South People - Oromia	1/1/2018	1/25/2022	1246
34	Deri-Km 78 (Masha Lot 1) Gimbo	62	>>	Oromia	9/1/2017	9/17/2020	780
35	Limu Junction-Kosa-Seka (Merewa-Somedo Seka)	94	>>	>>			2268
36	Nekemet-Bure Lot 1	86	>>	>>	11/9/2016	11/9/2020	1816
37	Nekemet-Bure Lot 2	88	>>	>>	1/9/2019	11/9/2020	1765
38	Nekemet-Bure Lot 3	85	>>	>>	11/9/2016	11/9/2020	2044
39	Dibu River-Baday Chelelek a	44	>>	Oromia	11/8/2017	10/8/2020	726
40	Abomesa-Aseko-Dibu River	61	>>	Oromia	11/8/2017	10/8/2020	992
41	Sodo-Tercha Lot 1	76	>>	South People	6/2/2015	4/27/2019	1325
42	Sodo-Tercha Lot 2 (Omo-Tercha)	83	>>	South People	5/1/2015	11/13/2019	1460
43	Dulecha-Awash Arba	53	>>	Afar	7/14/2016	2/9/2020	717
44	Debre Birhan-Ankober	42	>>	Amhara	8/29/2018	10/22/2020	1084
45	Menebegna-Finche-Shambu	66	>>	Oromia	5/1/2017	5/31/2020	999
46	Alem Ketema-Degolo	85	>>	Amhara	4/28/2017	4/27/2020	1281
47	Degolo-Kesela	75	>>	Amhara	4/8/2017	4/7/2020	1300
48	Kesela-Akesta	40	>>	Amhara	1/22/2019	1/21/2021	568
49	Bishoftu-Chefe Donsa-Sendafa	52	>>	Oromia	5/6/2019	5/6/2022	915
50	Bole Junction-Weteredino Horticulture	30	>>	Oromia	10/4/2017	4/3/2020	360
51	Atat Mazoriya-Gunchere-Kose-Geja-Lera	81	>>	South People	10/16/2017	4/13/2021	1165
52	Robe-Agarfa-Ali	54	>>	Oromia	10/30/2018	1/30/2022	2153
53	Robe-Seru (Lot 2)	68	>>	Oromia	1/18/2019	1/17/2022	993
54	Gihur-Deneba- Lemi Junction-Guguftu-Wereilu-Degolo(Lot 2 Guguftu-Wereilu-Degolo)	74	>>	Amhara	8/23/2019	8/22/2021	1395
55	Tarma Ber-Molale-Mehal Meda	119	>>	Amhara	12/24/2018	12/23/2021	1852
56	Bilalo-Kersa-Arsi Negele	93	>>	Oromia	መጋቢት 2011	መጋቢት 2014	1565.4
57	Mekele-Degolat-Km 70	94	>>	Tigrai	11/1/2016	4/28/2020	1594
58	Mota-Jara Gedo	63	>>	Amhara	7/14/2017	1/12/2021	1620
59	Km 69 Angereb Contract 2	71	>>	Amhara	6/20/2017	10/17/2021	1721
60	Kunzela Junction-Filon Holticulture	24	>>	Amhara	1/24/2018	6/27/2021	554.5
61	Debre Markos-Elias-Kuch	81	>>	Amhara	4/19/2018	1/17/2023	1299
62	Wekro-Neblet	80	>>	Tigrai	11/29/2017	11/28/2020	1251
63	Neblet-Felafel	57	>>	Tigrai	11/29/2017	11/27/2020	1004
64	Tenta Junction-Wegeltena-Kurba	79	>>	Amhara	4/1/2019	3/30/2022	1873.5
65	Rama-Chila-Wekro-Maray	91	>>	Tigrai	1/1/2019	3/29/2022	1480
66	Adishehu-Dila-Samra	77	>>	Tigrai	11/13/2019	7/8/2022	2114
67	Adiarkay-Temlet	76	>>	Tigrai	1/17/2019	1/16/2022	1982
68	Pawi Junction Km 70 Lot 1	69	>>	Benishangul Gumz	6/1/2017	6/2/2020	888
69	Adiremet-Adihirda-Baikel	70	>>	Tigrai	10/16/2017	11/15/2020	1026
70	Kuwiha-Maymekden	24	>>	Tigrai	6/14/2017	12/1/2019	552
71	Wekro-Adbi-Konba	63	>>	Tigrai	12/17/2018	6/14/2022	1746
72	Metema-Abrajira	117	>>	Amhara	10/19/2017	4/19/2021	1548

No.	Ongoing projects	Length	Owner of the project	The location of the project	The time it was started (Ethiopian calendar)	Time to Complete (Ethiopian calendar)	Contract Amount Million Birr
73	Semema-Indabaguna	83	>>	Tigrai	12/20/2017	6/17/2021	2252
74	Adiabun-Rama	47	>>	Tigrai	9/3/2017	9/30/2020	807
75	Fiyel Weha-Tekeze River Bridge	40	>>	Tigrai	9/26/2017	9/30/2020	1166
76	Abiadi-Semema	87	>>	Tigrai	12/20/2017	6/20/2021	1748
77	Beles River-Mekane Birhan	39	>>	Amhara	10/1/2016	10/1/2019	1019
78	Adiremet-Kulita-Adigoshu	69	>>	Tigrai	7/23/2017	10/25/2020	953
79	Ajre-Keraker-Ketema Nigus Contract 2	57	>>	Amhara / Tigray	9/21/2018	9/20/2021	1159
80	Mekele Industry Park	18	>>	Tigrai	10/20/2017	12/23/2019	992
81	Sawela-Kako Contract 2 (Lot 2)	30	>>	South People	5/11/2017	11/21/2018	293
82	Adaba-Angetu	102	>>	Tigrai	1/3/2015	5/18/2019	1262
83	Daye-Cheri-Nansebo	73	>>	Tigrai	11/27/2017	11/26/2020	1682
84	Oblo-Dermi	63	>>	South People	10/10/2018	10/8/2021	893
85	Omo-Turmi	73	>>	South People	8/3/2017	8/30/2020	897
86	Edo-Surafeta-Warka	73	>>	South People	1/24/2019	1/23/2023	1687
87	Omorate-Omo-Kangaken	74	>>	South People	2/7/2019	2/7/2022	966
88	Morka-Gircha-Chencha	73	>>	South People	3/13/2019	10/12/2022	1967
89	Yabelo City Alernative Road	7	>>	Oromia	5/5/2019	12/11/2019	297
90	Linking Awassa City with the Airlines	34	>>	South People	11/17/2017	5/18/2019	592
91	Fiseha Genet-Soyama-Km 90 (Fiseha Genet-Kele-Nedele)	92	>>	South People	10/19/2017	4/18/2021	1.2
92	Arbarekete-Gelemso	58	>>	Oromia	7/30/2015	5/26/2019	1018
93	Gelemso-Micheta	46	>>	Oromia	11/16/2015	2/14/2019	982
94	Afdera-Earbeti Junction-Km 48 Contract 1	55	>>	Afar	5/2/2017	5/2/2020	1711
95	Km 48-Ertale Junction Ahmedela Contact 2	79	>>	Afar	5/2/2017	5/2/2020	1366
96	Babile-Fik Babile City-Km 33 Contract 1	36	>>	Oromia and Somali	1/12/2017	5/12/2020	408
97	Babile-Fik Km33-km66-Contract 2	30	>>	Somali	1/12/2017	6/20/2020	451
98	Babile-Fik Km 66-Km 93 Cotract 3	27	>>	Somali	1/12/2017	6/1/2020	401
99	Babile-Fik Km 1-Km 93 Fik City Contract 4	33	>>	Somali	5/2/2017	5/2/2020	448
100	Fik-Hamero	81	>>	Somali	5/2/2017	5/29/2020	819
101	Kebridehar-Warder	139	>>	Somali	7/6/2019	7/6/2022	1814
102	Chereti-Hager Mekor	90	>>	Somali	4/26/2017	4/26/2019	1300
103	Hager Mekor-Gorobebeksa (Kundi)	102	>>	Somali	12/12/2018	12/11/2021	1552
104	Jijiga-Tuli-Lowanda-Lule Add-Samkab-Haremukal	103	>>	Somali	9/4/2017	9/4/2020	1552
105	Mesel-Kori-Teru	84	>>	Afar	2/11/2019	10/30/2019	1536
106	Mesel-Kori-Teru Lot 2	72	>>	Afar	2/11/2019	2/10/2022	1502
107	Jijiga-Fafen -Gelalshe-Degehamedo Lot 2 ; Gelelsh-Degehamedo	52	>>	Somali	9/4/2017	9/4/2020	1064
108	Hamero-Emi	136	>>	Somali	8/11/2018	11/5/2018	1544
109	Gambela-Eliya	78	>>	Gambella	5/1/2017	5/1/2020	1029
110	Adura Akobo Ina Adura Burbe	126	>>	Gambella	3/16/2009	5/3/2019	833
111	Aysid-Kong (Guba-Begondi)	62	>>	Benishangul	3/10/2015	3/5/2019	521
112	Asosa-Daleti (Contract 2)	69	>>	Benishangul	5/1/2017	4/30/2020	732
113	Gnengnang-Jikawa-Lare	35	>>	Gambella	9/4/2019	45,173.00	1421
114	Km 76-Meti Lot 2	82	>>	Gambella	11/1/2017	5/12/2021	1298
115	Nekemet-Soge-Kamish-Koncho Lot 3 Km 160 Koncho	86	>>	Benishangul	የካቲት 2011	ጥር 2014	1327
116	Shishinda-Tepi	79	>>	South People	10/9/2018	10/8/2022	1250
117	Assosa-Daleti (Contract 1)	36	>>	Benishangul	3/15/2017	3/6/2020	229
118	Yaso-Galasa-Dibate (Lot 1) (Yaso-Km 100)	100	>>	Benishangul	2/15/2019	2/15/2022	2666
119	Ababo-Km 76	76	>>	Gambella	1/7/2017	7/21/2020	960
120	Omo / Say-Maji	34	>>	South People	2/20/2017	2/20/2020	772
121	Gambela-Abobo-Pugnido	103	>>	Gambella	10/17/2017	10/16/2021	1311
122	Dengoro-Kingi-Mekebela	30	>>	Oromia	1/30/2019	1/30/2022	416
In red the projects not identified on the map. Total capital in millions of birr		**147,217.70**					

Source: 5 Years Development Plan

In the MoT **TYP - *Ten-Years Development Plan (2013-2022***), it is planned to increase the total all-weather road coverage of the country from 137,777 kilometers to 225,237 km, upgrade 8,635 km of road links, make regular and seasonal maintenance to 364,233 km, increase the extent of expressways to 2,960 km, build 1,324 km of gravel and 5,487 km of asphalt rural roads. Following is the ETRE Ten years plan of Expressways:

Table 59: Expressways Development Plan

NO	ROAD NAME	Operating status	LENGTH (KM)	PROJECTED TOTAL TRAFFIC	PROJECTED TOTAL REVENUE
1	Addis - Adama	Operating	78	162,909,004.0	5,409,123,552.4
2	Dire - Dewelle	To be completed	223	6,068,644.0	1,095,086,993.5
3	Modjo - Hawassa	To be built	220	44,290,560.0	5,883,557,990.4
4	Addis Ababa - Holeta-Ambo	To be built	118	11,497,309.0	977,271,268.0
5	Addis Ababa-Commando	To be built	110	5,209,977.7	442,848,105.0
6	Addis Ababa - Alemgena-Woliso	To be built	110	8,812,230.6	749,039,598.0
7	Addis Ababa-Debrebirhan	To be built	129	2,698,130.1	229,341,059.0
8	Alemgena-Butajira	To be built	117	2,710,855.0	230,422,675.0
9	Dire Dawa-Dengego-Harar	To be built	50	2,570,695.0	218,509,075.0
10	Awash Junction-Adaitu	To be built	270	773,070.0	65,710,950.0
11	Adaitu-Mille-Semera	To be built	105		
TOTAL		**1,530**	**247,540,475.4**	**15,300,911,266.3**	

5.2.2 Road transport services planning

For local public transport, investments are planned to improve the infrastructure and services. Bus stations, stops and drop-offs, depots and parks are among the most common infrastructure. Most of these infrastructures is built in some of the country's major cities, especially in Addis Ababa.

At national level, 692 1st, 2nd and 3rd level stations are in Tigray 21, Oromia 235, Amhara 231, Addis Ababa 6, Dire Dawa 2, Benishangul 16, South 161, Gambella 7, Harar 1, Somali 6, Afar, and Addis Ababa. In addition, there are 2 depots in Addis Ababa, 7 parking (5 earth, 2 smart), 5.2 km bicycle lane, 995 bus stop shelters, 5.5 km a dedicated bus lane has been built for the bus.

After the National Road safety Strategic Plan (2011 – 2020), the 2018 National Road Safety Policy (NRSP) document sets out the Ministry of Transport's vision, values and priorities in relation to road safety of Federal Democratic Republic of Ethiopia (FDRE). The document also includes a clear recognition of the challenges and opportunities related to road safety improvements to all road user groups. The presented Road Safety Policy for the FDRE shall be governed by the Ministry of Transport (MOT).

Ministry of Transport is working to establish a national road safety performance review, as a base to take the adequate measures to avoid increasing fatality rates and property loss in Ethiopia. Given that lack of national-based road safety performance review has forced the transport authorities to use information and data only collected from police sources, medical centers and other responsible agents.

The TYP is planning to adopt a Road Transport and Road Safety Policy & Strategy, establish a Road safety Commission office, improve post-crash response and compensation to victims and obtain a reduction of the current road fatality rate from 43 to 10 accident/10,000 cars.

The **MoT FYP** foresees to develop Master Plans for each main city, developing mobility plans and non-motor transport strategy, involving public-private partnership funding system, in particular:

- Increase road transport service infrastructures; building 14 public transport centers, 3 freight transport terminals, 536 transport infrastructures in Addis Ababa (1DP, 5 high and low terminals, 505 transit stops, 25 parking), Dedicated Bus Lane, 40 km fast bus (BRT) on 4 corridors and a Bicycle Lane of 194.8 km in Addis Ababa, develop 4 transport technicians' training centers nationwide, build 6 Driver Training and Testing Traffic Cops and Building 4

bus depots in Public Service;

- Increase the number of passengers on public transport nationwide: providing a national transport capacity of 913 million people annually, opening 80 new cross-country public transit service lines and delivering 304 service lines, increasing coverage from 67% to 85% on roads built on the Universal Rural Road Access Program, increase the average annual coverage of cross-country bus from 96,000 to 107,000 km, implementation 2,272 Transit and Border Public Transport Vehicles, establishing public transport service links with 5 neighbouring countries, providing 58,500 small and medium public transport services

The main objectives defined by Transport sector's ***10 Years Perspective Development Plan (2013-2022)*** for the public transport in Ethiopia are:

- Increase passengers' number from 722 million/2012 EC/to 1.5 billion in/2022 EC /;
- Increase Annual Routes coverage of public buses from 96,000 to 118,000 km;
- Increase passenger number of PSETS from 32 million to 52 million;
- Increase Routes of Public Transport from 224 to 384;
- Increase the current single cross-border public transport to 6;
- Increase number of mini and medium size public transport vehicles from 144,000 to 284,000;
- Introduce urban mass transport and non-motorized transport schemes in 69 urban centers;
- Increase passenger mobility share of urban mass transport services from 31% to 70%;
- Increase regular road transport coverage in rural areas from 57% to 100%.

5.2.3 Railway Sector

The present situation of the Ethiopia railway system is presented in Chapter 2. The analysis of the current situation and the interviews held with the main actors of the railway sector has led to the following SWOT Analysis of the railway sector:

STRENGTHS

Addis Djibouti railway line is along the main transport and logistic corridor of the country
Addis Ababa – Djibouti railway line has been built along the main logistic corridor of the country. It allows to intercept high passenger and freight flows.

Rolling stock potentially able to transport several cargo typologies
The available rolling stock in terms of quantity can operate all the foreseen service. Moreover, the rolling stock can operate several freight typologies and it allows to attract more demand.

WEAKNESSES

The line, in terms of capacity, is currently underused
The infrastructural and operational condition currently on the line Addis Ababa – Djibouti lead to an underusage of the line capacity limiting the transport capacity of the line. This is also limiting the economic and financial revenues of the railway.

Ethiopia is a newcomer in the electrified standard gauge railway world. For this reason, there is no wide know-how in the railway field
Ethiopia is a newcomer in the railway field and obviously the railway know-how is not fully developed in the country. It leads to:

- Needs of trainings
- Lack of local supplier for equipment of spare parts

Both the above considerations impact in the increasing of foreign currency needs to support the railway development due force Ethiopia to import training, equipment and spare parts. Moreover, the regulatory aspects and issues still need to be fully settled and implemented.

Loading /unloading facilities are low-equipped

Loading /unloading facilities are currently low-equipped. This leads to delay in train departure that affects the reliability and robustness of the railway transport. Moreover, despite the rolling stock is mainly available, currently in Ethiopia railway is not linked to loading /unloading facilities able to move non-containerized cargo such us: liquid loading/unloading facilities and bulk facilities. This limits the attractivity of the railway transport.

In the coming future, within one year, the Awash oil depot rail connection and unloading facilities works contract is going to be finalized and the current issues will be solved.

OPPORTUNITIES

Old railway corridor available in the urban area

Despite the old railway is not anymore operational, the railway corridor has a big value. It could be integrated with the new Addis Ababa – Djibouti providing local and commuter services within the city centre that can also increase the attractivity of the long-distance passenger transport that currently is affected by the high distance between the railway station and the city centre of the two major cities (Addis and Dire Dawa).

Freight and passenger demand constantly growing

The transport demand in Ethiopia is constantly growing, particularly along the corridor of the Addis – Djibouti railway line. This should allow that the rail transport demand growth accordingly ensuring the increasing of the economic and financial revenues of the railway.

THREATS

Shortage of foreign currency

Shortage of foreign currency is affecting the railway network in three main aspects:

- Delay in the construction of the new railway line
- Unavailability of spare parts that affect the reliability of the railway service
- Training not provided to the staff

These three main consequences are resulting in the overall slowdown of the development of the Ethiopian railway network.

No technical national railway standard for the development of the railway network

Currently each railway line has been developed with different standards. This led to challenges related to the interoperability and to a possible increasing of the costs in terms of:

- Additional investment to ensure the interoperability between the lines
- Increase the number (and then the costs) of the spare parts and suppliers
- Provide additional study for each line in order to evaluate the interoperability challenges
- Possible risks to increase the manoeuvres and travel time (and then reduce the attractivity of the railway) in order to ensure the movements between line with different standards
- Difficulties to develop spare parts and equipment for the local suppliers

No clear institutional and technical framework for the involvement of the private sector

Currently, the private companies that wish to be linked to the railway face the challenges related to the not clear instructional and technical framework that does not indicate clearly the role and the responsibilities, and the related costs allocation, in order to realize the railway link. This discourages the linking to the railway and limit the increasing of the traffic on the railway line.

ONGOING PROJECT

Currently in Ethiopia, two railway line is under construction:

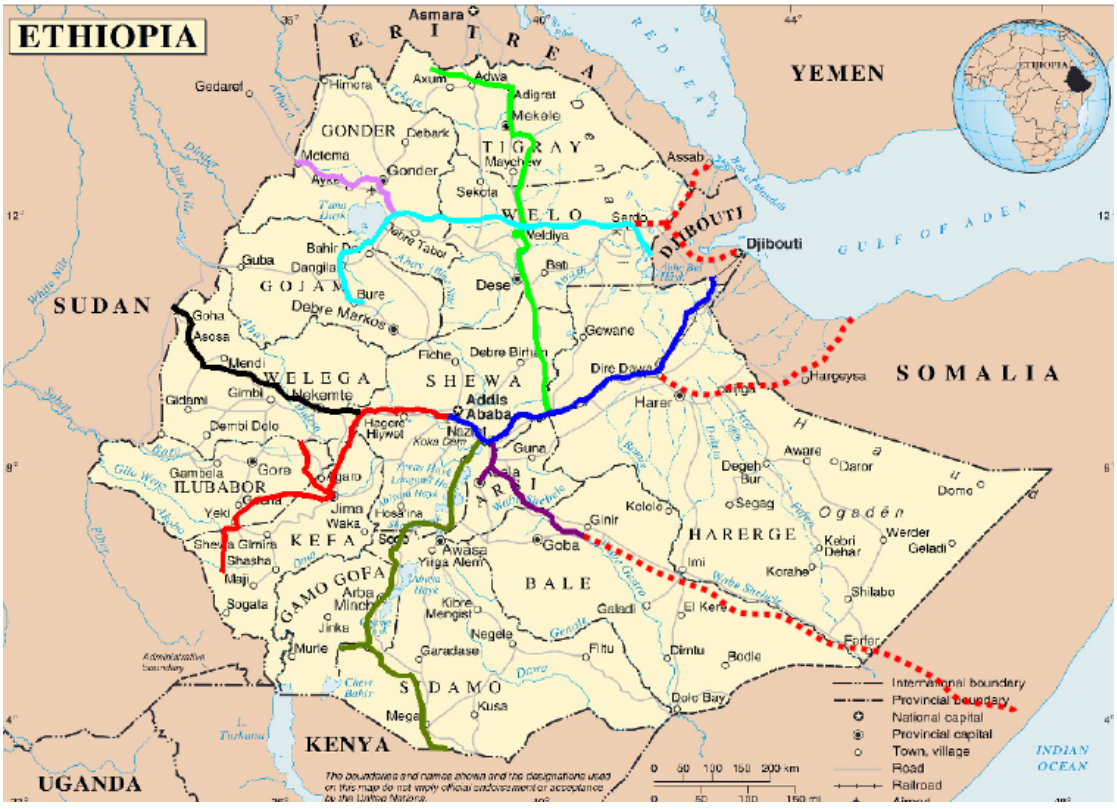
N.	Project	The owner of the project	The location of the project	Time to complete	The assigned capital [M ETB]	Current Status
1	Awash - Kombolcha – Haragebeya	Government	Amhara and Afar region	2021	7.084	under construction
2	Mekele – Haragebeya		Amhara Afar and Tigra	Not Defined, Expected about 2025	25.768	56% Constructed ceased due to budget

PROJECT UNDER IMPLEMENTATION (5 YEARS AND 10 YEARS PLAN)

According to the "Ministry of Transport's 5 Years Development Plan" and the "Ministry of Transport's 10 Years Development Plan" the ongoing project related to the railway development are summarized in the table below:

N.	Project	The location of the project	The assigned capital [M ETB]	Current Status
1	Mekelle - Assab Port Railway	Tigray region and Eritrea	93.978	Funded by ADB ongoing feasibility study
2	Weldia - Wereta - Matema - Ethiopia (Ethio Sudan) Railway	Amhara region	110.659	Team established for the study of the feasibility of the line
3	Mojo - Hawassa - Moyle	South and Oromia region	212.625	Feasibility study completed
4	Sebeta-Ijji-Jimma-Bedele - Booma South Sudan border	South and Oromia region	117.472	Feasibility study completed
5	Aisha - Berbera	Somali region	99.851	Concept study

The projects included in the above table are referred to the main corridor foreseen for the entire Ethiopian National Railway Network.



The corridor will lead to the link with the neighbourhood countries; indeed, each project is foreseen not only to connect Ethiopia to a port on the Red Sea but also to connect Ethiopia with the other inland country (such as South Sudan).

Due this configuration, it is expected that the finalization of the projects currently under implementation will lead to an increasing of the competitiveness of the Ethiopian products on the international markets promoting the export. In fact, the railway may lead to a decreasing of the transport cost for the products and this may lead to a more competitive price for the products.

5.2.4 Aviation sector

Current situation

During the 2nd Growth and Transformation Plan (GTP-II) period, it was planned to grow the number of domestic airports from 20 to 25 and to build 5 additional airstrips.

The result achieved was 3 new airports in Humera, Jijiga and Hawassa out of the 5 planned, that is 60 percent of the objective. In addition, 6 more airports - Semera, Shire, Kombolcha, Bale Robe, Jinka and Dembidolo - were upgraded to provide domestic services and are currently in operation.

The Somali regional government of has built Kebri Dahar Targia airport. The planned construction of passenger terminals and for new air traffic control towers at Semera, Shire and Jimma airports was not completed due to problems related to contract management[27]. However, construction was resumed lately.

According to the Ten Years Plan, given a steady growth of air traffic demand, at Addis Ababa Bole International Airport (ADD/HAAB) the passengers Terminal-2 was expanded and is partially operational for international services. The expansion of Terminal-2 of Addis Ababa Bole International Airport[28] was conducted by Ethiopian Airports, a business unit of Ethiopian Airlines Group. The airport unit has implemented an expansion project launched in November 2014, with a total value of some USD 400 million. The project had three phases: 1) expansion of Terminal-2 for international flights. The Terminal-2 had a surface of 48.000 sqm and could handle 6 million passenger per year. The expansion has given additional 74.000 sqm to the terminal. At the end Terminal 2 will be able to handle some 25 million passengers. Currently it can handle 12 million passengers; 2) construction of the VIP Terminal that started in 2017; 3) expansion of Terminal-1 that today handles domestic flights. The project is scheduled to reach the end in 2021 and will merge the terminals 1 and 2 where separated areas will be kept for domestic and international passengers. Investments have been allocated also to increasing the parking areas for aircraft bringing the current space available able to accommodate 75 planes at a time. More space is also available for private operators. Works have also been carried out to improve the runways and to create 3 new taxiways in addition to the 3 existing ones.

Of the 22 airports operated by Ethiopian Airlines Group, 4 are international Addis Ababa, Dire Dawa, Bahir Dar and Mekelle.

Works are in progress to install baggage handling systems (BHS) at airports of Hawassa, Kebri Dar, Dire Dawa, Mekelle, Axum, Lalibela, Gondar, Arba Minch, and Semera. In Jijiga and Jimma. Ground lighting systems are also under construction.

Construction of new airports in the regional states is to be launched by Ethiopian Airports in: Mizan Aman, Gore Metu, Debre Markos, Negele Borena and Yabelo.

It has been successful the plan to upgrade to world class level both the Ethiopian Aviation Academy (EAA) and the Civil Aviation Training Center (ECATC). The two institutes were awarded the TRAINAIR+ certificate and are globally recognized to deliver multi-disciplinary aviation trainings to Ethiopian and to foreign trainees.

Air navigation facilities have been upgraded and modernized at 22 existing airports and other 7

[27] Ten Years Plan, Ministry of Transport.

[28] Interview to CEO of Ethiopian Airports published on Africa Aerospace magazine, Issue 2, Volume 8, April – June 2020.

area control centers[29] including air traffic control tower at Addis Ababa (ADD) and Gambela (GMB). Equipment rooms and access roads were completed at BahirDar (BJR), Mekelle (MQX), Gondar (GDQ) and ArbaMinch (AMH) airports among others.

The planned objective to increase cold storage warehouses construction for perishable export goods from 2 to 10 has not been achieved. One location only has been added during the period. This since the product supply did not increase as planned due to the slower than expected economic growth. Currently three international airports, Addis Ababa, Bahir Dar and Mekele are equipped with such facilities for cold storage and are serving the export of perishables goods.

The major issues identified in this sub-sector include the lack of appropriate budget for infrastructure development, the lack of a legal framework to encourage private investor participation. A higher degree of focus and attention should be therefore dedicated to address these issues. The new aviation sub-sector regulation recently approved should bring improvements in this area.

The existing aviation infrastructure relies on a network 22 airports which are currently under administration of Ethiopian Airports Group. These airports have air navigation facilities and are serving scheduled air traffic. Improvements at airports air navigation systems were illustrated above.

1	Addis Ababa Bole International	ADD
2	Dire Dawa International	DIR
3	Bahir Dar Belay Zeleke International	BJR
4	Mekele Alula Aba Nega International	MQX
5	Jimma Abba Jiffar	JIM
6	Gondar Emperor Tewodros-II	GDQ
7	Lalibela	LLI
8	Axum Emperor Yohannes IV	AXU
9	Arba Minch	AMH
10	Gambella	GMB
11	Assosa	ASO
12	Jigjiga	JIJ
13	Gode/Iddidole	GDE
14	Humera	HUE
15	Semera	SZE
16	Shire	SHC
17	Dessie/Kombolcha	DSE
18	Goba/Robe	GOB
19	Jinka	BCO
20	Hawassa	HWA
21	Dembi Dollo	DEM
22	Qabridehar	ABK
23	Nekemt (currently not operational)	NEK

Within the upcoming 10 Years Perspective Development Plan (2013-2022EFY), goals have been set to develop and expand air transport with the following targets/KPIs:

a) Infrastructure & facilities

- No. of airports 22 to 28 (including Nekemt/NEK)
- New passenger terminals = 6
- Airfields/Airstrips = 10

b) Operational development

- No. of International destinations from 127 to 187
- No. of international passengers (million) from 10.2 to 48.4
- No. of domestic passengers (million) from 2 to 11.8

[29] Entoto/Gawassa, Dire Dawa, Endayesus, Gode, Gore, Debre Markos, ArbaMinch.

A comparison between data at 2019 and forecasted data by the 10 Years Perspective Development Plan (2013-2022) is provided in the following table

	Status at 2019	10 Years Perspective Dev. Plan (2013-2022)	Growth
Domestic passengers	2 mln	11,8 mln	490%
International passengers	10,2 mln	48,4 mln	375%
Total passengers	12,2 mln	60,2 mln	393%
International routes	127	187	47%
Airports	22	28	27%
Airport/control towers	28	33	18%
New passenger terminals		6	
New operational airstrips		10	

A further objective indicated in the 10-years plan is to make Ethiopia Africa's travel and Aviation cargo hub. In recent years cargo warehouses have been expanded with the addition of Terminal-2 for cargo. The total area available for perishable and dry goods now totals 40.000 sqm and, for dry products, the level of automation is very high.

In addition to EAL there are 8 private aviation operators that are mostly offering private non-scheduled air services. Such operators use small aircraft due to past regulation that was limiting the maximum number of seats. The latest regulation introduced in 2020 has lifted seat limitations and opened the market to the entrance of foreign investors in joint venture with Ethiopian ones.

It is worth noting that Ethiopian Civil Aviation Authority (ECAA), a founding member of ICAO, has recently achieved 89,89 score at the last ICAO audit.

Ethiopian Airlines Group and Vision 2035

In 2011, government owned Ethiopian Airlines launched Vision 2025, a 15-year growth roadmap. Results achieved under that plan have transformed EAL from an airline into the biggest aviation group in Africa based on an organization of specialized Business Units: Ethiopian International, Ethiopian Express (regional), Ethiopian Cargo, Ethiopian MRO, Ethiopian Airports, Ethiopian Catering, Ethiopian Aviation Academy and Ethiopian Ground Handling.

The airline has grown significantly, from an annual passenger traffic of three million and a revenue of 1.3 USD billion in 2010 to more than 12 million passengers and an annual revenue of 4 USD billion in 2019.

According to management interviews available in internet, most of the targets set in vision 2025 were achieved. The company has then defined a new growth strategy named Vision 2035. This new plan aims at sustaining the airline's future fast growth.

In a scenario of intense competition on both passenger and cargo air transport, Ethiopian Airlines looks at consolidating its Addis Ababa hub to connect Africa with China and South east Asia, as well as South and North America. These are different geographical areas and economies that, before Covid-19 outbreak, were all growing, although at different speed.

The airline is looking at different new market segments in the passenger business. Such as the pilgrimage market from Indonesia to Saudi Arabia where the gulf carriers (Saudi Arabian airline, Garuda, Turkish, etc.) competition is already strong. In cargo business, during the Covid-19 pandemic EAL has acted as key player of the air freight global market. EAL linked the two sides of the world transporting international aids and health related products to Africa Canada, and South America from China. The recently created joint-venture with DHL aims to transform its cargo business into a fully-fledged logistics company.

Today Ethiopian serves 60 destinations in Africa. But the airline intends to grow in order to consolidate its leadership and beat competition. Especially from middle East airlines.

Ethiopian is also expanding its presence across Africa by signing direct agreements with different

countries. The carrier recently signed an agreement with the Ghanaian Government to set up a home-based carrier in Accra. In addition, EAL has Asky airline in Lome that would complement.

In terms of diversification, Ethiopian has ventured into the hotel and tourism sector by setting up Ethiopian Holidays and opened the five-star Ethiopian Skylight Hotel near Addis Ababa Bole International Airport. Further expansion of the hotel is also planned.

A significant project is the one for the development of a new international airport. The project which is its starting phase will be located in the Oromo region not far from Addis Ababa. Open sources indicate 5 USD billion as size for this project which is for an airport able to handle over 100 million passengers every year. The existing International Bole Airport, with its renewed terminals, can handle up to 22 to 25 million passengers at maximum. With the new international airport, Addis Ababa will be able to compete head-to-head with other international top connecting hubs in Middle East and Africa such as Dubai, Istanbul, Doha and Johannesburg.

In addition, Ethiopian Airlines Group plans also include establishing an aerospace manufacturing industry in cooperation with leading aircraft and engine manufacturers. And this would bring a bosst in employment in hight tech sector as well as more revenues in foreign currency.

In total, the Vision 2035 sets a growth path for the airline that will bring EAL to a fleet of more than 200 aircraft and a, pre Covid-19, objective of total annual revenue for the aviation group of more than $25 billion. Of such revenues, some 3 USD billion are to be achieved by the cargo unit.

In relation to air cargo transport, Ethiopian Airlines website also provides a specific section for the Cargo & Logistics Business Unit. Here specific information on Vision 2035 are provided for this organizational unit. And these are:

Vision, Ethiopian Cargo will be one among the top 20 cargo airlines in the world in terms of FTK by providing safe, market driven and customer focused air cargo, courier and mail transport services by 2035.

Mission, Ethiopian Cargo aims at the following:

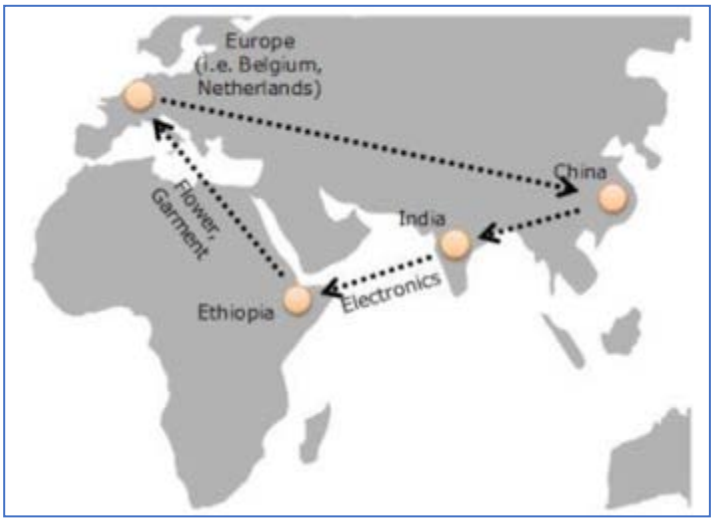
- To become one of the leading cargo airlines in the world by providing safe, reliable and fast cargo transport services, whose quality and price “Value Proposition” is always better than its competitors.
- To ensure being a cargo airline of choice to its customers, employer of choice to its employees and an investment of choice to the Owners.
- To support the economic development of Ethiopia and the countries it operates by fulfilling its corporate social responsibility and providing vital global air cargo connectivity.
- To Specifically support Ethiopian Export Sector.

Ethiopian Cargo Strategic Objectives 2035

- Annual Revenue of USD 2.97 Billion including belly hold cargo (USD 2.37bill for dedicated freighter);
- Annual total tonnage of 1.6 million including belly hold cargo (1.3mill tons for dedicated freighter);
- Serving 70 International Destinations;
- Earning annual profit of US$ 421 million from freighter operation;
- Market Share in the Sub-Sahara African Cargo Market of 30%;
- Operating 24 Jet Aircraft by 2035;
- Leader in Africa in Quality Cargo Services;
- Fully implement IATA e-freight by 2020;
- Achieve Cargo-IQ certification for major freighter stations by 2020;
- Sensitizing the horti-growers & exporters to utilize the additional capacity to be availed.

In the air cargo business one of the issues to face for EAL is imbalance between import and export. As a measure to streamline its operations, Ethiopian Airline Cargo has been working according to a triangular model as shown in the following figure. Export goods are transported from Ethiopia to Europe. Here cargo goods for Asian markets are loaded on the aircraft that flies directly to Asia. The aircraft flies back to Ethiopia directly from Asia importing goods to Ethiopia, in particular ICT and electric products made in Asia. The triangle operation model has helped to improve efficiency at operational level by EAL.

Figure 107: The triangle operation model of Ethiopian Airlines



Aviation developments

The aviation industry of Ethiopia is showing resilience to the harsh crisis generated by the Covid-19 pandemic outbreak in early 2020 despite the very high impact on the global industry.

Ethiopian Airline Group has been able to adapt to the emergency and implement a contingency plan that has seen the airline developing additional business volumes in the cargo segment while losing demand from passengers due to inability to travel for almost the entire world population. In order to increase the cargo business, the airline has also transformed some passenger aircraft into cargo ones. As a result, Ethiopian Airline Group stated that it has achieved positive economic results on its accounts. On the contrary a number of airlines around the world have either suffered significant losses or filed for bankruptcy. Among others, South African Airlines and Mauritius Airlines.

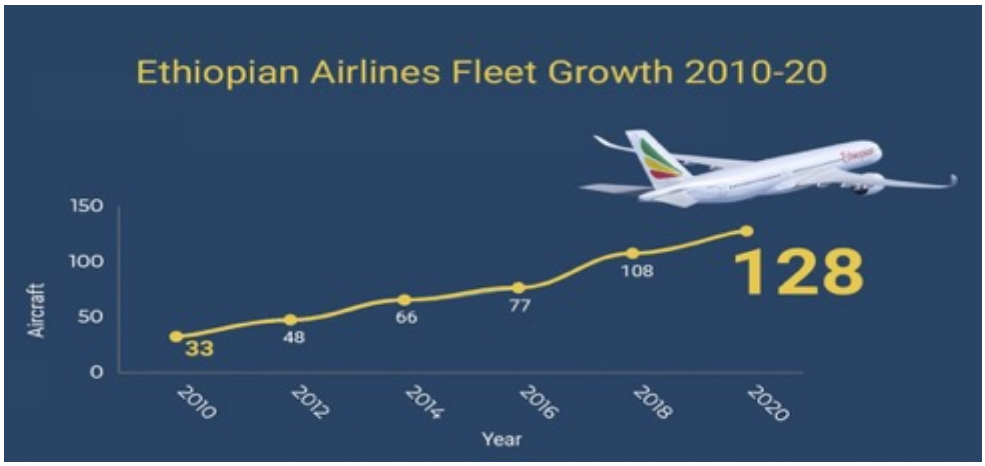
Since 2017, Ethiopian Airline Group (EAG) has incorporated the company Ethiopian Airports Enterprise which was previously managed under the direct government control. Such change has made EAG the monopolist business organization in the Ethiopian aviation industry managing both transport services and air transport infrastructures. A vertically integrated model not so common in those markets where liberalization is well established. And this will represent an issue in the future process of making market liberalization real under all aspects at national level.

Nevertheless, EAG is a key organization for the national economy of Ethiopia. Given its strong competitive position on the international airline market in terms of passenger and cargo transport services, Ethiopian Airlines is a direct generator of foreign currency in-flows. Most of the 4 USD billion revenues of 2019 relate to international business, and it is paid in foreign currency. The company also offers services at Bole International Airport to foreign airlines for aircraft maintenance, catering and baggage handling services. In addition, EAG has recently ventured in tourism and hospitality markets targeting international tourists and business travellers. The more the group invests in international growth, which is the guide line of its vision 2025 and 2035 strategy, the better for the country in terms of generating valued currency inflows. Considering that

by 2035 EAG aims at becoming a 25 USD billion revenue company, aviation is poised to consolidate its role as a key strategic industry sector in terms of Ethiopian export.

On the other side, EAG is a key player for what relates import of advanced technology in Ethiopia. According to OECD data[30], in 2018 Ethiopia totalled 659 USD million in imports of planes and helicopters. This was the largest import category with a share of 7.93% of the total, the second being gas turbines with a share of 5.02% with a value of 418 USD million, 37% less than aviation. At end of 2020 Ethiopian Airlines' fleet has reached 128 aircraft in total, as shown in the next figure, with a growth over the ten year period 2010-2020 of 288%.

Figure 108: Ethiopian Airlines fleet growth in the period 2010 - 2020



The aviation group has recently announced the addition of new planes to its fleet of turbo propeller aircraft used for domestic and regional traffic. Considering EAG Vision 2035 objective of reaching a fleet of 200 aircraft, this means that the flow of import of planes and helicopters will be significant also in the future years.

Given the very ambitious growth objectives for the aviation industry indicated by the 10 Years Perspective Development Plan (2013-2022), it is clear that this economic sector will play a key role for the future growth of Ethiopian economy. And this will be even more when the new international airport will be completed after an investment of some 5 USD billion.

In addition, the pandemic is creating many opportunities for the growth of EAG in Africa and at global level in its core business of passengers and cargo services through the creation of a number of partnerships agreement with national African air carriers in need of financial support to survive and avoid bankruptcy risks that emerged due to the Covid-19 pandemic.

In perspective terms, however, the domestic aviation market will need further significant investments to grow and satisfy the needs of the country in the future. At the same time, it is critical to put in action the openings and the first steps of liberalization that have been laid down with the regulation issued in the first months of 2020. A more liberalized, competitive and dynamic domestic aviation market will be extremely helpful in supporting the economic growth of the country.

In terms of aviation infrastructure there is the need to keep expanding and improving existing airports for passenger traffic. When the covid-19 pandemic will be over, international leisure travel will start again while business travel is expected to recover more slowly. In this context Ethiopia has the potential to attract flows on international tourism to its beautiful destinations across the country. For this to happen in a better and more effective way than in the past, and looking at the future, there will be the need of better aviation and tourism infrastructures in place. At the same

[30] OECD, Ethiopia imports, exports and trade partners, 2018, https://oec.world/en/profile/country/eth

time, for air cargo to evolve and to grow it is of highest importance to create those enabling facilities for cargo services in the airports located in regions and areas that produce goods to be exported by air. Refrigerated storage facilities, warehouses and sufficient parking spaces for aircraft at regional airports and ease of access for trucks, etc., are essential to make air cargo a reality across Ethiopia. During 2020 EAG has further developed and is promoting its pharma wing in the Cargo business unit as ready to distribute the Covid-19 vaccine. For this, it is highly possible that additional investments will be needed at a number of airports in order to build or upgrade existing facilities with very low temperatures storage areas in order to store the vaccine.

As illustrated in the next figure, ICAO[31] forecasts strong annual growth of both passengers and cargo traffic within Africa and between Africa and other destinations for the period 2015-2035. These are pre covid-19 forecasts, however it is highly possible that, even if with some delay, future traffic demand will keep a positive trend over the long term.

Figure 109: ICAO Projected annual growth of passenger traffic 2015 – 2035

5.2.5 National Logistic Planning

Recently the Ethiopian government has approved the National Logistics Strategy (2018 – 2028) to modernize the sector and stimulate economic activities and soon after the National Logistics Policy document, to indicate the way to implement the set strategies.

The National Logistics Strategy has been edited by the MoT and EMAA, with the purpose of:

- Enable National Development, avoiding logistic bottlenecks and hindrances;
- Reduce logistic costs, due to inefficiency and waste of time;
- Provide systemic logistic solutions, coordinating the different players (regulatory, operators, importers/exporters, customs clearing agents, freight forwarders, non-government organizations, and other logistics service providers);
- Provide Direction and Leadership, with effective coordination of different stakeholders and systems.

The Logistic Policy document clearly sets policy issues and direction in order to modernize the Ethiopia logistics sector so that the sector provides efficient service and contribute to the growth of the national economy.

[31] ICAO, Aviation Infrastructure for Africa Gap Analysis - 2019

The bases for drafting the logistic policy have been:

- **The general national transport strategy**, prepared by the Ministry of Transport. Beyond the provision of transport services, logistics service system embraces warehousing, freight forwarding, dry port services, customs service, finance system, trade system, etc.
- **The National Economic Reform,** transforming the country's economy, opening various economic sectors to competition and involvement of the private sector and other economic operator.
- **The Industrial Development Policy**, with the aim to deliver the required number of industrial inputs and products on the right time and proper and efficient handling of products in warehousing.
- **The Agriculture and Rural Development Policy,** taking into account the supply of agriculture inputs, warehousing, forwarding, port services and the agriculture- market and agriculture-industry linkage.
- **The Pastoralist and Semi-Pastoralist Development Policy**, to facilitate product supplies, fosters economic gain and ensure that these areas equally benefit from the overall economic growth of the country.
- **The National Information Technology Policy**, recently approved by the government, in order to modernize and organize the logistics sector with information technology and strong organizational setup, human resource, information exchange and technology.
- **The Logistics Service Operators enhancement**, like the Ethiopian Shipping and Logistics Service Enterprise- ESLSE – and possible new private operators.
- **Private Investor's attraction**, in order to make the logistics sector effective and competitive, through competent work force and technology.

The **Five-Years Plan** foresees to study new OSBPs implementations and increase the number of dry ports from 9 to 13, and:

- Carry out dry port construction on Jimma, Hawassa and Assosa;
- Complete the remaining 62% of the construction work to transform the Modjo dry port into a Logistics hub;
- Carry out an IT center development to improve the logistics system;
- Build a Cold Store in 2 locations;
- Increasing multimodal transport performance from 45% to 90%
- Reducing the shipment time to 43 days (from 123 to 80), from requesting a bank license for shipment to the country;
- Reduce the time it takes to ship within 23 days (from 46 to 23) from the date of shipment of import cargo
- Reduce Port Dwell time by 17 days (37 to 20)
- Reduce freight cargo ships by 15 days (from 35 to 20) at port

The ETMP Draft Master Plan will consider

- Implement the National Logistics Strategy measures;
- Implement a Seaport Corridor Strategy;
- Increase One-Stop Border Posts from 2 to 6;
- Increase number of Dry ports from 12 to 20
- Upgrading from 3 to 7 Cold Stores
- Number of Freight Terminals from 1 to 23;
- Building 925 km of refined oil pipeline from Djibouti to Addis
- Increase logistic efficiency by increasing service control stations;
- Facilitate the movement of trucks with 100% fleet management system.

5.2.6 Maritime Infrastructure

As for maritime transport, the Five Years Plan declares that it is not possible, at least in the short term, to improve transport, especially on Lake Tana. The main reason for this is the inability to use the funds from foreign countries for the implementation of the project.

Successful planning for the establishment of an internationally recognized training center has enhanced the level of the Bishoftu Maritime Academy and has also provided training to foreign trainees in addition to domestic demand.

In this context, the *Transport sector's 10 Years Perspective Development Plan (2013-2022)* introduce the opening of the new 25 km long Cable Car system will become operational. The transport systems will be included in 8 major lakes and rivers, a river-based transport system will commence (Lake Tana, GERD Dam, Abaya, Chamo, Ashenge and rivers in Baro and Tekeze).

MARITIME SECTOR

The **10 Years Perspective Plan (2020-2030)** includes the following projects in the Maritime Sector:

- **On going Projects:**
  - The project of developing the Mojo dry port to logistics center (Ethiopian commercial logistics project) in Mojo Town;
- **New Projects to start:**
  - Cool Chain facility development project in Ethio-Djibouty corridor;
- **Projects on research and designing stage:**
  - One Stop Boarder Post facility project in Ethio-Djibouti border, Ethio-Sudan border, Ethio-Somaliland and Ethio-Eritria border;
  - Sea port development project in Berbera and Djibouti;
  - Cross – docking center construction project At loading and unloading sites of the country;
  - Capacity building projects of logistics sector in Addis Ababa;
  - Building liquid load logistics facilities in Ethio-Djibouty corridor.

Figure 110: Ten-Years Plan (2020-2030): *Maritime Project Map*

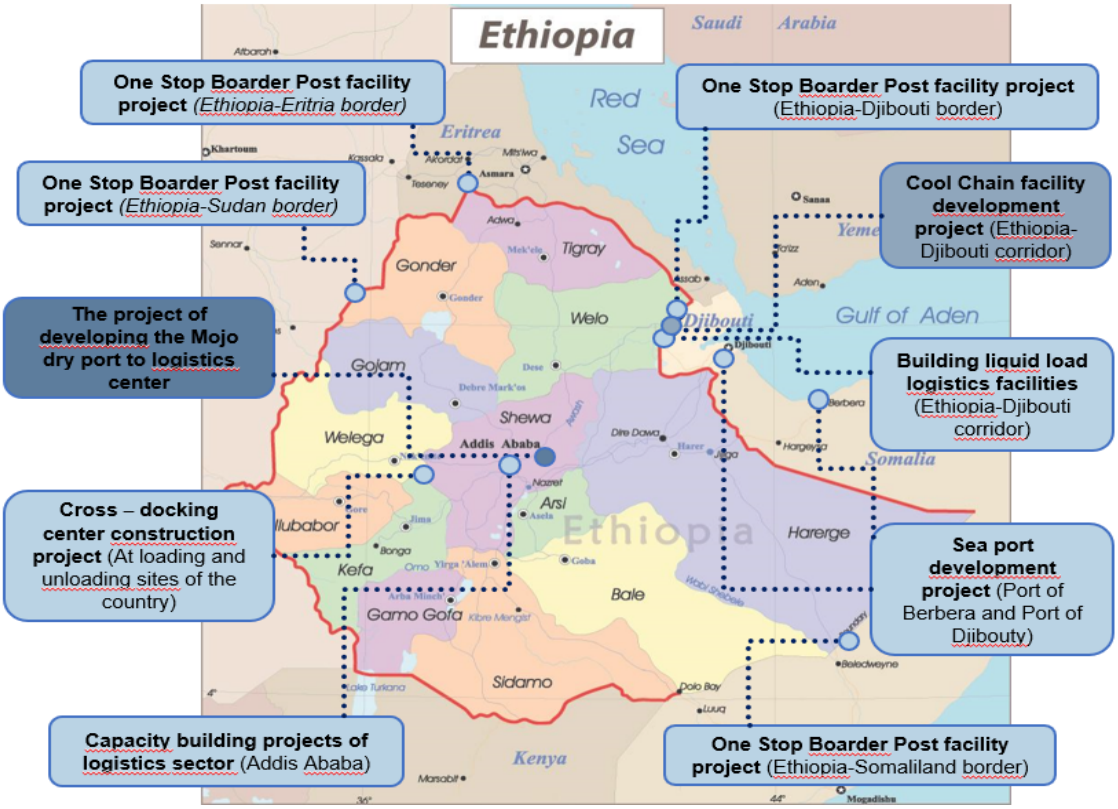


Table 60: Ten-Years Plan (2020-2030): *List of Maritime Project*

N.		Project owner	Project site	Year it started	Year it ends	Budget (million birr)
ON-GOING PROJECTS						
1	The project of developing the Mojo dry port to logistics center (Ethiopian commercial logistics project)	Maritime Authority	Mojo town	August 2017	2022	150.000.000
					Subtotal budget	***150.000.000***
NEW PROJECTS TO START						
1	Cool Chain facility development project	Maritime Authority	Ethio-Djibouty corridor	2019	2025	44.115.684,66
					Subtotal budget	***44.115.684,66***
PROJECTS ON RESEARCH AND DESIGNING STAGE						
1	One stop boarder post facility project	Maritime Authority	Ethio-Djibouti border Ethio-Sudan border Ethio-Somaliland border Ethio-Eritria border	2020	2025	92.441.764,66
2	Sea port development project	Maritime Authority	Berbera, Djibouty	2020	2023	489.862.964,66
3	Cross- docking center construction project	Maritime Authority	At loading and unloading sites of the country	2020	2022	37.972.799,14
4	Capacity building projects of logistics sector	Maritime Authority	Addis Ababa	2020	2027	77.113.692,08
5	Building liquid load logistics facilities	Ethiopian fuel supply agency	Ethio-Djibouti corridos	2020	2023	55.041.764,66
					Subtotal budget	***752.432.985,20***

INLAND WATER SECTOR

Human and material resources in the transport sector were taken into consideration during the preparation of this 10-year perspective plan. The main ones are:

- Experts and leaders with extensive knowledge, skills and long experience and initiative in the air, land and water transport sectors;
- Accredited training institutions and transport (aircraft and ships) in the aviation and maritime sector.

Goal 1. Ensuring the fairness and accessibility of the transport infrastructure

- Increasing the number of dry ports from the current 8 to 11 in 2030;
- Developing local water transport infrastructures at seven locations *(Tana, Baro, Abaya, Chamo, Tekeze, Renaissance Dam and Gibe River)*

Table Ten-Years Plan (2020-2030): *Inland Water Sector*

No	Objectives/ goals	Unit index/ KPI	Start Year 2019/2020 efficiency	Yearly Trget									
				2020/ 2021	2021/ 2022	2022/ 2023	2023/ 2024	2024/ 2025	2025/ 2026	2026/ 2027	2027/ 2028	2028/ 2029	2029/ 2030
1.17	Developing water transport structures at 7 location (Tana, Baro, Renaissance Dam, Gibe, Tekeze, Abaya and Chamo)	Number of newly built water transport infrastructures	0	-	2	3	-	3	6	6	6	6	6
1.18	-	Number of improved water transport infrastructures	0	-	1	-	-	-	-	-		-	-

Figure 111: Ten-Years Plan (2020-2030):
Map of developing local water transport infrastructures

5.2.7 Urban Mobility

The **MoT FYP** foresees to develop Master Plans for each main city, developing mobility plans and non-motor transport strategy, involving public-private partnership funding system, develop and implement an incentive system to promote mass transit service; develop and implement a non-motorized transportation strategy. Establish coordination between urban transport modes (train, bus, taxi and motorway transport); improve the organization and operation of transport operators; implementing an integrated management system with transport service stakeholders;

in particular:

- Improve urban transport service: Implement bicycle transport service on a 30-line basis with over 30 thousand residents, Increasing mass transit service from 11 to 36 in the nation's largest and medium sized cities with over 50,000 inhabitants, Develop and service Dedicated Bus Lane (8 Addis Ababa, Dire Dawa, Adama, Mekele, Bahir Dar, Gondar, Hawassa, Jimma) on 8 major cities; Bring 500 buses operating from the public transport service, Provide Bus Rapid Transit lanes (BRT) in 6 corridors in Addis Ababa, Increasing the proportion of public transport in urban areas from 31% to 51%; Provide 2,500 buses providing mass transit service in Addis Ababa, Reduce the waiting time from Addis Ababa to 15 minutes; The average daily mileage of a city bus. Coverage extending from 124.5 km to 171 km. Offer a seat for public transport to 1,000 people by 79; Carry out the city's average daily transport capacity by 2.6 million 5.2 million people a day. Develop and implement an integrated freight transport and logistics strategy.
- Increase public transport use, through: providing transportation services to the Addis Ababa

city administration and federal employees in the Oromia and Addis Ababa cities of Oromia, 25.9 million annually. increasing bus delivery from 460 to 560 by introducing 100 new buses to work; providing transportation services to the population of Addis Ababa's 17.5 million people annually; Provide contract transport services for conference and other social issues to 126,000 passengers per year in Addis Ababa and Addis Ababa; carry out 230,400 citizens a year by implementing a special cross-country transport service; provide 4.8 million Government Development Enterprise employees every year to provide, execute, and execute transport services at work and departure times. new standard buses; Providing the service and distribution system supported by Fleet Management; Improve the establishment of Public Service Transportation Enterprise Establishment Regulations; Improve coordination and collaboration with stakeholders; Research and implement service and employment lines;

- Improve passenger train service**:** Carry up to 150 thousand passengers a day in Addis Ababa Light Rail Transit Service; Carry 248,000 passengers a year in New-Djibouti Railway; Carry 55,000 passengers a year from the Hira-market-Awash-Djibouti railway; deploying 1.5 pairs of cross-country passenger trains per day: performing Operation Train Operation at Local Capacity: allow the city government to provide subsidies for light rail transport services; review of tariff reform; organizing and maintaining maintenance centers

The **MoT FYP** foresees to:

- Increasing the number of public transport parks nationwide from 690 in 2012 to 732 in 2022;
- Urban transport d e Reta infrastructures (depots, terminals, parking lots, parking) building from 1008 in 2022 to grow in 2106,
- Extending 25 km of car cable
- Nationally, the number of passengers in public transport nationwide will increase to 1.5 billion from 205 million in 2011 by 2022,
- Expansion of mass and motor transport services in 69 cities with over 50 thousand inhabitants;
- Increasing the coverage of normal transport service from rural roads to 100% from 57.6%
- Increasing the share of public transport service from 31% in 2011 to 70% by 2022,
- Service slender public service users in 2011, up from 32 6 million in 2022 to 53 million upgrades;
- Increasing capacity of Addis Ababa light rail transport service from 120,000 to 200,000 passengers

Implementation Strategies:

- Establish and implement incentive system to promote mass transport service.
- Develop and implement a non-motorized transportation strategy
- Urban transport modes (train, bus pickup, tax and motor wireless transport of) setting to promote,
- Create public transport service links with neighbouring countries
- Improve the organization and operation of transport operators
- Implementing an integrated coordination system for transport service stakeholders
- Increasing the number of users of public transport services from Public Service Services from 32.6 million in 2011 to 53 million by 2022,

Addis Ababa light rail transportation capacity from 120 thousand a day, transporting passengers to grow to 200 thousand passengers,

5.2.8 List of main planned actions

Following is the list of actions planned at 5 and 10 years by the Ministry of Transport:

Table 61: New projects to be implemented

No.	New projects to be implemented	The owner of the project	The location of the project	The time it was started (Ethiopian calendar)	Time to complete (Ethiopian calendar)	The assigned capital
Road Transport Sector						
1	Data Warehouse	Ministry of Transport	Addis Ababa	2013	2015	14,000,000 birr
Maritime Transport Sector						
1	Cool Chain Facility Development Project	The Maritime Affairs	Ethio - Djibouti Corridor	2013	2017	44,115,684.66
Railway Transport Sector						
1	Weldia - Wattana - Ethiopia (Ethio Sudan) Railway;	Government	Amhara region	2016	2020	110,658.8
2	Mojo - Hawassa - Woo - Moyle,	Government	South and Oromia region	2017	2022	212,624.6
Aviation Transport Sector						
1	Construction of Tower Building and Airports Facility at Bahir Dar, Nekemte and Dembidolo Airport.	Ethiopian Civil Aviation Authority	Bahir Dar, Nekemte and Dembidolo Airport	1-Jan-20	1-Jan-22	100.00
2	Construction of the bridge at Dire Dawa Airport	Ethiopian Civil Aviation Authority	Dire Dawa Airport	31-Dec-19	30-Junc-20	20
3	Construction of a blind building and air conditioning facility at Mizan Aman, Gore Metu, Debre Markos, Yabelo and Negele Borena airports.	Ethiopian Civil Aviation Authority	Jima, Mizan Aman, Gore Metu, Debre Markos, Yabelona, Negele Borena	1-Jan-21	1-Jan-25	200.00
4	Construction of the Aviation Training Academy Center, Aviation Museum, Simulated Fire Training Center, Additional Buildings, Recreation Center	Ethiopian Civil Aviation Authority	Addis Ababa	1-Jan-25	1-Jan-29	500.00
5	Procurement and installation of equipment for development Aeronautical Information Service (AIS) to Aeronautical Information Management (AIM)	Ethiopian Civil Aviation Authority	Addis Ababa	2012	2015	60

Source: FYP

Table 62: Projects at the research and design stage

No.	Projects at the research and design stage	The owner of the project	The location of the project	The time it was started (Ethiopian calendar)	Time to complete (Ethiopian calendar)	The assigned capital
Road Transport Sector						
1	Construction of a bus terminal	ፌ/ት/ባ	Addis Ababa	2014	2017	600,000,000 birr
2	National Central Station Construction	ፌ/ት/ባ	Addis Ababa	2015	2018	1,500,000,000 birr
Maritime Transport Sector						
1	One Stop Boarder Post Facility Project	The Maritime Affairs Authority	Ethio - Djibouti Ethio - Sudan Ethio - Somali Ethio – Eritrean	2013	2017	92,441,764.66
2	Seaport Development Project	The Maritime Affairs Authority	Bebera Djibouti	2013	2016	489,862,964.66
3	Cross - docking construction project	The Maritime Affairs Authority	Departures and destination locations in the country	2013	2015	37,972,799.14
4	Logistics Sector Capacity Building Project	The Maritime Affairs Authority	Addis Ababa	2013	2017	77,113,692.08
5	Construction of Liquid Frequency Logistics Facility	Ethiopian Petroleum Supplier	Ethio - Djibouti Corridor	2013	2016	55,041,764.66

No.	Projects at the research and design stage	The owner of the project	The location of the project	The time it was started (Ethiopian calendar)	Time to complete (Ethiopian calendar)	The assigned capital
Aviation Transport Sector						
1	Implementation of design work at Bahir Dar, Nekemte and Dembidolo Airport	Ethiopian Civil Aviation Authority	Bahir Dar, Nekemte and Dembidolo Airport	31-Dec-19	30-Junc-20	2.00
2	Conduct a design study of the bridge leading at Dire Dawa Airport.	Ethiopian Civil Aviation Authority	Dire Dawa Airport	31-Dec-19	30-Junc-20	0.50
3	Construction of tower design works at Jimma, Mizan Aman, Gore Metu, Debre Markos, Yabelo and Negele Borena airports.	Ethiopian Civil Aviation Authority	Jima, Mizan Aman, Gore Metu, Debre Markos, Yabelona, Negele Borena	1-Jan-20	30-Jan-20	4.00
4	Design at the Head Office Aviation Training Academy Center, Aviation Museum, Simulated Fire Training Center, Additional Buildings, Recreation Center	Ethiopian Civil Aviation Authority	Addis Ababa	1-Jan-22	1-Jan-23	10.00
5	Provide the necessary air conditioning facilities at all levels for regional airports and improve air service delivery service.	Ethiopian Civil Aviation Authority	Different airports	2013	2022	110
6	Increasing VHL Data Link from VDL to Aeronautical Information Exchange between Pilots and Air Traffic Controllers	Ethiopian Civil Aviation Authority	Addis Ababa	2013	2015	15
7	From the ground-based navigation of Nav Aid to the GNSS flight system, updating the airfield based on air traffic growth.	Ethiopian Civil Aviation Authority	Addis Ababa	2014	2016	15
8	Upgrading the country's Servers to WAM	Ethiopian Civil Aviation Authority	Miscellaneous Airports	2017	2019	60

Source: FYP

Table 63: Projects going into implementation - ETRE

No.	Projects going into implementation	The owner of the project	The location of the project	The time it was started (Ethiopian calendar)	Time to complete (Ethiopian calendar)	The assigned capital
Ethiopian Payment Methods Enterprise						
1	New-Adama Speedway Revenue and Revenue Calibration Repairs	Ethiopian Payment Methods Enterprise	New-Adama Speedway and Payday Bells	2017 and 2019	2018 and 2020	3423.87

The Ethiopian Ministry of Transport, in addition to the 5 Years Development Plan, has published the 10 Years Development Plan. The document is a programming tool for the main long-term infrastructure works. In the text of this document, the planning and development of further railway connections is foreseen. The details of the individual sections are shown below.

Table 64: New projects to be implemented – Railways Transport Sector - S*ource: TYP)*

No.	New projects to be implemented	The owner of the project	The location of the project	The time it was started (Ethiopian calendar)	Time to complete (Ethiopian calendar)	The assigned capital
Railway Transport Sector						
1	Mekelle - Assab Port Railway;	Government	Tigray Region and Eritrea			93,977.7
2	Sebeta-Ijaji-Jimma-Bedele - Boma (South Sudan border);	Government	South and Oromia region			117,472.2
3	Aisha – Berbera	Government	Somali region			99,852,3
4	Link Railways	Government	-	-	-	-

No.	New projects to be implemented	The owner of the project	The location of the project	The time it was started (Ethiopian calendar)	Time to complete (Ethiopian calendar)	The assigned capital
Railway Transport Sector						
5	Addis Ababa Light Rail Expansion	Government	City of Addis Ababa	-	-	-

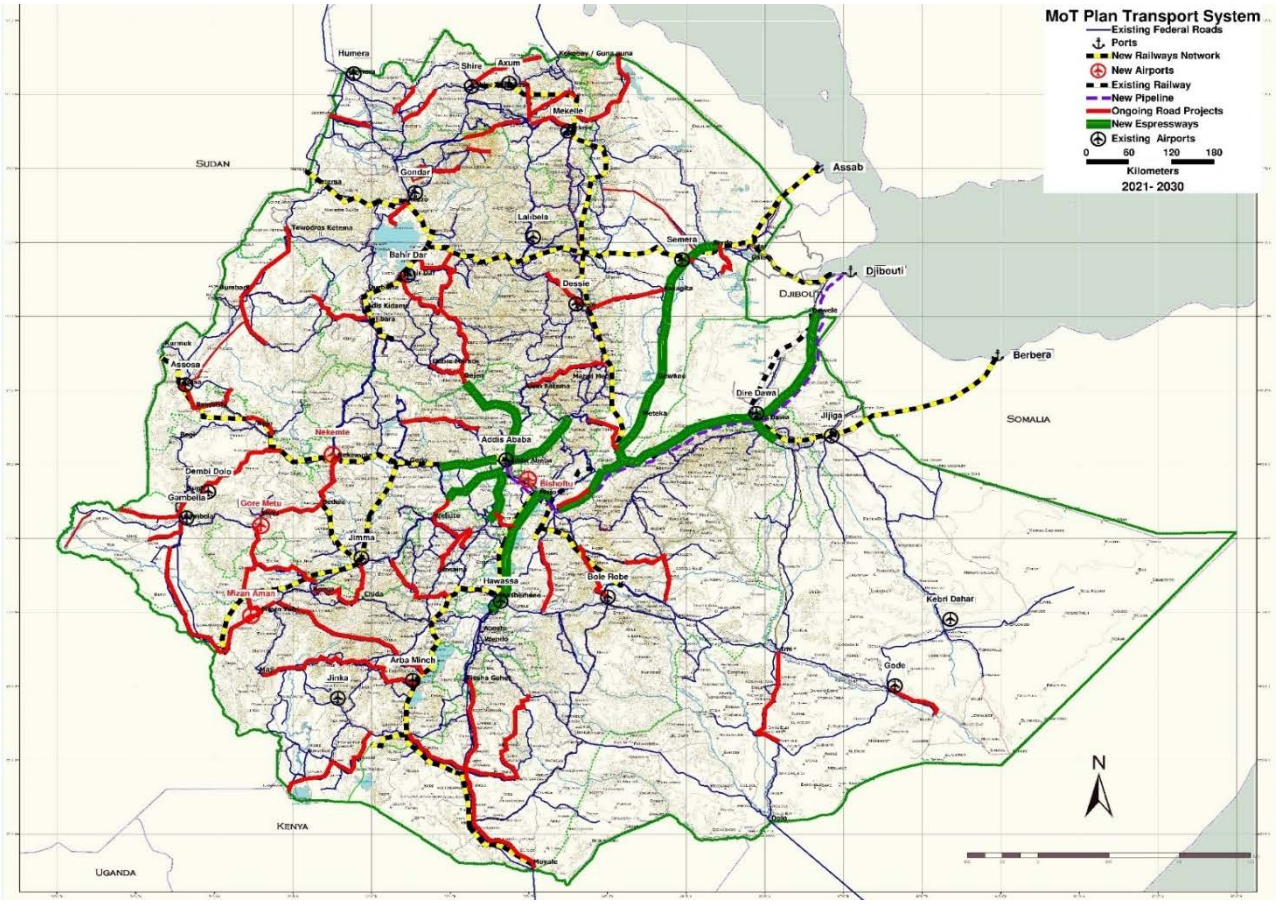
Source: FYP

Table 65: Projects at the research and design stage - Railways

No.	Projects at the research and design stage	The owner of the project	The location of the project	The time it was started (Ethiopian calendar)	Time to complete (Ethiopian calendar)	The assigned capital
Railway Transport Sector						
1	Mekelle - Assab Port Railway;	Government	Tigray Region and Eritrea			469.9
2	Sebeta-Ijaji-Jimma-Bedele - Boma (South Sudan border);	Government	South and Oromia region			587.4
3	Aisha - Berbera	Government	Somali region			499.3
4	Link Railways	Government	-	-	-	-
5	Addis Ababa Light Rail Expansion	Government	City of Addis Ababa	-	-	-

Source: TYP

Figure 112: MoT - Planned transport System



6 FUTURE MOBILITY DEMAND

6.1 ECONOMIC DEVELOPMENT TRENDS

6.1.1 The recent evolution of the Ethiopian Economy

Ethiopia's growth performance over the past decade has been one of the most successful among low-income countries: Country achieved rapid and inclusive economic growth which has reduced poverty and raised living standards. Since 1990, per capita income in Ethiopia has increased by about 200 percent, while other development indicators saw remarkable improvement: life expectancy rose by about 10 years in a decade while infant mortality was halved. Importantly, Ethiopia made these strides while maintaining a relatively equitable income distribution.

The development model has been characterized by a number of peculiar aspects. Ethiopia's economic strategy during this recent period strongly emphasized public infrastructure investment and was supported by "heterodox" macro-financial policies. The public investment rate rose from about 5% of GDP in the early 1990s to 18.6% of GDP in 2011, making it the third highest in the world (WDI, World Bank)[32]. Massive infrastructure investments took place in the energy, transport, communications, agriculture, and social sectors, albeit from very low levels. While agriculture was the main growth contributor at the beginning of the take-off, the services sector gradually took over in terms of importance and was later complemented by a construction boom. The contribution to the growth given by the industrial sector was limited, since this sector accounted for less than 5% of value added over this period. Private consumption was important on the demand side, though investment (especially public) has become increasingly important in recent years. The financing of public investment projects led to a crowding out of many private investment projects owing to lack of financing, and this helps explain why the private investment rate in Ethiopia is the sixth lowest worldwide (WDI, World Bank)[33]. An overvalued real exchange rate (lowering the import costs of public capital goods while hurting export competitiveness) and elevated inflation (yielding substantial "seignorage" (income) public revenues while harming macro stability) were other aspects of this policy mix.

6.1.2 The homegrown Economic Reform Plan

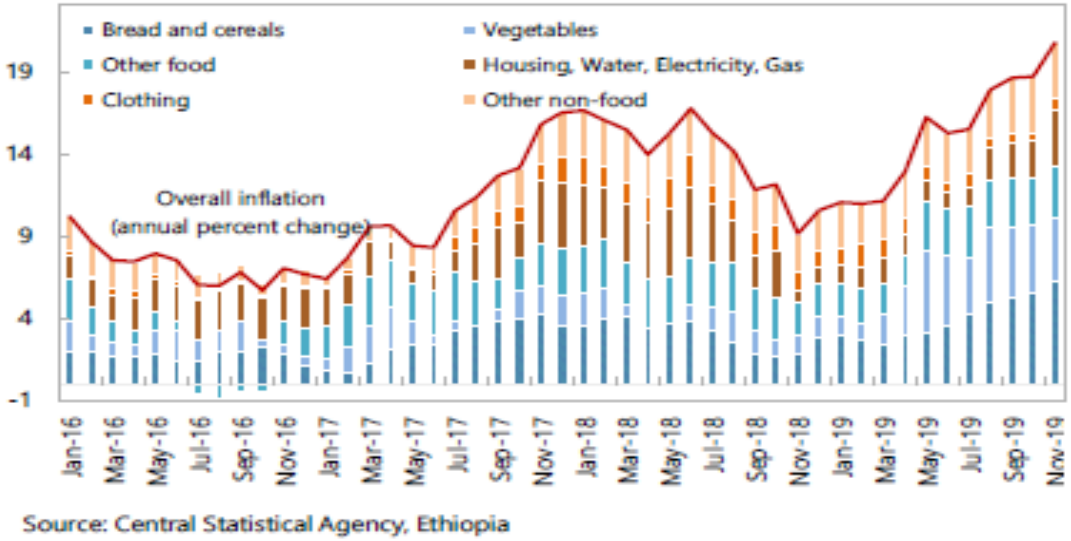
This original development policy mix found its limits in recent years.

The debt-financed public investment-led development model has reached its limits, amid a build-up in external vulnerabilities, as illustrated by high inflation, particularly for food products, severe foreign exchange shortages and high premia on the parallel market, as well as debt and likely financial sector vulnerabilities (see graph. 5.2).

[32] Moller, L. C., & Wacker, K. M. "Explaining Ethiopia's Growth Acceleration—The Role of Infrastructure and Macroeconomic Policy", World Development (2017)

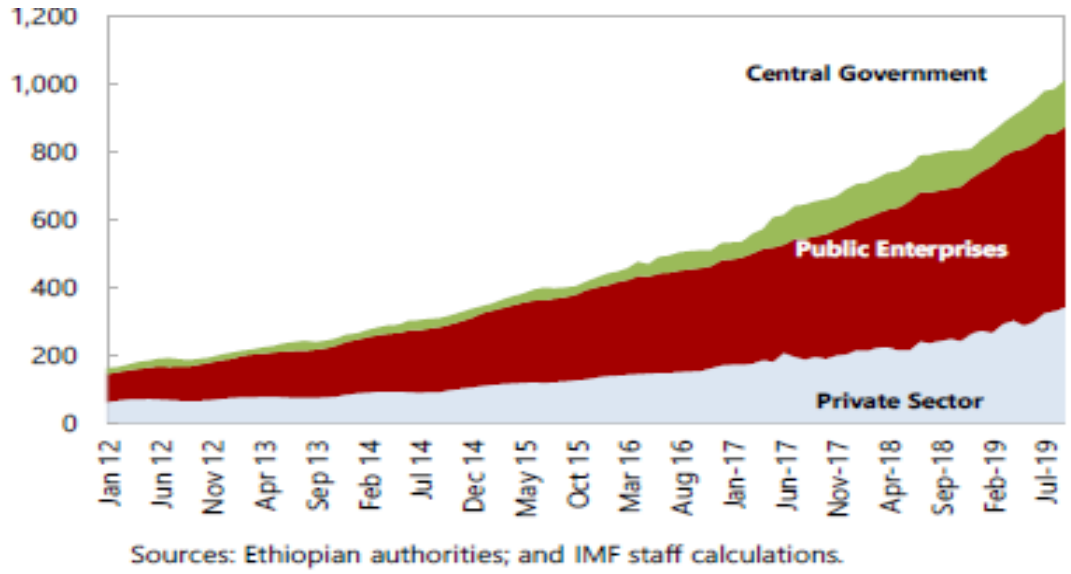
[33] Ibidem

Figure 113: Contribution to Inflation (percentage points)



Source: Central Statistical Agency, Ethiopia

Figure 114: Credit to the Economy (billions of Birr)



Sources: Ethiopian authorities; and IMF staff calculations.

Recognizing these vulnerabilities, the authorities have prepared a "Homegrown Economic Reform Plan". Their reform agenda is appropriately ambitious and wide-ranging, encompassing macroeconomic reforms, structural reforms to ease institutional and structural bottlenecks to productivity and job growth, and sectorial reforms.

The "*Homegrown Economic Reform Plan*", takes a comprehensive approach to addressing imbalances and rebalancing growth, with three pillars:

1. macroeconomic and financial sector reforms to correct FX imbalances, control inflation, safeguard financial stability while promoting intermediation, and ensure debt sustainability;
2. structural reforms to ease institutional and structural bottlenecks to productivity and job growth, and
3. sectorial reforms to address institutional and market failures in key strategic sectors.

The Government has requested to the International Monetary Fund a three-year arrangement under the ECF and EFF, with Fund financing of SDR 2,1 billion (about USD 2,96 billion). The Fund-supported

program will build on their Home grown Plan and aim to durably address the FX shortage, a key constraint on private sector growth; reduce debt vulnerabilities; gradually lift financial repression and harden State Owned Enterprises (SOE) budget constraints to improve private sector access to credit; improve domestic revenue mobilization and strengthen public financial management to ensure that adequate resources are devoted to pro-poor spending; and address vulnerabilities in the financial sector and gradually expand government debt markets to encourage financial sector development.

On the basis of this reform program, the macroeconomic forecasts for the Ethiopian economy, released in December 2019 by the IMF, were the ones of Table 56.

Table 66: Ethiopia Selected Economic and Financial Indicators, 2015/16–2023/24

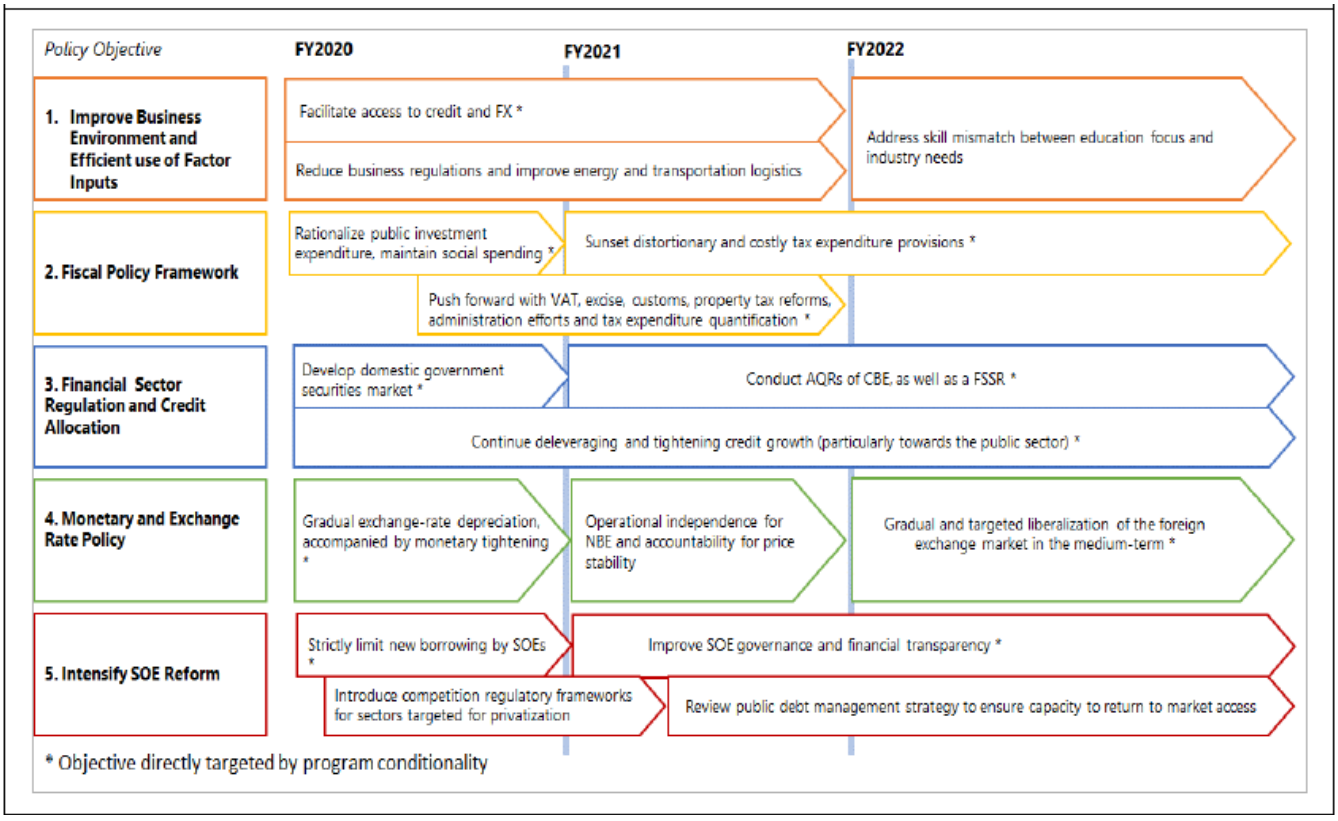
	Actual			Preliminary	Program			IMF Protection	
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
GDP at Constant Prices	8.0	10.2	7.7	9.0	6.2	6.1	7.0	7.5	8.0
Consumer prices (end period)	7.5	8.0	16.8	15.3	18.1	9.4	8.0	8.0	8.0
Export of goods and services (USD) year over year	0.3	2.9	13.1	7.9	12.8	12.7	14.0	12.4	9.7
Import of goods and services (USD) year over year	3.1	-4.8	0.2	4.1	11.3	9.4	8.5	6.6	5.1
Gross Domestic Investment (% of GDP)	38.0	38.4	34.2	35.2	34.3	36.3	38.1	38.6	40.8
Public	17.1	14.4	12.6	11.0	10.0	10.3	10.3	9.4	9.7
Private	20.9	24.1	21.6	24.2	24.3	26.0	27.8	29.2	31.1
External Current Account Balance (% of GDP)	-9.1	-8.0	-6.2	-4.5	-5.5	-4.6	-4.6	-4.0	-3.4
Fiscal Balance, including grants (% of GDP)	-2.3	-3.2	-3.0	-2.5	-2.5	-2.2	-1.9	-1.9	-1.9
Public Debt (% of GDP)	54.3	56.5	59.5	56.8	53.4	52.7	52.0	47.5	43.3

Together with the macro-economic forecasts, the IMF pointed out the vulnerabilities of the program scenario.

In particular, Ethiopia will continue to be vulnerable to external shocks, even under a program scenario. As external vulnerabilities are expected to only improve gradually, shocks in the near term could have adverse effects on growth and stability. Reserves will only rise gradually, while FX rationing is only expected to recede later in the program period as the supply of FX strengthens. In particular, potential shocks due to rising protectionism and weaker-than-expected global growth could negatively affect exports further exacerbating FX and debt vulnerabilities. In addition, climate-related shocks would affect agriculture and hydro-power generation with adverse implications on growth exports, and inflation. Domestic opposition to reforms could increase investor uncertainty and weigh on investment and growth. However, with determined program implementation over the medium term, vulnerabilities are expected to recede gradually even as economic conditions improve. There is, however, a substantial upside risk that envisaged reforms, if implemented faster than expected, would strengthen competitiveness, and spur investment and exports growth. Absent the implementation of reforms, Ethiopia's external vulnerabilities will remain significant even over the medium term.

The announced Reform Program underlying the Plan has been calendarized and put in the complementarity's perspective. It is shown in Figure 56:

Figure 115: Ethiopia- Reform complementarities in Program Design and Sequencing



Source IMF

A particular attention must be devoted to the line n. 5: "Intensify SOE Reform", for the effect that this can have on the major players as investors in the transport arena.

The authorities have started reforming the sector to curb debt levels, limit fiscal risks, improve transparency and oversight, and where appropriate, embark on privatizing these enterprises. In particular, the authorities have:

- **Tightened controls on new debt.** To limit debt accumulation and control fiscal risks, the Ministry of Finance introduced the 2017 Public Debt Management and Guarantee Issuance Directive to tighten controls over the contracting of new debt and limit government guarantees. Further, the authorities instituted a policy of zero new external non concessional borrowing and have sought debt reprofiling on external debt with official bilateral creditors. These efforts have successfully allowed them to rein in borrowing and bring down the public debt-to-GDP ratio.
- **Privatization.** The authorities have embarked on an ambitious privatization program starting with the telecom and sugar sectors, including opening them to competition. Their broader plan is to transform and partially privatize strategic SOEs, fully divest non-strategic SOEs and improve the regulatory environment for SOEs. The partial privatization of Ethio-Telecom and expected issuance of additional licenses are expected to enhance efficiency and improve telecom services.
- **Strengthen governance and management of key SOEs.** In support of the SOE reform, authorities have revised the Public Enterprise Proclamation and established a supervisory authority, PEHAA. The new law, that will establish SOE governance structures and policies, financing, debt management, performance management, transparency and disclosure requirements, is in the approval pipeline.

It must be underlined that these measures are among the Objectives directly targeted by program conditionality. This means that, in case the objective should not be matched, there would be

problems for the payment of the instalments of the Financial support granted by IMF.

In this condition, it appears quite probable that new borrowings of the public company would be limited, and the new infrastructure investments in the transport sector must find also alternative ways of financing.

6.1.3 Vulnerabilities due to Covid 19 outbreak

Starting from January 2020 the world has entered in a totally new experience, the "pandemic".

Among the many complex and combined new trends that are emerging from the event, what will be focused here is the possible impact of the Covid 19 outbreak on the economic perspectives of Ethiopia.

A significant source for this evaluation is the The EIB COVID-19 Economic Vulnerability Index, recently published.

The EIB COVID-19 Vulnerability Index examines three main factors that influence the resilience of economies to the COVID-19 shock:

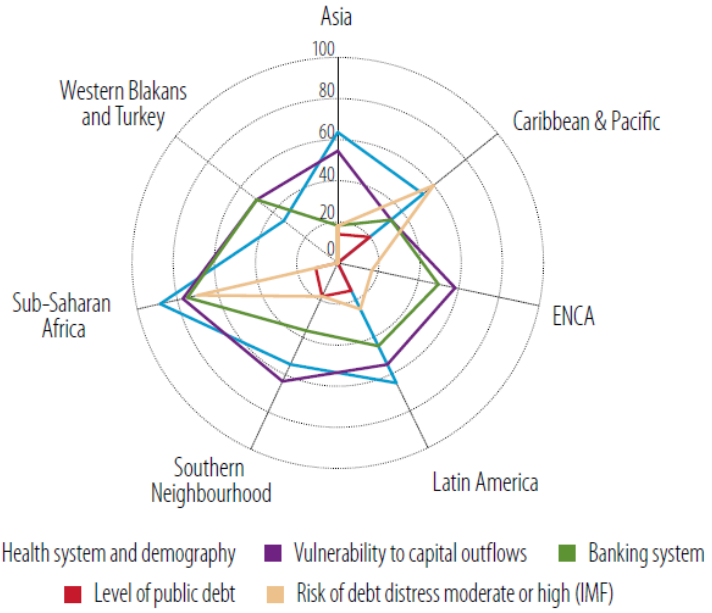
1. **Quality of healthcare and age of the population.** Older societies and poorly functioning healthcare systems often make countries vulnerable to the health impacts of the pandemic.
2. **Structure of the economy**. The variables include integration into global value chains, dependence on exports such as fuels, metals and ores, revenue from tourism, and remittances, or the money people send back to their countries of origin.
3. **Exposure and ability to respond to shocks.** The shocks considered include the reversal of capital flows. Economies with large current account deficits not financed by foreign direct investments have to fund their remaining external financing needs through volatile capital flows, such as portfolio investment. These flows have declined sharply, particularly in developing and emerging markets. Other variables include the ability of countries to implement countercyclical fiscal policies, the strength of the banking sector and its capacity to support the recovery from the crisis.

The report outlines three levels of vulnerability: lowest, intermediate and highest. The levels are relative, meaning that the countries with the lowest vulnerability to the crisis may still suffer from a significant shock if they are badly hit by the virus.

The index shows that the economies of low-income countries are highly vulnerable to the COVID-19 pandemic. Half of low-income countries and 25% of middle-income countries face the highest risk from COVID-19. Unsurprisingly, higher-income countries generally have better coping capacities, even when hit by an unprecedented global shock.

For what concerns Sub-Saharan Africa, the region shows the highest levels of vulnerability, compared with the other low-income regions, for the factors "health system and demography", "vulnerability to capital outflows" and "banking system" (see picture below with percentage of countries in the highest vulnerability group).

Figure 116: Vulnerability of economic system and health sector



Source: *EIB Economics Department. See Annex.*
Note: *Debt distress is based on IMF debt sustainability analyses and is not available for high-income countries.*

Going to the scoring of Ethiopia, the total scoring puts the country in the highest category of vulnerability. The specific factors that bring to this result are the same mentioned for Sub-Saharan Africa, and are in the table below.

Even though the source doesn't provide any specific indication about the vulnerability of the transport system, it is clear that the vulnerability of the general economic conditions of Ethiopia can have negative impact on the transport system development, in particular for the ability of the nation to finance new infrastructure investments and for the close link between GDP development and transport demand evolution. For both these phenomena the Covid 19 vulnerability is taken in account for the projection of the Ethiopia GDP in the master Plan horizon.

Figure 117: The EIB COVID 19 Vulnerability Index

	Economic vulnerability to drop								
	COVID-19 Economic Vulnerability Index	Health system and demography	Global value chains	Tourism	Remittances	Commodity exports	Vulnerability to capital outflows	Fiscl space	Bankcing sector strenght
Eswatini									
Ethiopia									
Fiji									
Gabon									
Gambia, The									

Highest vulnerability | Intermediate vulnerability | Lowest vulnerability | Data missing

6.1.4 Projections of GDP in the period 2020-2049 in the base scenario.

In this paragraph it will be formulated the projection of the GDP in the NTMP horizon with reference to a base scenario, in order to feed, at the end of the present chapter, the assignments of

the future transport demand without any plan implementation.

This base scenario can be considered coincident with the first scenario of chapter 8, the so-called Go-Ahead Scenario.

It is useful to refer to the most recent international Outlooks, in order to focus the magnitude of the external shocks that the economies will receive. In particular it will be examined the World Economic Outlook update of June 2020 of IMF, the Global Economic Prospect of The World Bank Group, also of June 2020 and the last version of the World Economic Outlook of IMF, updated in October 2020.

According to the last version of IMF projections, Global growth is projected at –4.4 percent in 2020. The COVID-19 pandemic has had a more negative impact on activity in the first half of 2020 than anticipated, and the recovery is projected to be more gradual than previously forecast. In 2021 global growth is projected at 5.2 percent. Overall, this would leave 2021 GDP some 6½ percentage points lower than in the pre-COVID-19 projections of January 2020. The adverse impact on low-income households is particularly acute, imperiling the significant progress made in reducing extreme poverty in the world since the 1990s.

In November 2020, for the first time in history, the global debt exceeds the global GDP.

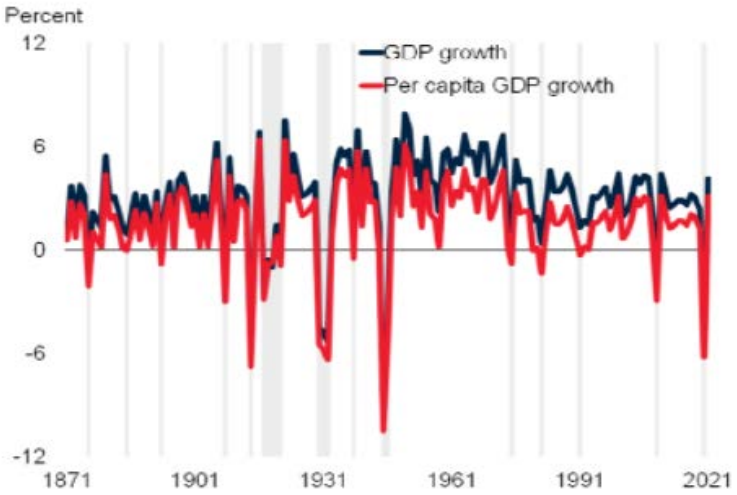
IMF declares that here is a higher-than-usual degree of uncertainty around this forecast. The baseline projection rests on key assumptions about the fallout from the pandemic. In economies with declining infection rates, the slower recovery path in the updated forecast reflects persistent social distancing into the second half of 2020; greater scarring (damage to supply potential) from the larger-than-anticipated hit to activity during the lockdown in the first and second quarters of 2020; and a hit to productivity as surviving businesses ramp up necessary workplace safety and hygiene practices. For economies struggling to control infection rates, a lengthier lockdown will inflict an additional toll on activity.

Mobility remains depressed. Globally, lockdowns were at their most intense and widespread from about mid-March through mid-May. As economies have gradually reopened, mobility has picked up in some areas but generally remains low compared to pre-virus levels, suggesting people are voluntarily reducing exposure to one another. Mobility data from cell phone tracking, for example, indicate that activity in retail, recreation, transit stations, and workplaces remains depressed in most countries, although it appears to be returning to baseline in certain areas. Furthermore, building on the record drop in greenhouse gas emissions during the pandemic, policymakers should both implement their climate change mitigation commitments and work together to scale up equitably designed carbon taxation or equivalent schemes.

The Global Economic Prospect of The World Bank Group provides a broader analysis and focuses more on the developing Countries.

Its global forecast is even more pessimistic. The baseline forecast envisions a 5.2 percent contraction in global GDP in 2020, the deepest global recession in eight decades, despite unprecedented policy support.

Figure 118: Global GDP growth



Per capita incomes in the vast majority of Emerging Markets and Developing Economies (EMDE) are expected to shrink this year. The global recession would be deeper if bringing the pandemic under control took longer than expected, or if financial stress triggered cascading defaults. The pandemic highlights the urgent need for health and economic policy action—including global cooperation—to cushion its consequences, protect vulnerable populations, and improve countries' capacity to prevent and cope with similar events in the future. Since EMDEs are particularly vulnerable, it is critical to strengthen their public health care systems, to address the challenges posed by informality and limited safety nets, and, once the health crisis abates, to undertake reforms that enable strong and sustainable growth.

About Regional Macroeconomic Implications, the rapid rise of COVID-19 cases, together with the wide range of measures to slow the spread of the virus, has slowed economic activity precipitously in many EMDEs. Economic disruptions are likely to be more severe and protracted in those countries with larger domestic outbreaks, greater exposure to international conditions (particularly through exposure to global commodity and financial markets, global value chains, and tourism). Growth forecasts for all regions have been severely downgraded; Latin America and the Caribbean (LAC) and Europe and Central Asia (ECA) in particular have large downgrades partly because of the size of their domestic outbreaks and exposure to global conditions, while South Asia's substantial downgrade is primarily the result of stringent lockdown measures. Many countries have avoided more adverse outcomes through sizable fiscal and monetary policy support measures. Despite these measures, per capita incomes in all EMDE regions are expected to contract in 2020, likely causing many millions to fall back into poverty.

Going to the specific projections for the Low-Income Countries (LIC), whose Ethiopia belongs, World bank makes a forecast of total GDP for the aggregate of LICs of + 1,0% for 2020 and +4,6 for 2021. These forecasts are, respectively, 4,4 points and 0,9 points lower than the previous ones. The forecasts done by IMF for Ethiopia is shown in the next table, where the projection is compared with the one done by IMF ten months earlier and commented in the previous paragraph.

Table 67: Ethiopia GDP projections from different sources

	Actual			Preliminary	Forecast				
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
GDP at Constant Prices (IMF Dec 2019)	8.0	10.2	7.7	9.0	6.2	6.1	7.0	7.5	8.0
GDP at Constant Prices (IMF Oct 2020					1.9	0.0			
Differences from previous projection					-4.3	-6.1			

For 2019/20 the updated projection shows a reduction of 4,3 points on the previous one, and for the following year a further reduction of 6,1 points add to it.

With this new trend there are doubts on the success of the *Homegrown Economic Reform Plan*, as significant variations can be expected in the public deficit and in the ability of the private investors to substitute the role of the public entities. Also, the general targets of stability of the financial sector are at risk.

The hypotheses outstanding the projection are:

- the external shock, caused by the COVID 19 outbreak, will have on the short run consequences in line with the last forecast of IMF;
- the sharp reduction of the development rate will have significant impact on the results expected by the *Homegrown Economic Reform Plan*, in line with the vulnerabilities envisaged by IMF;
- the Ethiopia authorities will take approximately a decade to manage the emergency and to bring the reform plan to perform as originally expected by IMF, also benefiting of the parallel recovery of the global economy.
- In the decade 2030-2039 the economic development continues, but at lower rates, because the Public Budget will not support anymore the internal demand with deficit spending policies, being the cumulated debt arrived to its physiological limit.

The projections are shown in the next table.

Table 68: Ethiopian GDP at constant prices. Actual and Forecast

Year	ET GDP (constant 2010 US bn $)	Year over Year %	CAGR of the period %
2003	14,06	-	
2004	15,97	13,6	
2005	17,86	11,8	
2006	19,8	10,8	
2007	22,06	11,5	
2008	24,44	10,8	
2009	26,6	8,8	11,2
2010	29,93	12,6	
2011	33,28	11,2	
2012	36,16	8,6	
2013	39,98	10,6	
2014	44,09	10,3	10,6
2015	48,67	10,4	
2016	52,56	8	
2017	57,92	10,2	
2018	62,38	7,7	
2019	68	9	9,1
2020	69,29	1,9	
2021	69,29	0	
2022	71,09	2,6	
2023	73,51	3,4	
2024	75,45	4	2.4

Year	ET GDP (constant 2010 US bn $)	Year over Year %	CAGR of the period %
2025	79,5	4	
2026	82,68	4	
2027	85,99	4	
2028	89,43	4	
2029	93,01	4	4
2030	98,59	6	
2031	104,5	6	
2032	110,78	6	
2033	117,42	6	
2034	124,47	6	6
2035	133,18	7	
2036	142,5	7	
2037	152,48	7	
2038	163,15	7	
2039	174,57	7	7
2040	185,04	6	
2041	196,15	6	
2042	207,92	6	
2043	220,39	6	
2044	233,61	6	6
2045	245,29	5	
2046	257,56	5	
2047	270,44	5	
2048	283,96	5	
2049	298,16	5	5

6.2 TRANSPORT DEMAND FACTORS

The issue of the relevant factors affecting transport demand is well known and stabilized in the scientific literature. In this paragraph, after recalling the main affecting factors, some contribution of the recent literature will be summarized, with particular focus on the dynamics observed in the developing countries and in dynamic economies that face the challenge to enter in the group of the medium-low-income countries, as the case of Ethiopia is.

6.2.1 Factors affecting transport demand: findings from the recent literature

The main factors impacting on quantity and quality of the transport demand (both passenger and freight demand) appear to be the following.

Demographics and social structure

Different types of people have different travel demands. Travel, particularly automobile travel, tends to increase with employment and wealth. Walking, cycling and public transport demand tend to be higher for people who are younger, older, poor, have impairments, are immigrants, enjoy exercise, and live-in urban areas. A relevant demographic increase, as in Ethiopia, obviously increase the number of subjects that express a transport demand.

Income

The personal income of the traveler affects hugely its pattern of consumption and the percentage of the income that can be devoted to travel, after have satisfied more basic needs. Its mobility opportunity is then strongly defined by the level of his disposable income. The development of GDP changes substantially the total transport demand.

Prices (Monetary Costs)

Vehicle, road, parking, fuel, insurance and public transport prices tend to affect travel activity. Increased prices for a particular type of travel tends to reduce its consumption and can cause shifts to alternatives.

Economic Activity

Different business activities have special travel demands, including heavy freight transport, local deliveries, service vehicles, business travel, and tourist travel. This type of travel tends to have high value and may require special vehicles, including rail, large trucks and buses, delivery fleets, and air travel.

Transport Options

The quality of transport options affects travel activity. Improving walking and cycling conditions, and public transit service quality, tends to increase use of these modes and reduce automobile travel, although the relationships are complex. For example, some walking and cycling activity may be recreational and not reduce automobile travel. Conversely, in some situations, improving alternative modes may leverage additional motor vehicle travel reductions by helping to create communities where residents own fewer automobiles and drive less overall.

Geography and Land Use Patterns

Land use (also called *urban design*) factors such as density, mix, roadway connectivity, building design and parking supply can affect transport demand. Per capita vehicle ownership and travel tend to be higher in rural and automobile-dependent suburban areas, while walking, cycling and public transit travel tend to be higher in urban areas, particularly those developed prior to 1950, or more recently with transit-oriented or smart growth development policies.

Demand Management Strategies

Transportation demand management (also called *mobility management*) refers to various policies and programs specifically intended to affect travel activity, in most cases, to reduce urban-peak motor vehicle traffic. These strategies include improvements to alternative modes (walking, cycling, public transport, car-sharing, etc.), pricing reforms (as road pricing) and other incentives to reduce vehicle travel, and smart growth land use policies.

Recent literature has contributed to better qualify the demand factors in specific contexts.

A study titled " *The Future of Driving in Developing Countries"* (Ecola, et al. 2014)[34] identified various factors that affect motor vehicle ownership and use, including demographics (the portion of residents who work), incomes, geography (development density and travel distances), vehicle infrastructure (the quality and price of using roads and parking facilities), fuel price, vehicle ownership policies (such as vehicle taxes and registration fees), quality of alternatives to driving, the political influence of domestic oil and vehicle production industries, and the favorability of car culture (whether popular culture, attitudes toward the environment and consumer attitudes, and perceptions) favor automobile travel over other modes.

This analysis framework is used to develop a predictive model of motorization. The results indicate that although motor vehicle ownership and use tend to increase as during a country's period of motorization, as incomes increase from very low to moderate, at high incomes they tend to saturate, and the level of saturation varies significantly depending on geographic factors and public policies. This explains why, for example, per capita vehicle travel has saturated at about 4.000 annual kilometers in Japan, 7.000 annual kilometers in Germany, 10.000 annual kilometers in Australia and 15.000 kilometers in the United States.

Analyzing the 2009 U.S. National Household Travel Survey, Blumenberg and Pierce (2012)[35] identified factors that affect vehicle ownership and passenger travel, including income, age, gender, race-ethnicity, employment status (student, work, retiree, homemaker), children in household, geographic location (density and urban region), vehicle insurance costs and vehicle ownership (as it affects personal travel). The results indicated that as household incomes rise from low to medium levels, vehicle ownership and travel tend to increase proportionately faster than incomes. As household incomes rise from poverty their vehicle ownership tends to increases, but at a declining rate. Vehicle ownership and travel increase for workers and if a household has children, decline with land use density.

Again, about the relationship between income and transport demand, International data indicate that between $3.000 to $10.000 annual income (2002 U.S. dollars), per capita automobile ownership and mileage tend to increase about twice as fast as income growth, but at higher incomes growth rates levels off and eventually saturate (Dargay, Gately and Sommer 2007[36]; Millard-Ball and Schipper 2010[37]).

Dargay (2007) finds asymmetry in these impacts: household vehicle ownership rates increase with employment and incomes but are less likely to decline if employment and incomes are reduced. Kopits and Cropper (2003)[38] find that vehicle ownership rates level off at about $ 16.000 (2003 dollars) per capita annual income. Karlaftis and Golias (2002)[39] find that a household's purchase of its first vehicle is primarily dependent on socioeconomic factors (employment and income), but the

[34] Liisa Ecola, et al. (2014), The Future of Driving in Developing Countries, RAND Institute for Mobility Research

[35] Evelyn Blumenberg and Gregory Pierce (2012), "Automobile Ownership and Travel By The Poor,"Transportation Research Record 2320, Transportation Research Board

[36] Joyce Dargay, Dermot Gately and Martin Sommer (2007), Vehicle Ownership and Income Growth, Worldwide: 1960-2030, New York University

[37] Adam Millard-Ball and Lee Schipper (2010), "Are We Reaching Peak Travel? Trends in Passenger Transport in Eight Industrialized Countries," Transport Reviews, Vol. 30

[38] Elizabeth Kopits and Maureen Cropper (2003), Traffic Fatalities and Economic Growth, World Bank Research Working Paper 3035

[39] Matthew Karlaftis and John Golias (2002), "Automobile Ownership, Households Without Automobiles, and Urban Traffic Parameters: Are They Related," Transportation Research 1792, Transportation Research Board

purchase of additional vehicles depends primarily on local travel conditions. If walking and cycling conditions are poor and driving is faster and cheaper than transit, households tend to own more automobiles. Small and Van Dender (2005 and 2007) [40]found that fuel price rebound effects (increased annual vehicle travel from increased vehicle fuel economy) declines significantly with income.

Glaister and Graham (2002)[41] conclude that the long-run elasticity of vehicle fuel consumption with respect to income is 1.1 to 1.3, and the long-run elasticity of vehicle travel with respect to income is 1.1 to 1.8, with lower short-run values.

Based on their review, Goodwin, Dargay and Hanly (2003)[42] conclude that if real income increases 10%:

- Vehicle ownership and fuel consumption will increase nearly 4% within a year, and over 10% in the longer run.
- Traffic volumes will increase 2% within a year and about 5% in the longer run. Much of the increase in fuel consumption will result from reduced fuel efficiency.
- About air transport demand, major study commissioned by the International Air Transport Association (IATA) concluded that demand for airline services is generally both price and income elastic (Tassew et. Al., 2020)[43]. Different price elasticity associated with different market segments.
- There is a high elasticity for an individual airline or route, since consumers can often choose other carriers, routes and destinations. However, demand is less price elastic for overall air travel. The study identified the following patterns:
- Business travellers tend to be less price elastic than leisure travellers;
- Fare elasticities on short-haul routes were generally higher than on long-haul routes.
- This reflects the opportunity for inter-modal substitution (e.g., travellers can switch to
- rail or automobile);
- The demand elasticity faced by individual air carriers is higher than that faced by the
- whole market;
- Virtually all studies estimate income elasticities to be above one, generally between +1 and +2. This indicates air travel increases with higher incomes.

The elasticity of air travel with respect to ticket price is about -1.0, and fuel costs represent about 10% of total operating costs, so doubling fuel costs or comparable fees would reduce air travel mileage about 10% (Davidson, Wit and Dings 2003)[44].

A relevant contribution is offered by the study *"The Relationship between Road Infrastructure Development and Long-run Economic Growth in Ethiopia: the ARDL Approach"*[45]. The paper explores the economic impacts of the Ethiopian road infrastructure from the year 1981 to 2017. The results show that an increase in paved road infrastructure by 1 percent boosts GDP by 0.376 percent while an increase of 1% in unpaved road infrastructure increases GDP by about 0.231%. Moreover,

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[40] Kenneth Small and Kurt Van Dender (2005), The Effect of Improved Fuel Economy on Vehicle Miles Traveled: Estimating the Rebound Effect Using U.S. State Data, 1966-2001, University of California Energy Institute's (UCEI) Energy Policy and Economics Working Paper Series; Kenneth A. Small and Kurt Van Dender (2007), "Fuel Efficiency and Motor Vehicle Travel: TheDeclining Rebound Effect," Energy Journal, Vol. 28, No. 1, pp. 25-51;

[41] Stephen Glaister and Dan Graham (2002), "The Demand for Automobile Fuel: A Survey of Elasticities," Journal of Transport Economics and Policy, Vol. 36, No. 1, pp. 1-25

[42] Phil Goodwin, Joyce Dargay and Mark Hanly (2003), Elasticities Of Road Traffic And Fuel Consumption With Respect To Price And Income: A Review, ESRC Transport Studies Unit, University College London

[43] Tassew Dufera Tolcha∗, Svein Brathen, Johan Holmgren "Air transport demand and economic development in sub-Saharan Africa:Direction of causality" Journal of Geography 2020

[44] Marc D. Davidson, Ron C.N. Wit, Jos M.W. Dings (2003), Meeting External Costs in the Aviation Industry, Commission for Integrated Transport

[45] Bayissa Badada, Sun Baiqing (2019) "The Relationship between Road Infrastructure Development and Long-run Economic Growth in Ethiopia:The ARDL Approach" School of Management, Department of Management Science and Engineering, Harbin Institute of Technology Harbin, China ICSEB 2019: Proceedings of the 2019 3rd International Conference on Software and e-Business

a 1% rise in road infrastructure spending would boost GDP by 0.93%. It could be due to the country's increased expenditure on road infrastructure and formed an extensive road system since 2009 that offers the chance to cooperate between economically potential sectors, develop electronic businesses, and increase market places. The insight behind this outcome is that a comprehensive and efficient development of road transport infrastructure is crucial to ensuring an economy's effective running, as it is an essential factor to determine the location of economic activities. In addition, the extensiveness and worthiness of road networks significantly influence economic growth. A well-developed road is thus a precondition for the societies to necessary economic activities and services in the country. Hence, the results of the study reveal that the road infrastructure positively influences economic growth with the lag effect of one year. The lag effect indicates that the impact of road infrastructure is not immediate, but seen after years. The empirical findings showed that road infrastructure and economic growth co-integration means that a long-term relationship between them exists. If policy-makers need to maintain economic growth, they may pay close attention to the expansion of road infrastructure in the economy in the longer term.

The long-term perspective and the input to the model

The transport demand factor analysis performed in the previous paragraph paves the ground for the long-term estimates (30 years) that a National Master Plan requires.

Among the different factors discussed, it must be considered that:

- The demography growth is already incorporated inside the GDP projections that have been done in the previous paragraph. The differential impact of the demography on the various States of the FRE will be considered when the model will distribute the aggregated transport demand on the clusters of origins/destinations.
- The price of the different transport services will be considered analytically by the model in comparing the available travel options. So the factors “price” and “transport options” are endogenous at the model.
- The factors “land use” and “demand management strategies”, are part of the recommended policies that will be developed in the Policy Note, and will be reflected in the model more from the supply side, as the new infrastructure stock proposed will be related to the policies;
- The only factors that remain to be considered to build the projection of the aggregate transport demand for the next twenty years are the “Income” and the “economic activities”.

In particular, the growth rate of the projected GDP, discussed in the previous paragraph, reflect also, even implicitly, the contribution that the different economic activities give to the economic growth. Consequently, the sole factor that remains to be evaluated and projected is the one of the transport demand elasticity to GDP growth. All the effects coming from the development of new sectors (as for example Tourism) and the effects coming by the choices of the individuals for their increased disposable income will be incorporated in the elasticity value. This parameter is always the crucial one for the long-term projection. The literature estimates already set an value interval for elasticity to GDP – in broad sense between 1 and 2 -, but doesn’t allow to be more specific. For this reason, the adopted methodology intends to arrive to an estimate to the elasticity values observed in Ethiopia in the recent past, and, starting from it, arriving to a thirthy years projection of this parameter. It will be done in the next paragraph.

6.2.2 The transport demand elasticity to GNP: an estimate of the Ethiopia

To reach an estimate of the transport demand elasticity to GDP in the Ethiopian reality it has been capitalized the historical series data of the Annual average daily traffic by road section, that is available yearly since the year 2002. The road traffic accounts for more than 90% of total transport demand both in passengers and in freight, so in can be used as an excellent proxy of the universe.

In particular, it is useful to estimate the elasticity of transport demand to GDP separately for passengers and for freight.

The methodology adopted is in three steps:

- in step one the aggregates for passengers and freights representing the transport demand are built and their yearly evolution is observed;

in step two this evolution is compared to the parallel evolution of Ethiopia GDP in real terms, to arrive to a first estimate of the elasticity for the whole period examined:

- In step three the analysis is done by sub periods, in order to investigate if there is a trend in the elasticity value.

STEP I - The two aggregates are built aggregating the average daily traffic, as supplied by ERA. The traffic for cars and buses is summed for passengers, while the traffic for trucks and truck-trailers are totalised for freight. The aggregation is done summing up all the transits by road sections in all the roads covered in the year by the official statistics. Obviously, over time new national roads have been built and measurement involves a growing number of kilometres of national roads. This is not a bias of the data, because part of the transport demand is expressed by the transit on the new infrastructures.

The following table 59 shows the annual average daily traffic for the total road sections. The road section where the counting was performed had a length of 12.564 km in 2003, while in 2017 it had reached 21.749 km. The two series of passengers and freights are very similar, both for magnitude and for evolution. The composed average annual growth rate of the transport demand has been of 12,.02% for freights and 11,62% for passengers.

Table 69: Annual average daily traffic for the total road sections and length of the road sections

Year	Length	ETHIOPIA	
		ET Freight	ET Passenger
2003	12,564	41,793	37,573
2004	13,332	44,511	39,614
2005	14,073	50,837	43,357
2006	13,659	55,084	48,296
2007	14,241	65,680	58,943
2008	14,241	69,799	65,498
2009	14,241	88,882	77,448
2010	14,241	91,102	83,712
2011	16,516	112,712	101,736
2012	16,516	113,806	98,897
2013	16,516	125,060	108,087
2014	16,516	126,342	108,106
2015	16,516	130,416	111,339
2016	20,732	167,032	145,454
2017	21,764	204,651	175,028
GA GR		**12.02 %**	**11.62 %**

STEP II – The series of Ethiopia GDP at constant prices (therefore cleaned from the effect of monetary inflation) is the one of source The World Bank. It is expressed in Billions USD at constant 2010 prices.

Table 70: Ethiopia Gross Domestic product at constant 2010 USD Billions

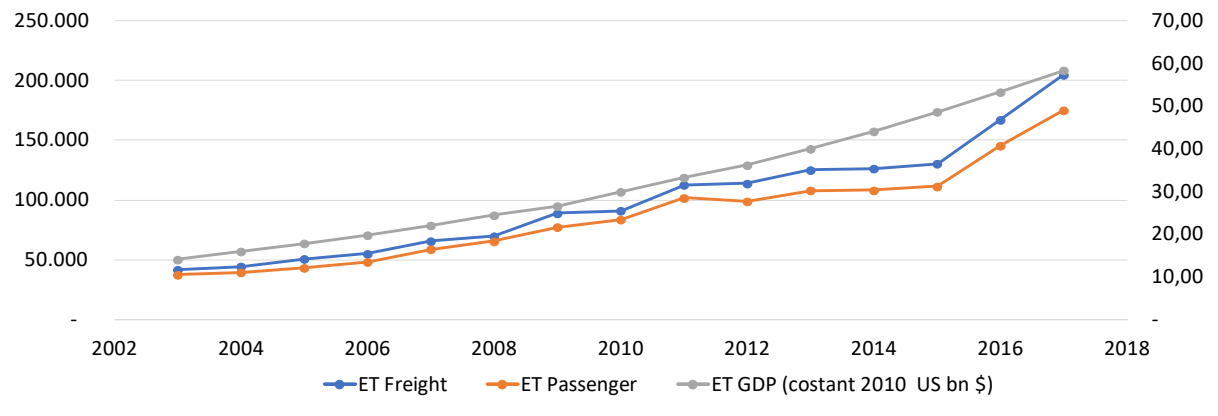
Year	ET cop (constant 2010 US bn $)
2003	14,06
2004	15,97
2005	17,86
2006	19,80
2007	22,06
2008	24,44
2009	26,60
2010	29,93

Year	ET cop (constant 2010 US bn $)
2011	33,28
2012	36,16
2013	39,98
2014	44,09
2015	48,67
2016	53,26
2017	58,35
GA GR	**10.70 %**

As it can be seen, the average growth rate is 10,7%, very similar to the one of the transport demand for passengers and for freights.

If it is considered the yearly increases of the curves (graph 5.1), we see that the profiles are more similar in the long run than in the short run. This is perfectly logic and described in the literature: after the stimulus coming from a GDP growth, it is necessary to adequate the stock of capital to produce the transport services, and it takes time. In particular, the vehicle stock is almost totally dependent from imports, and then from the availability of foreign currency, while the roads stock needs to be increased by new constructions, with the required time.

Figure 119: GDP and Transport Demand



It can be noticed that both in the period 2003-2009 and in the period 2011-2017 the transport demand remains detached from GDP growth, and then recuperates progressively the level of the GDP. The freight demand shows to be more "resilient" than the passengers one. This can be explained by the fact that in presence of bottlenecks of the offer, a part of the privates that express the passengers demand can be discouraged, while in the freight sector the transport is an essential input for the production and commercialisation, and then the demand expressed by the companies is available to suffer any level of service misfit, just to succeed in making the transport.

The estimate of the elasticity (η) of the freight transport demand to the GDP is for the fifteen years examined brings to a value of 1,12, while the elasticity of passengers is 1,09 (see tab.3)

Table 71: Elasticity of freights and passengers transport demand to GDP – fifteen years average

Year	ɳ Freight (15 years)	ɳ Passenger (15 years)
2003	1.12	1.09
2004		
2005		
2006		
2007		
2008		
2009		
2010		

Year	ɳ Freight (15 years)	ɳ Passenger (15 years)
2011		
2012		
2013		
2014		
2015		
2016		
2017		

STEP III- final step is required to check if it is possible to find a trend in the elasticity in association of a growing GDP. It is envisaged in the literature described in paragraph 5.2.1 that the elasticity tend to grow till the personal income reaches a threshold of around 10.000 USD, and then tend to decline. Ethiopia is still very far from this average level of income, so the expectation is of a growing elasticity.

To verify the existence of a trend the fifteen years period has been divided in three sub-period of 5 years. The results are shown in Table 62

Table 72: Elasticity of freights and passengers transport demand to GDP – five years average

Year	ɳ Freight (5 years)	ɳ Passenger (5 years)
2003	1.00	1.00
2004		
2005		
2006		
2007		
2008	1.26	1.06
2009		
2010		
2011		
2012		
2013	1.32	1.29
2014		
2015		
2016		
2017		

The estimates are in line with the literature predictions: although not supported by an historical series long enough to be statistically robust, it is observed a growing trend.

A similar trend is observed again for freights and passengers (respectively from 1 in the period 2003-2007 to 1,32 in the period 2013-2017 and from 1 to 1,29). This similarity strengthens the significance of the result.

The projection of the elasticity value in the thirty years horizon poses a serious issue of approach:

- on one side it can be observed a growing trend,
- on the other side to project a trend not statistically robust in a thirty years horizon would be an hazard.

A further aspect is that in presence of a higher level of elasticity, the risk that the offer is not able to satisfy the demand grows significantly, also for the dependence from the import of the vehicles. The final effect could be a difficult growth of the elasticity parameter.

It is then necessary a prudent approach, that is to consider the average fifteen years value of elasticity (1,12 for freight and 1,09 for passengers) and use them for all the planning period.

6.2.3 The transport demand projections in the period 2020-2049 in the base scenario

In Paragraph 6,1 it has been examined the recent economic growth and the projections of it for the

Master plan Horizon for the base scenario have been proposed. Then, in the three previous paragraphs the recent history of the transport demand has been analysed, in particular with the reference to its relationship with economic growth.

There are now all the necessary elements to draw a projection of the transport demand trend in the next thirty years, as a relevant input to the transport model.

The average annual development rate of the GDP at constant prices will be multiplied by the Transport demand elasticity to GDP to obtain the average annual development rate of the transport demand, that is what is needed as an input for the model.

The table below shows the result of the projections

Table 73: Freight transport demand – Year over year variation in the period 2020-2049

Year	GDP Year Over Year (%)	ɳ Freight	Freight Transport demand Year over Year (%)
2020			
2021			
2022			
2023			
2024	2,4	1,12	2,69
2025			
2026			
2027			
2028			
2029	4	1,12	4,48
2030			
2031			
2032			
2033			
2034	6	1,12	6,72
2035			
2036			
2037			
2038			
2039	7	1,12	7,84
2040			
2041			
2042			
2043			
2044	6	1,12	6,72
2045			
2046			
2047			
2048			
2049	5	1,12	5,6

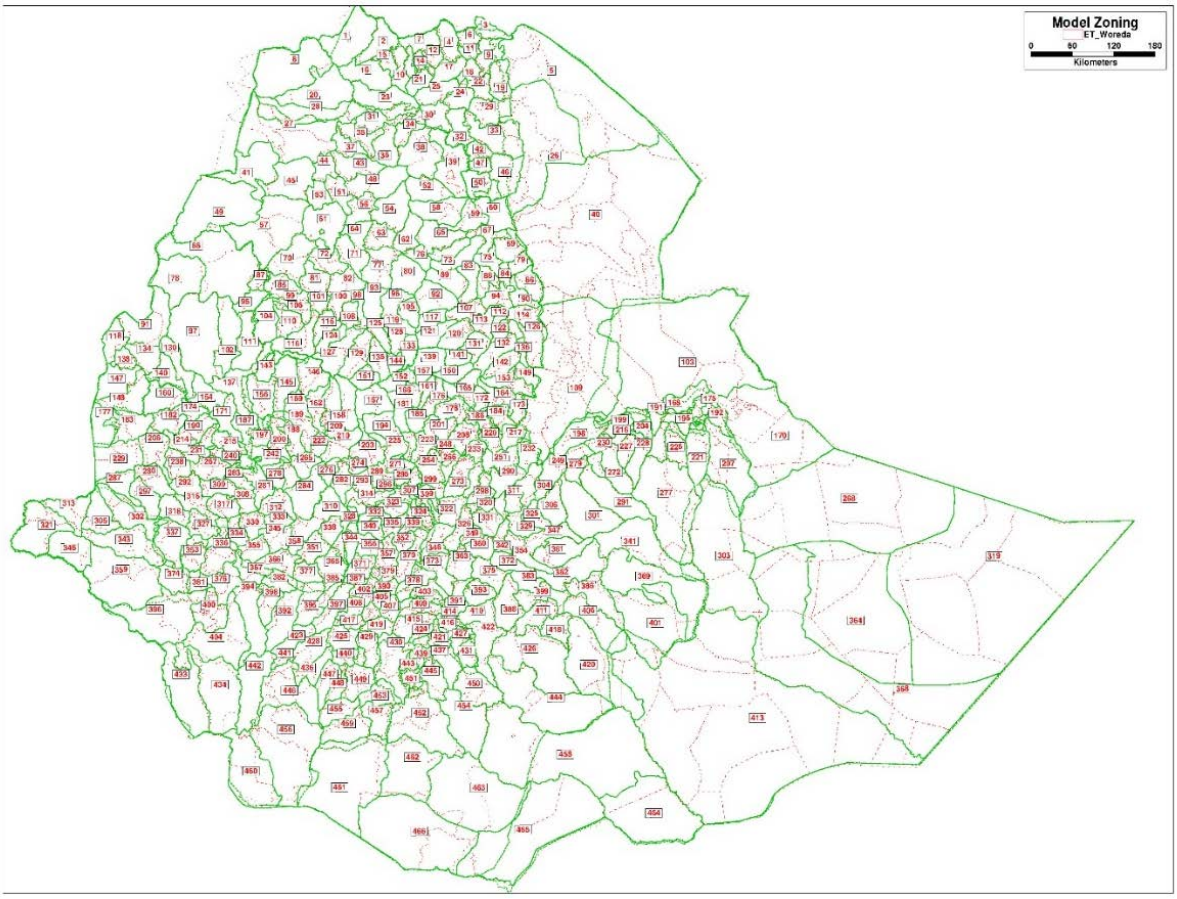
Table 74: Passengers transport demand – Year over year variation in the period 2020-2049

Year	GDP Year Over Year (%)	ɳ Passenger	Passengers Transport demand Year over Year (%)
2020			
2021			
2022			
2023			
2024	2,4	1,09	2,62
2025			
2026			
2027			
2028			
2029	4	1,09	4,36
2030			
2031			
2032			
2033			
2034	6	1,09	6,54
2035			
2036			
2037			
2038			
2039	7	1,09	7,63
2040			
2041			
2042			
2043			
2044	6	1,09	6,54
2045			
2046			
2047			
2048			
2049	5	1,09	5,45

6.3 FUTURE TRANSPORT DEMAND MATRICES

The Present Transport Model (PTM) has been calibrated in Chapter 3, using the present freight, passengers and vehicle Origin/Destination Matrix and a detailed zoning of Ethiopia territory at woreda level, as shown in the following figure, with each zone ID numbering.

Figure 120: Model Zoning



In order to build the Future Transport Model at different horizons (2025, 2035 and 2050), different socio-economic and territorial development foreseen in the short and medium-long term have been considered, increasing or decreasing the average traffic demand growth calculated in the preceding paragraph. A specific traffic demand growth factor has been calculated for each woreda, in accordance with its foreseen territorial development, building new Future Origin/Destination Matrix for freight, passengers and vehicles at the different time horizons considered.

In this way the future transport demand will be integrated with the future need of mobility for passengers, freight and vehicles. To expand the traffic demand matrices to the future, the Consultant has taken into consideration the different territorial socio-economic developments foreseen, in terms of urban, population, industrial, agricultural, mining, tourist and trade development foreseen.

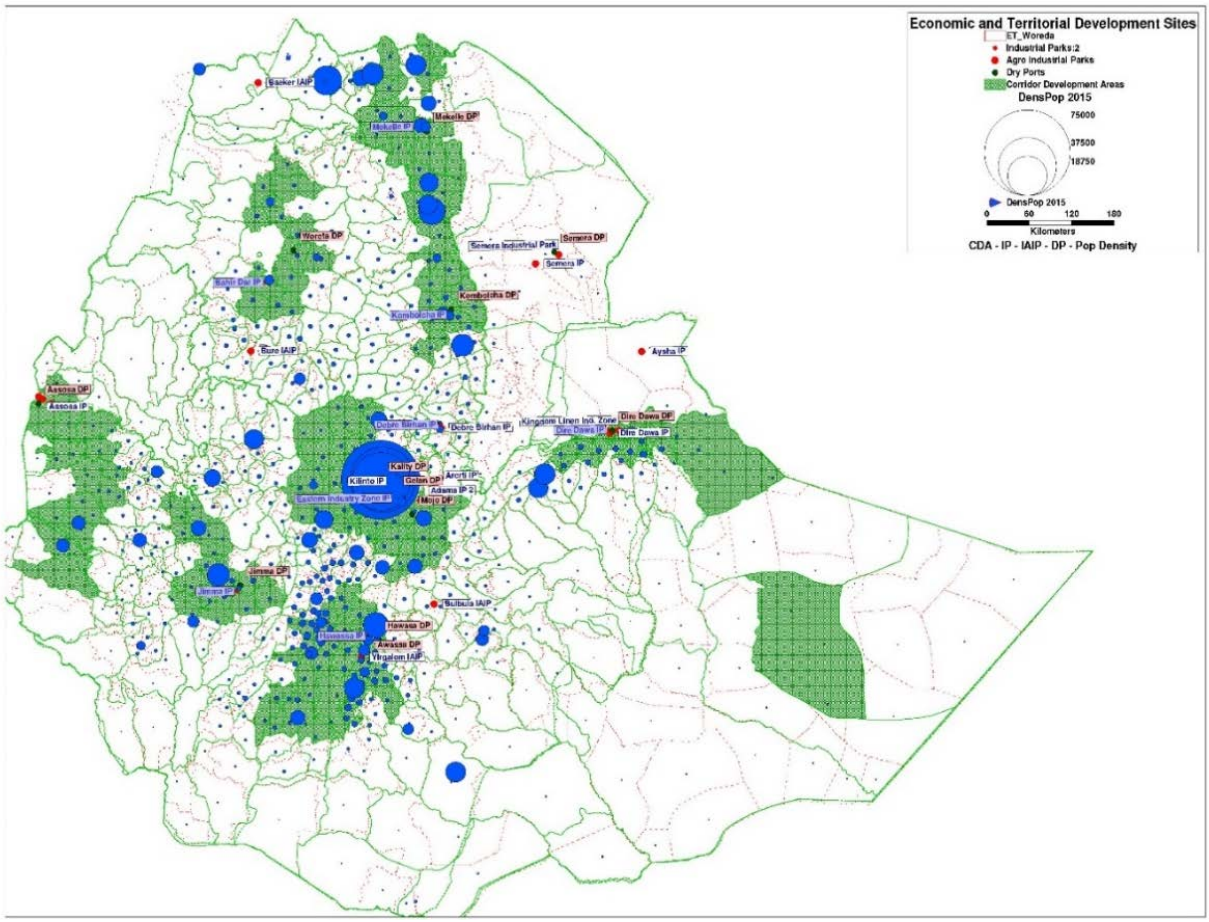
Following are the considerations made for each territorial development aspects considered.

6.3.1 Urban development & population density areas

As shown in paragraph 4.9, the spatial planning of the country will enhance urbanization and industrial development in strategic development corridors, like Mekele-Kombolcha industrial corridor, Jimma agricultural corridor, Gambela export corridor, DireDawa-Jijjiga trade corridor, Lake Tana agricultural area, Hawassa economic corridor, Degehabur-Kebridehar pastoralist corridor and Addis Ababa and surrounding towns development area.

The following figure show the location of areas with more than 1,000 inhabitants per sq. km, that are to be considered as urban areas with high potential for development and attracting and generating additional traffic demand and the location of the spatial development areas where industrial and agro-industrial areas are concentrated.

Figure 121: Economic development areas

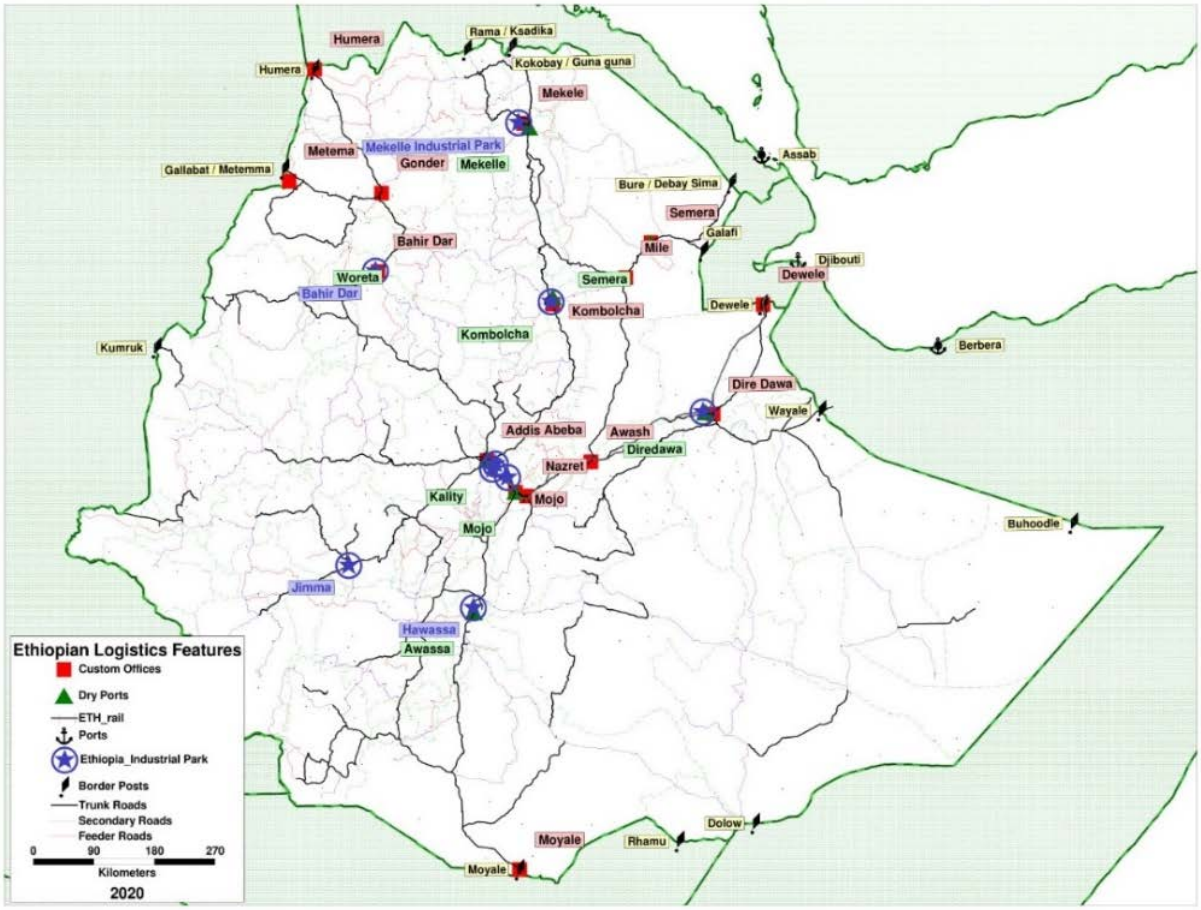


Belonging to a development corridor, the woreda is estimated to generate/attract a surplus of transport demand of 25% annually on the base demand growth, both for passengers and freight. At the same time the dynamic of progressive urbanization in Ethiopia will concentrate transport demand in urban areas with a surplus increase of 50% for passengers and 30% for freight.

6.3.2 1.1.2 Industrial Parks & Logistics

According with paragraph 4.5 a number of industrial parks and agro-industrial parks are programmed in different parts of the country, together with additional dry ports to serve for related import/export products. The location of these parks will generate/attract a surplus of transport demand of 25% annually for freight and 10% annually for passengers.

Figure 122: Industrial Parks



6.3.3 Agricultural surplus production & Agro-centres

On the base of the Agricultural Growth Program (AGP) shown in paragraph 4.4, the foreseen surplus crop areas and agro-centers of the country are shown in the following figures. Belonging to a crop surplus area, the woreda is estimated to generate/attract a surplus of transport demand of 1% annually for passengers and of 15% for freight. At the same time the location of agro-centers will increase by 2% the passenger demand and 25% the freight demand.

Figure 123: Agricultural surplus areas

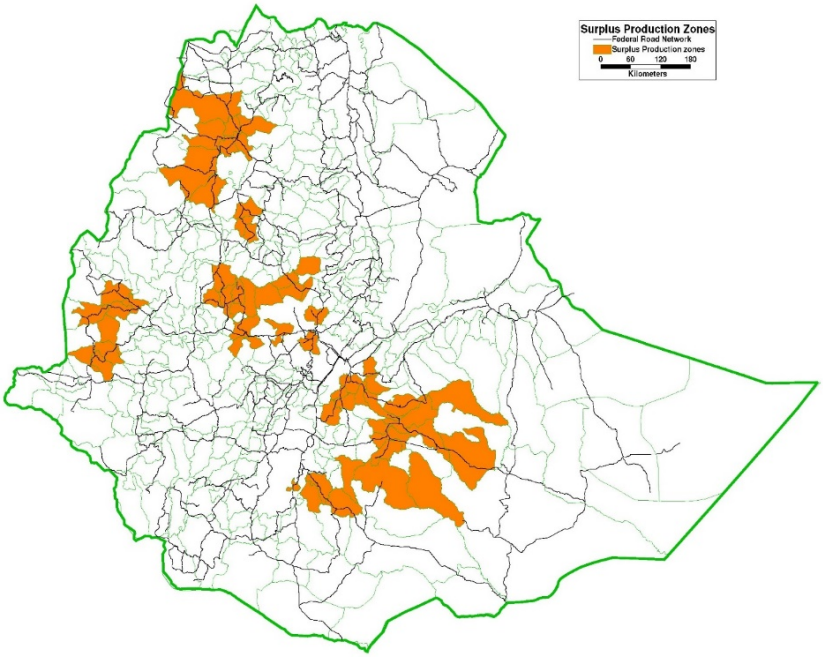
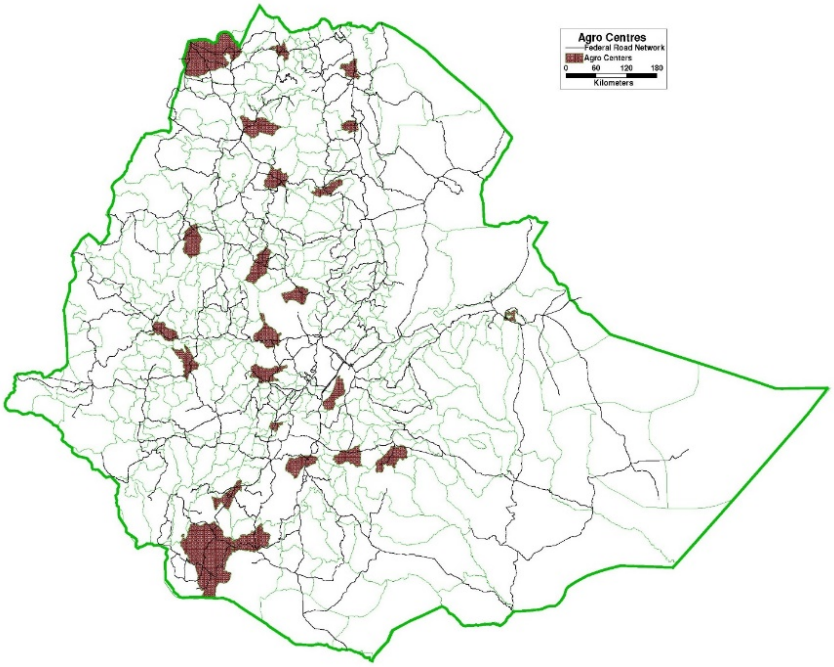


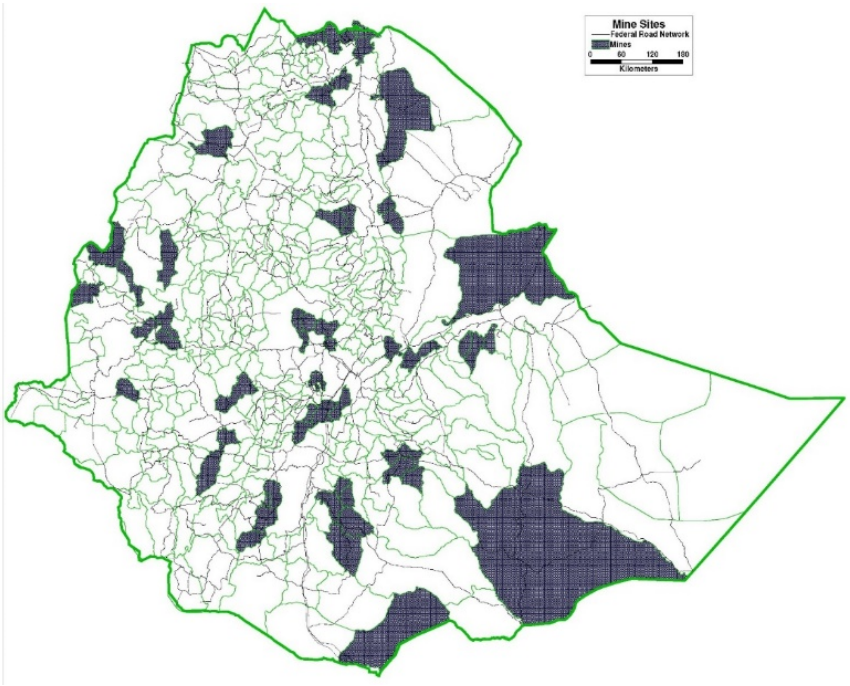
Figure 124: Agricultural Centres



6.3.4 Mining sites

In consideration of the mining development described in paragraph 4.7 and the location of mining sites shown in the following figure, the areas with mining potential have been received a surplus of 1% for passengers and 25% for freight demand.

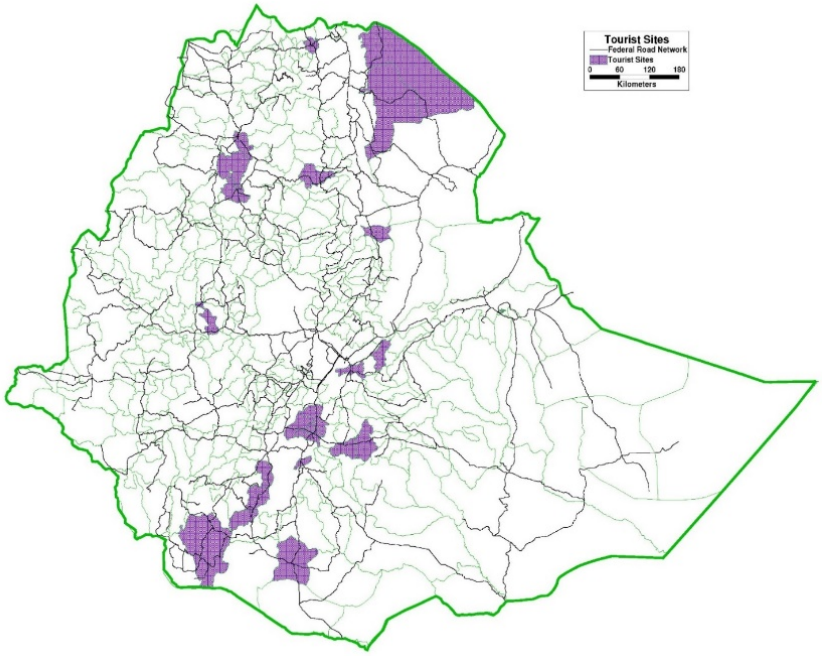
Figure 125: Mining sites



6.3.5 Tourist sites

In consideration of the tourist development areas of the country, described in paragraph 4.8 and shown in the following figure, the areas with tourist potential have been received a surplus of 5% for passengers transport demand.

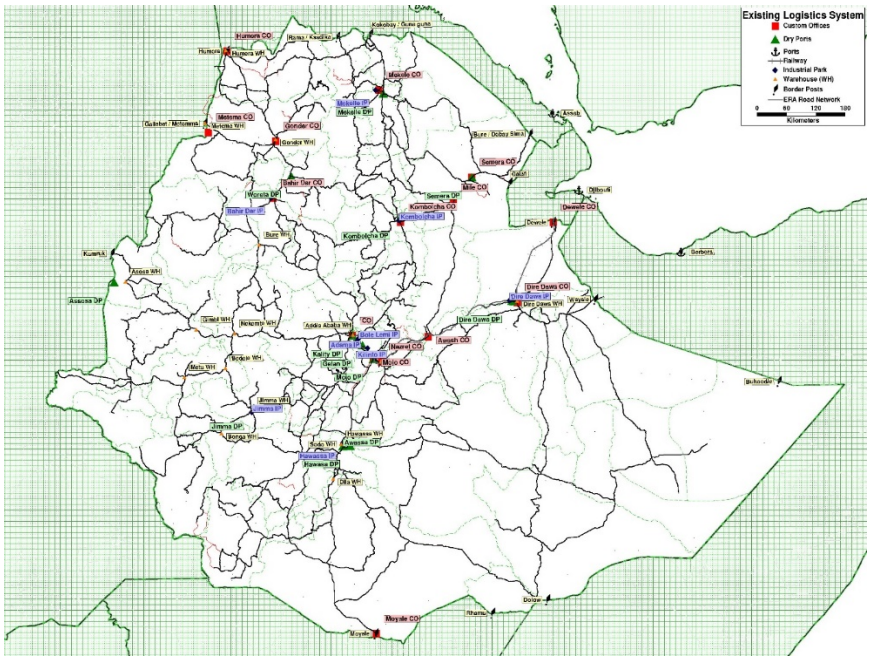
Figure 126: Tourist Areas



6.3.6 Trade centres

The regional transit corridors are the main access to international trade of the country and are to be considered, together with custom areas and dry ports as main generating/attraction poles. (see paragraph 2.5) the woreda that are located in border crossing and custom areas have been given a 20% surplus of freight transport demand.

Figure 127: Logistic System



The following table show the number of woredas where there is a specific development foreseen and the kind of surplus growth attributed.

Table 75: Presence of socio-economic development factors in the woredas

Incremental Growth Factors	Passengers		Freight	
	Surplus factor	Numb. of zones	Delta factor	Numb. of zones
Base Zones	negative	87	negative	87
Corridor Development	positive	159	positive	159
Urbanization	positive	52	positive	52
Industrial & Agro-Industr.	positive	15	positive	15
Crop Surplus Production	positive	58	positive	58
Agro Centres	positive	22	positive	22
Mines	positive	54	positive	54
Tourist Site	positive	26	nul	26
Internat. Trade	nul	14	positive	14

Finally, the table below reports for each woreda the kind of development included:

Table 76: Woredas with sustained transport generation/attraction growth

ID	Region	Zones	WOREDA	Corridor Develop.	Urbanization	Industrial & Agro Ind. Parks	Crop Surplus - tons	Agro-centres	Mines	Tourist Sites	International Trade
1	Tigray	Western	Tahtay Adiabo								
2	Tigray	Western	Laelay Adiabo								
3	Tigray	Eastern	Erob	Mekelle UA					MINE		
4	Tigray	Central	Adi Ahferom	Mekelle UA					MINE		
6	Tigray	Eastern	Gulo Mekheda						MINE		
7	Tigray	Central	Mereb Lekhe						MINE		
8	Tigray	Western	Kafta-Humera		Humera	IAIP_Baeker		Humera			Humera CO
9	Tigray	Eastern	Saesie-Tsaedaem	Mekelle UA					MINE		
11	Tigray	Eastern	Ganta Afe Shum	Mekelle UA	Adi Girat Town						
12	Tigray	Central	Adwa	Mekelle UA	Adwa Town					Aksum	
14	Tigray	Central	Laelay Maichew		Akisum Town						
15	Tigray	Western	Tahtay Koraro		Shire EnidanSilase						
16	Tigray	Western	Asgede-Tsimbila								
17	Tigray	Central	Werii Lekhe	Mekelle UA							
18	Tigray	Eastern	Hawzien	Mekelle UA							
19	Tigray	Eastern	Atsbi-Wenberta	Mekelle UA							
20	Tigray	Western	Wolkait								
22	Tigray	Eastern	Wukro	Mekelle UA	Wekere Town			Wukro			
23	Tigray	Western	Tselemti								
24	Tigray	Central	Degua Tembien	Mekelle UA					MINE		
25	Tigray	Central	Kolla Tembien	Mekelle UA	Abiyi Adi Town						
28	Tigray	Western	Tsegedie								
29	Tigray	Southern	Enderta	Mekelle UA	Mekelle Town	IP_Mekelle + Mekelle DP					Mekele CO
30	Tigray	Central	Abergelle	Mekelle UA					MINE		
32	Tigray	Southern	Samre-Seharti	Mekelle UA							
33	Tigray	Southern	Hintalo-Wajirat	Mekelle UA							
42	Tigray	Southern	Alajie	Mekelle UA							
46	Tigray	Southern	Raya Azebo	Mekelle UA							
47	Tigray	Southern	Enda Mekhoni	Mekelle UA	Maychew Town			Maychew			
50	Tigray	Southern	Ofla	Mekelle UA	Korem Town						
55	Tigray	Southern	Alamata	Mekelle UA	Alamata Town						
309	Southern Region	Gurage	Soddo	Addia Abab					MINE		
314	Southern Region	Gurage	Gorro					Tumi			
315	Southern Region	Gurage	Kokir Gedebano	Addia Ababa UA							
332	Southern Region	Gurage	Cheha		Welkite Town						
336	Southern Region	Keficho Shekich	Gesha								

ID	Region	Zones	WOREDA	Corridor Develop.	Urbanization	Industrial & Agro Ind. Parks	Crop Surplus - tons	Agro-centres	Mines	Tourist Sites	International Trade
339	Southern Region	Gurage	Silti		Butajira Town						
350	Southern Region	Gurage	Lanfaro						MINE		
353	Southern Region	Keficho Shekich	Masha Anderacha								
367	Southern Region	Keficho Shekich	Gimbo	Jimma UA							
370	Southern Region	Kembata Alaba T	Alaba	Hawassa Southern					MINE		
371	Southern Region	Hadiya	Soro		Hoaena Town						
376	Southern Region	Keficho Shekich	Chena								
379	Southern Region	Kembata Alaba T	Kedida Gamela	Hawassa Southern							
380	Southern Region	Kembata Alaba T	Angacha					Hosaina			
382	Southern Region	Keficho Shekich	Menjiwo	Jimma UA							
390	Southern Region	Hadiya	Badawoch	Hawassa Southern	Kedida Town						
392	Southern Region	Semen Omo	Ela						MINE		
396	Southern Region	Bench Maji	Sheko								
398	Southern Region	Keficho Shekich	Tello		Bonga Town						
400	Southern Region	Bench Maji	Bench		Miza Aman Town						
402	Southern Region	Semen Omo	Boloso Sorie	Hawassa Southern							
403	Southern Region	Sidama	Awassa	Hawassa Southern	Shashemene Town					Hawassa	
405	Southern Region	Semen Omo	Damot Gale	Hawassa Southern							
407	Southern Region	Semen Omo	Damot Weidie	Hawassa Southern							
409	Southern Region	Sidama	Shebedino	Hawassa Southern	Shebediro Town						
412	Southern Region	Semen Omo	Sodo Zuria	Hawassa Southern	Sodo Town						
415	Southern Region	Sidama	Dale	Hawassa Southern				Dila			
416	Southern Region	Sidama	Arbegona								
417	Southern Region	Semen Omo	Offa	Hawassa Southern							
419	Southern Region	Semen Omo	Humbo	Hawassa Southern							
421	Southern Region	Sidama	Hula	Hawassa Southern							
423	Southern Region	Semen Omo	Melekozza								
424	Southern Region	Sidama	Aleta Wondo	Hawassa Southern						Yrgalem	
425	Southern Region	Semen Omo	Kucha								
427	Southern Region	Sidama	Bensa						MINE		
428	Southern Region	Semen Omo	Gofa Zuria								
429	Southern Region	Semen Omo	Boreda Abaya	Hawassa Southern					MINE	Rift Valley Lakes 1	
431	Southern Region	Sidama	Aroresa						MINE		
432	Southern Region	Sidama	Yirga Dera	Hawassa Southern	Aleta Wonda Town						
435	Southern Region	Gedeo	Wenago	Hawassa Southern	Dila Town						
436	Southern Region	Semen Omo	Zala Abamale					Sawla			
438	Southern Region	Semen Omo	Chencha	Hawassa Southern					MINE		
439	Southern Region	Gedeo	Bule	Hawassa Southern							
440	Southern Region	Semen Omo	Deta Daramalo	Hawassa Southern							

ID	Region	Zones	WOREDA	Corridor Develop.	Urbanization	Industrial & Agro Ind. Parks	Crop Surplus - tons	Agro-centres	Mines	Tourist Sites	International Trade
441	Southern Region	Semen Omo	Basketo								
442	Southern Region	Debub Omo	Silamago								
443	Southern Region	Gedeo	Yirga Chefe	Hawassa Southern			150,000				
446	Southern Region	Debub Omo	Bako Gazer					Jinka			
447	Southern Region	Semen Omo	Kemba	Hawassa Southern							
448	Southern Region	Semen Omo	Bonkie	Hawassa Southern							
449	Southern Region	Semen Omo	Arbaminch Zuria	Hawassa Southern	Abra Minch Town				MINE	Chamo Lake	
451	Southern Region	Gedeo	Kocherie	Hawassa Southern							
453	Southern Region	Amaro	Amaro	Hawassa Southern							
455	Southern Region	Derashie	Derashie						MINE	Riflt Valley Lakes 2	
456	Southern Region	Debub Omo	Hamer Bena							Omo and Mago Natinal Pakks	
459	Southern Region	Konso	Konso					Konso			
460	Southern Region	Debub Omo	Kuraz								
103	Somali Region	Shinile							MINE		Dewele CO
170	Somali Region	Jigjiga		Dire Dawa UA							
364	Somali Region	Korahe		Dega Habour							
413	Somali Region	Afder							MINE		
139	Oromia	North Shoa	Dera				undefined				
143	Oromia	East Welega	Ebantu								
145	Oromia	East Welega	Gida Kiremu								
146	Oromia	East Welega	Amuru Jarte				150,000,00				
152	Oromia	North Shoa	Were Jarso	Addia Ababa UA			150,000,00				
156	Oromia	East Welega	Limu								
157	Oromia	North Shoa	Hidebu Abote	Addia Ababa UA							
158	Oromia	East Welega	Guduru				150,000				
159	Oromia	East Welega	Abay Chomen				150,000				
160	Oromia	West Welega	Menesibu	Gambella UA			150,000				
161	Oromia	North Shoa	Degem	Addia Ababa UA			150,000				
162	Oromia	East Welega	Jimma Horo		Shambu Town		150,000				
163	Oromia	North Shoa	Girar Jarso	Addia Ababa UA	Fiche Town						
166	Oromia	North Shoa	Kuyu	Addia Ababa UA			150,000	Gabre Guracha			
167	Oromia	West Shoa	Ginde Beret	Addia Ababa UA			undefined				
169	Oromia	East Welega	Abe Dongoro				150,000				
174	Oromia	West Welega	Nejo				150,000				
175	Oromia	East Harergie	Jarso (2)	Dire Dawa UA							
176	Oromia	North Shoa	Yayagulelena De	Addia Ababa UA							
179	Oromia	East Harergie	Kombelcha	Dire Dawa UA							

ID	Region	Zones	WOREDA	Corridor Develop.	Urbanization	Industrial & Agro Ind. Parks	Crop Surplus - tons	Agro-centres	Mines	Tourist Sites	International Trade
181	Oromia	West Shoa	Meta Robi	Addia Ababa UA					MINE		
182	Oromia	West Welega	Jarso (1)	Gambella UA			150,000				
183	Oromia	West Welega	Begi (2)	Gambella UA			800,000				
185	Oromia	West Shoa	Adaa Berga	Addia Ababa UA					MINE		
188	Oromia	East Welega	Sibu Sire							Oromiya National Park	
189	Oromia	East Welega	Billa Seyou								
190	Oromia	West Welega	Boji						MINE		
191	Oromia	East Harergie	Metta	Dire Dawa UA							
192	Oromia	East Harergie	Gursum	Dire Dawa UA							
193	Oromia	East Harergie	Gorro Gutto	Dire Dawa UA							
194	Oromia	West Shoa	Jeldu	Addia Ababa UA							
195	Oromia	East Harergie	Kersa	Dire Dawa UA							
196	Oromia	East Harergie	Haremaya	Dire Dawa UA							
197	Oromia	East Welega	Sasiga								
198	Oromia	West Harergie	Miesso								
199	Oromia	West Harergie	Dobba	Dire Dawa UA							
200	Oromia	East Welega	Guto Wayu		Nekemte Town						
201	Oromia	North Shoa	Mulona Sululta				undefined		MINE		
203	Oromia	West Shoa	Ambo	Addia Ababa UA	Ambo Town			Ambo			
204	Oromia	East Harergie	Deder	Dire Dawa UA							
206	Oromia	West Welega	Gawo Dale	Gambella UA			800,000				
207	Oromia	East Harergie	Babile								
208	Oromia	North Shoa	Berehna Aletu		Sendafa Town						
209	Oromia	East Welega	Jimma Rare								
210	Oromia	West Shoa	Chelia				300,000				
212	Oromia	East Harergie	Kurfa Chele	Dire Dawa UA							
213	Oromia	East Harergie	Bedeno						MINE		
214	Oromia	West Welega	Aira Guliso	Gambella UA							
215	Oromia	West Welega	Gimbi		Gimbi Town			Gimbi	MINE		
216	Oromia	West Harergie	Tullo	Dire Dawa UA							
221	Oromia	East Harergie	Fedis								
222	Oromia	West Shoa	Bako Tibe								
223	Oromia	West Shoa	Welmera	Addia Ababa UA	Holeta Town						
224	Oromia	West Shoa	Ejere	Addia Ababa UA					MINE		
225	Oromia	West Shoa	Dendi	Addia Ababa UA			undefined				
226	Oromia	East Harergie	Girawa								
227	Oromia	West Harergie	Messela						MINE		
228	Oromia	East Harergie	Melka Bello						MINE		

ID	Region	Zones	WOREDA	Corridor Develop.	Urbanization	Industrial & Agro Ind. Parks	Crop Surplus - tons	Agro-centres	Mines	Tourist Sites	International Trade
230	Oromia	West Harergie	Chiro		Chiro Bedesa Town						
232	Oromia	East Shoa	Fentale						MINE		
233	Oromia	East Shoa	Gimbichu								
238	Oromia	West Welega	Dale Lalo	Gambella UA							
242	Oromia	East Welega	Diga Leka								
249	Oromia	West Harergie	Guba Korcha		Bedesa Town				MINE		Awash CO
264	Oromia	West Shoa	Alem Gana	Addia Ababa UA			150,000				
265	Oromia	East Welega	Wama Boneya								
266	Oromia	East Shoa	Akaki	Addia Ababa UA		Kilinto IP					
271	Oromia	West Shoa	Dawo	Addia Ababa UA							
272	Oromia	West Harergie	Kunni								
273	Oromia	East Shoa	Adaa Chukala	Addia Ababa UA	Bishoftu Town	Adama IP Adma I Park 2 + Eastern Ind. Zone					
274	Oromia	West Shoa	Tikur	Addia Ababa UA			300,000				
275	Oromia	West Shoa	Illu	Addia Ababa UA							
276	Oromia	West Shoa	Dano				undefined				
277	Oromia	East Harergie	Gelo Odana Meyo								
278	Oromia	East Welega	Jimma Arjo								
279	Oromia	West Harergie	Habro								
280	Oromia	West Welega	Hawa Welel	Gambella UA			800,000				
281	Oromia	Illu-Aba-Borra	Bedele	Jimma UA				Bedele			
283	Oromia	Illu-Aba-Borra	Dega	Jimma UA							
284	Oromia	Jimma	Limu Seka								
285	Oromia	East Welega	Nunu Kumba								
286	Oromia	East Shoa	Lomie	Addia Ababa UA		Modjo DP					Mojo CO
287	Oromia	West Welega	Anfilo	Gambella UA			150,000				
288	Oromia	Arsi	Merti							Fentale	
289	Oromia	West Shoa	Wenchi	Addia Ababa UA							
290	Oromia	East Shoa	Boset	Addia Ababa UA							
291	Oromia	West Harergie	Bokie								
292	Oromia	Illu-Aba-Borra	Darimu								
293	Oromia	West Shoa	Ameya	Addia Ababa UA							
294	Oromia	West Shoa	Tolle	Addia Ababa UA							
295	Oromia	West Shoa	Becho	Addia Ababa UA							
296	Oromia	West Shoa	Welisona Gorro	Addia Ababa UA	Welise Town						
297	Oromia	West Welega	Seyo	Gambella UA	Dembi Dolo Town		800,000				
298	Oromia	East Shoa	Adama	Addia Ababa UA	Adama Town						Nazaret CO
299	Oromia	West Shoa	Kersana Kondelt	Addia Ababa UA							

ID	Region	Zones	WOREDA	Corridor Develop.	Urbanization	Industrial & Agro Ind. Parks	Crop Surplus - tons	Agro-centres	Mines	Tourist Sites	International Trade
301	Oromia	West Harergie	Daro Lebbu								
304	Oromia	Arsi	Aseko								
306	Oromia	Arsi	Golelcha								
307	Oromia	West Shoa	Kokir	Addia Ababa UA							
308	Oromia	Illu-Aba-Borra	Chora	Jimma UA							
310	Oromia	Jimma	Limu Kosa						MINE		
311	Oromia	Arsi	Jeju				200,000				
312	Oromia	Illu-Aba-Borra	Gechi	Jimma UA							
316	Oromia	Illu-Aba-Borra	Metu		Metu Town						
317	Oromia	Illu-Aba-Borra	Yayu								
318	Oromia	Illu-Aba-Borra	Burie						MINE		
320	Oromia	Arsi	Dodotana Sire	Addia Ababa UA						Sodere	
322	Oromia	East Shoa	Dugda Borra	Addia Ababa UA							
325	Oromia	Arsi	Chole								
326	Oromia	Arsi	Zway Dugda	Addia Ababa UA				Ziway	MINE		
327	Oromia	Illu-Aba-Borra	Alie								
328	Oromia	Jimma	Sekoru								
329	Oromia	Arsi	Sude				100,000				
330	Oromia	Jimma	Setema								
331	Oromia	Arsi	Hitosa	Addia Ababa UA			100,000				
333	Oromia	Illu-Aba-Borra	Dedesa	Jimma UA							
334	Oromia	Jimma	Sigmo								
337	Oromia	Illu-Aba-Borra	Nono								
338	Oromia	Jimma	Tiro Afeta								
341	Oromia	Bale	Legehida				200,000				
342	Oromia	Arsi	Tena				100,000				
345	Oromia	Jimma	Goma	Jimma UA	Agaro Town						
346	Oromia	East Shoa	Kombolcha		Zeway Town				MINE		
347	Oromia	Arsi	Amigna Adami Tullu Jido								
349	Oromia	Arsi	Tiyo	Addia Ababa UA	Asela Town		100,000				
351	Oromia	Jimma	Kersa	Jimma UA							
354	Oromia	Arsi	Robe				100,000				
355	Oromia	Jimma	Gera	Jimma UA							
358	Oromia	Jimma	Mana	Jimma UA							
360	Oromia	Arsi	Degeluna Tijo				200,000				
361	Oromia	Arsi	Seru				100,000				
362	Oromia	Bale	Gaserana Golelc				undefined				
363	Oromia	Arsi	Munesa				200,000				
365	Oromia	Jimma	Omo Nada	Jimma UA							

ID	Region	Zones	WOREDA	Corridor Develop.	Urbanization	Industrial & Agro Ind. Parks	Crop Surplus - tons	Agro-centres	Mines	Tourist Sites	International Trade
366	Oromia	Jimma	Seka Chekorsa	Jimma UA		Jimma IP					
369	Oromia	Bale	Seweina								
372	Oromia	Arsi	Shirka								
373	Oromia	East Shoa	Arsi Negele							Langano Lake	
375	Oromia	Arsi	Bekoji			IAIP_Bulbula					
377	Oromia	Jimma	Dedo	Jimma UA					MINE		
378	Oromia	East Shoa	Siraro	Hawassa Southern						National Park Abijatta Shalla	
383	Oromia	Bale	Agarfa				undefined				
386	Oromia	Bale	Ginir				undefined				
388	Oromia	Bale	Adaba							Bale National Park 2	
389	Oromia	East Shoa	Shashemene	Hawassa Southern						Wondo Genet	
391	Oromia	Arsi	Kofele								
393	Oromia	Arsi	Gedeb								
399	Oromia	Bale	Sinanana Dinsho				undefined		MINE		
401	Oromia	Bale	Raytu				150,000				
406	Oromia	Bale	Gorro (2)								
410	Oromia	Bale	Dodola					Dodola		Bale National Park 1	
411	Oromia	Bale	Goba		Robe Goba Town		100,000	Goba	MINE		
414	Oromia	Bale	Kokosa								
418	Oromia	Bale	Berberie						MINE		
420	Oromia	Bale	Gura Demole				200,000				
422	Oromia	Bale	Gonsebo				200,000				
426	Oromia	Bale	Menana Harena B				200,000				
430	Oromia	Borena	Gelana Abaya	Hawassa Southern							
437	Oromia	Borena	Bore	Hawassa Southern			150,000		MINE		
444	Oromia	Bale	Meda Welabu								
445	Oromia	Borena	Uraga				150,000				
450	Oromia	Borena	Adolana Wadera		Adola Town		200,000		MINE		
452	Oromia	Borena	Hagere Mariam								
454	Oromia	Borena	Odo Shakisso						MINE		
458	Oromia	Borena	Liben		Negele Town						
461	Oromia	Borena	Teltelie								
462	Oromia	Borena	Yabelo							Yabelo National Park	
463	Oromia	Borena	Arero								
465	Oromia	Borena	Moyale						MINE		Moyale CO
466	Oromia	Borena	Dire								
202	Harari	Harar	Rural Harar	Dire Dawa UA				Harar			
211	Harari	Harar	Woreda 3	Dire Dawa UA						Harar 1	

ID	Region	Zones	WOREDA	Corridor Develop.	Urbanization	Industrial & Agro Ind. Parks	Crop Surplus - tons	Agro-centres	Mines	Tourist Sites	International Trade
218	Harari	Harar	Woreda 2	Dire Dawa UA						Harar 2	
219	Harari	Harar	Woreda 1	Dire Dawa UA						Harar 3	
302	Gambella	Zone 1	Gambella	Gambella UA	Gambela Town						
343	Gambella	Zone 2	Abobo	Gambella UA							
348	Gambella	Zone 2	Jor								
359	Gambella	Zone 2	Gog								
374	Gambella	Leiyu Zone	Godere								
168	Dire Dawa	Diredawa	Rural Diredawa	Dire Dawa UA	Dire Dawa	Dire Dawa IP+DP and Kingdom IZ					Dire Dawa CO
180	Dire Dawa	Diredawa	Diredawa Town	Dire Dawa UA							
91	Benishangul-Gum	Assosa	Sherkole						MINE		
102	Benishangul-Gum	Metekel	Bulen						MINE		
111	Benishangul-Gum	Metekel	Dibatie								
130	Benishangul-Gum	Kemashi	Arba Abay						MINE		
138	Benishangul-Gum	Assosa	Komsha	Gambella UA							
147	Benishangul-Gum	Assosa	Assosa	Gambella UA		Assosa IP			MINE		
148	Benishangul-Gum	Assosa	Bambasi	Gambella UA							
171	Benishangul-Gum	Kemashi	Kemashi						MINE		
27	Amhara	Semien Gonder	Sanja				undefined				
37	Amhara	Semien Gonder	Dabat	Lake Tana UA							
41	Amhara	Semien Gonder	Metema								Metema CO
43	Amhara	Semien Gonder	Wegera	Lake Tana UA			150,000	Gondar			
44	Amhara	Semien Gonder	Lay Armachiho	Lake Tana UA			350,000				Gonder CO
45	Amhara	Semien Gonder	Chilga				undefined		MINE		
49	Amhara	Semien Gonder	Quara								
51	Amhara	Semien Gonder	Gonder Zuria	Lake Tana UA	Gondar Town		undefined			Gondar	
53	Amhara	Semien Gonder	Denbia	Lake Tana UA			undefined				
56	Amhara	Debub Gonder	Kemkem	Lake Tana UA							
57	Amhara	Semien Gonder	Alefa				350,000				
60	Amhara	Semien Wello	Kobbo	Mekelle UA							
61	Amhara		Lake Tana							Lake Tana	
63	Amhara	Debub Gonder	Farta	Lake Tana UA				Debre Tabor			
64	Amhara	Debub Gonder	Fogera	Lake Tana UA		Woreta DP					
65	Amhara	Semien Wello	Mekiet							Lalibela	
67	Amhara	Semien Wello	Guba Lafto	Mekelle UA							
69	Amhara	Semien Wello	Habru	Mekelle UA							
70	Amhara	Mierab Gojam	Achefer				700,000				
71	Amhara	Debub Gonder	Dera	Lake Tana UA							
72	Amhara	Mierab Gojam	Bahir Dar	Lake Tana UA	Bahr Dar Town	Bahir Dar IP				Bahir Dar	Bahir Dar CO

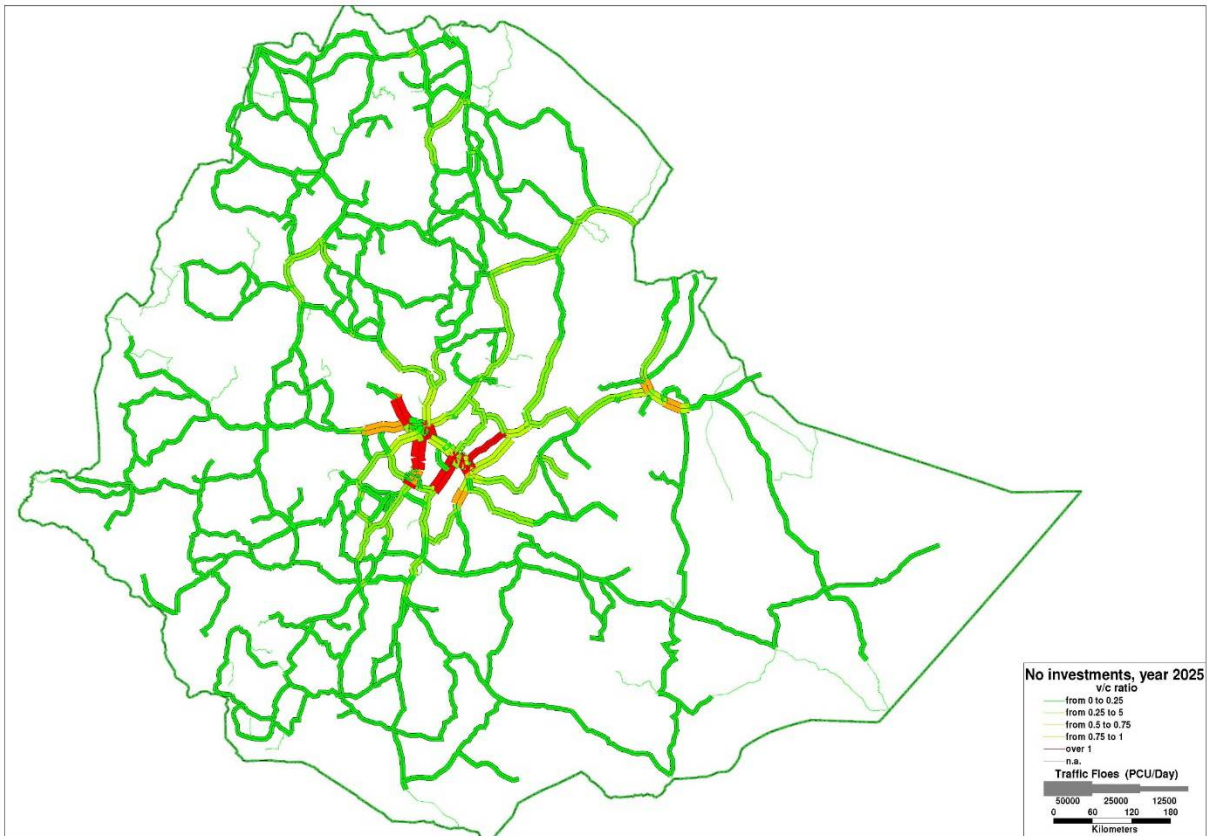
ID	Region	Zones	WOREDA	Corridor Develop.	Urbanization	Industrial & Agro Ind. Parks	Crop Surplus - tons	Agro-centres	Mines	Tourist Sites	International Trade
73	Amhara	Semien Wello	Dawint Delanta								
74	Amhara	Semien Wello	Wadla					Gashena			
75	Amhara	Debub Wello	Ambassel	Mekelle UA							
77	Amhara	Debub Gonder	Estie								
79	Amhara	Debub Wello	Werebabu	Mekelle UA					MINE		
80	Amhara	Debub Gonder	Simada								
81	Amhara	Mierab Gojam	Merawi	Lake Tana UA							
82	Amhara	Mierab Gojam	Adet	Lake Tana UA			150,000				
83	Amhara	Debub Wello	Tenta						MINE		
84	Amhara	Debug Wello	Tehulederie	Mekelle UA		Kombolsha DP+IP					
85	Amhara	Agew Awi	Dangla								
86	Amhara	Oromia Zone	Bati	Mekelle UA					MINE		
88	Amhara	Debub Wello	Kutaber	Mekelle UA							
89	Amhara	Debub Wello	Mekdella						MINE		
90	Amhara	Debub Wello	Kalu	Mekelle UA							
92	Amhara	Debub Wello	Saint								
93	Amhara	Misrak Gojam	Hulet Ej Enesie								
94	Amhara	Debub Wello	Dessie Zuria	Mekelle UA	Dese Town						Kombolsha CO
96	Amhara	Misrak Gojam	Goncha Siso Enesie								
98	Amhara	Misrak Gojam	Bibugn								
99	Amhara	Agew Awi	Fagta Lekoma								
100	Amhara	Mierab Gojam	Quarit				150,000				
101	Amhara	Mierab Gojam	Sekela								
104	Amhara	Agew Awi	Guangua					Chagni			
106	Amhara	Agew Awi	Banja								
107	Amhara	Debub Wello	Legambo								
108	Amhara	Mierab Gojam	Dega Damot				150,000				
110	Amhara	Agew Awi	Ankasha								
112	Amhara	Debub Wello	Albuko	Mekelle UA							
113	Amhara	Debub Wello	Were Illu	Mekelle UA							
114	Amhara	Oromia Zone	Chefie Golana Dawe Rahmedo		Kemise Town					Kemise	
115	Amhara	Mierab Gojam	Jabi Tehnan		Finote Selam Town						
116	Amhara	Mierab Gojam	Burie Wemberma								
117	Amhara	Debub Wello	Debre Sina								
120	Amhara	Debub Wello	Kelala								
121	Amhara	Debub Wello	Wegdie								
124	Amhara	Mierab Gojam	Dembecha								
127	Amhara	Misrak Gojam	Machakel								

ID	Region	Zones	WOREDA	Corridor Develop.	Urbanization	Industrial & Agro Ind. Parks	Crop Surplus - tons	Agro-centres	Mines	Tourist Sites	International Trade
129	Amhara	Misrak Gojam	Gozamn		Debre Markos Town			Debtre Markos			
131	Amhara	Debub Wello	Jamma								
132	Amhara	Semien Shewa	Gera Midirna Keya Gebriel								
142	Amhara	Semien Shewa	Lalo Midirna Mama Midir								
153	Amhara	Semien Shewa	Mafud Mezezo Mojana Wadera								
155	Amhara	Semien Shewa	Moretna Jiru								
164	Amhara	Semien Shewa	Debre Birhan Zuriana Keyit			Debre Birhan IP					
184	Amhara	Semien Shewa	Angolela Terana Asagrt								
217	Amhara	Semien Shewa	Berehet								
5	Afar	Zone 2								Erta Ale	
26	Afar								MINE	Danakil Depression	
40	Afar	Zone 1				Semera IP+DP					Mile CO and Semera CO
248	Addis Ababa			Addia Ababa UA	Addis Ababa Kaliti Kolfe Nefas ..	Bole lemi IP+Bole Lemi Park2+ Kaliti DP			MINE		Kaliti CO

6.4 ASSIGNMENTS WITHOUT PLAN

The traffic assignment without plan were carried out at time horizons 2025, 2035 and 2050 by using the same multimodal graph used for the estimation of the present levels of service and by using the future o/d matrices (for freight and passengers) used for the "Limits to growth" scenario. The results are presented in the next pages (from Figure 108 to Figure 110). It can be clearly seen that, even if the most conservative scenario in terms of demand growth has been considered, the situation begins to become critical especially starting from the year 2035.

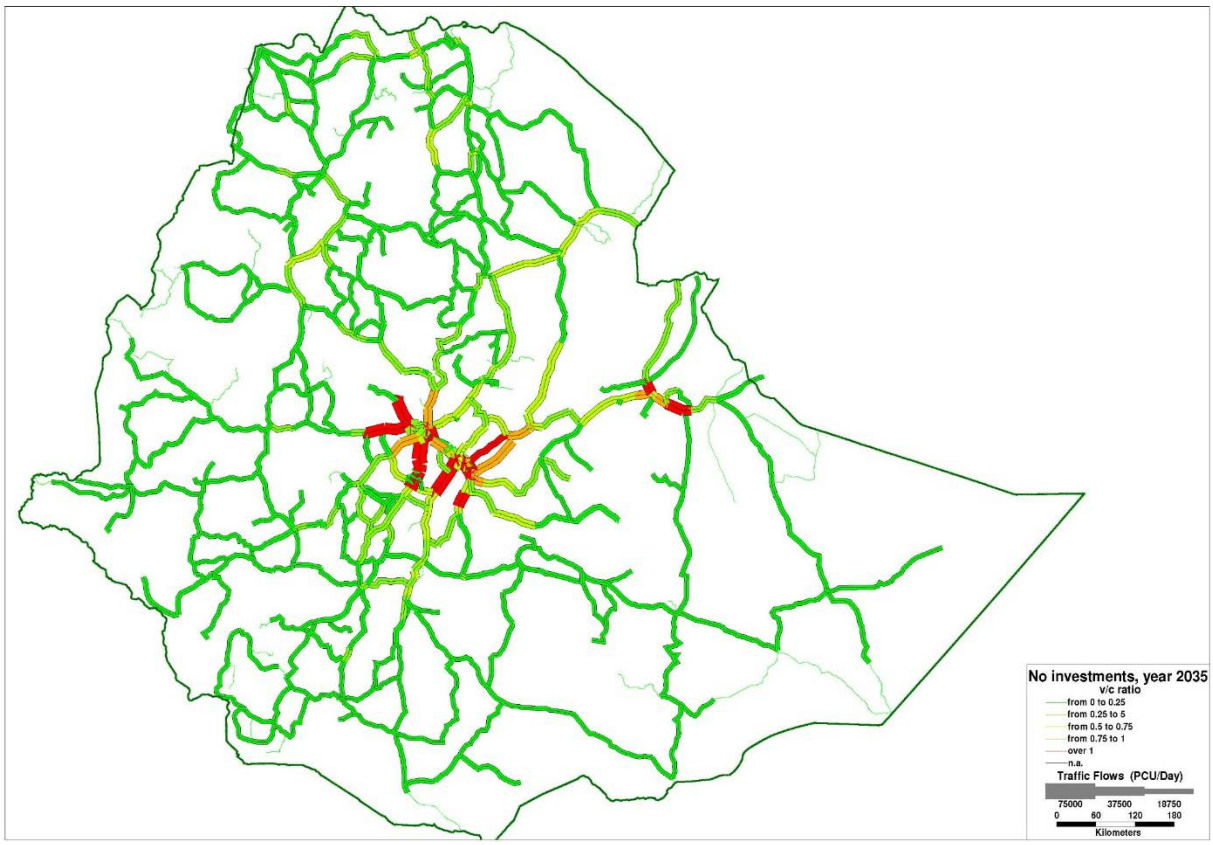
Figure 128: Levels of service at year 2025 on the road network



According with the Model assignments at year 2025:

- **High level of congestions** remains at Addis urban section, Alemgena – Tiya, Modjo – Ziway, Adama – Metehara, Adama – Dera and appears at; Holeta – Muger and Tiya – Butajira, Dera – Asela
- **Moderate congestions** remain in Holeta – Ambo, DireDawa – Cinile and Harar – Babile.

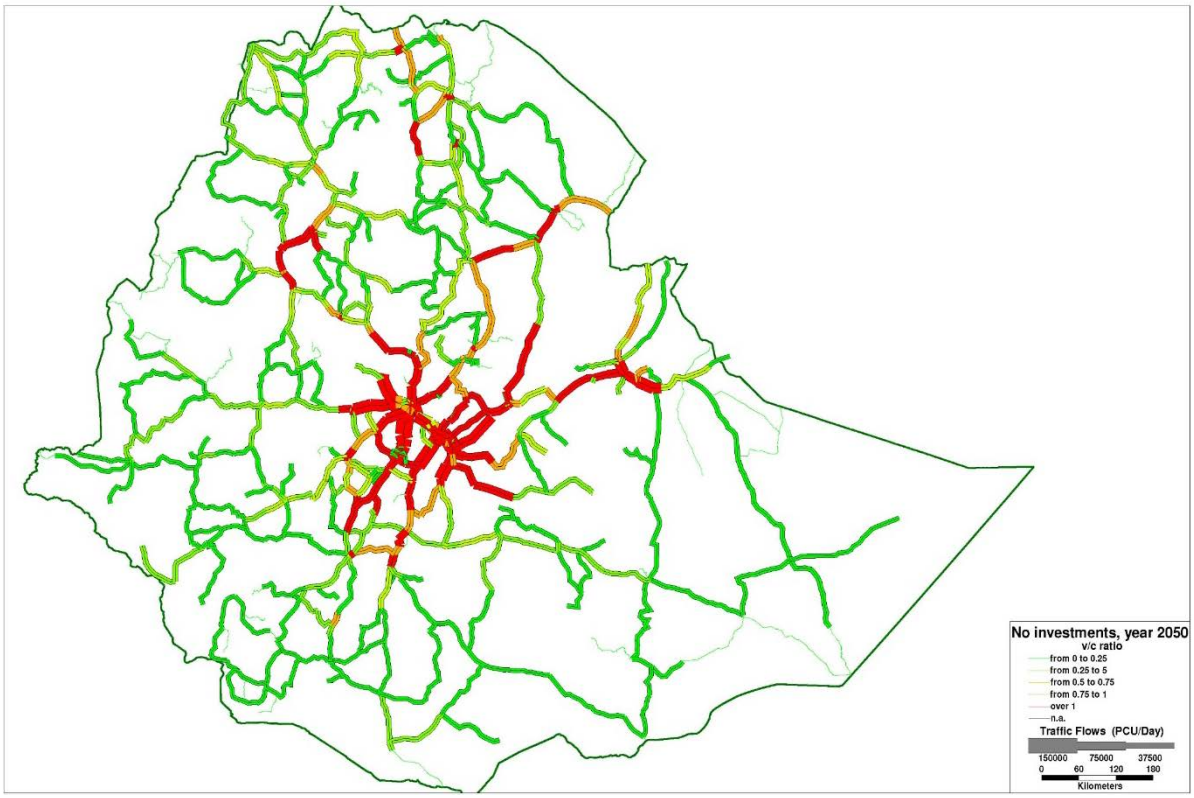
Figure 129: Levels of service at year 2035 on the road network



According with the Model assignments at year 2035:

- **High level of congestions** remains at Addis urban section, Alemgena – Tiya, Modjo – Ziway, Adama – Metehara, Adama – Dera and appears at; Holeta – Muger and Tiya – Butajira, Dera – Asela, Holeta – Ambo, DireDawa – Cinile and Harar – Babile.
- **Moderate congestions appear** in Addis – Commando, Addis – Tulubolo (Woliso), Addis – Modjo (A1), Melkasa – Metehara – Awash junction, DireDawa – Harar.

Figure 130: Levels of service at year 2050 on the road network



According with the Model assignments at year 2050:

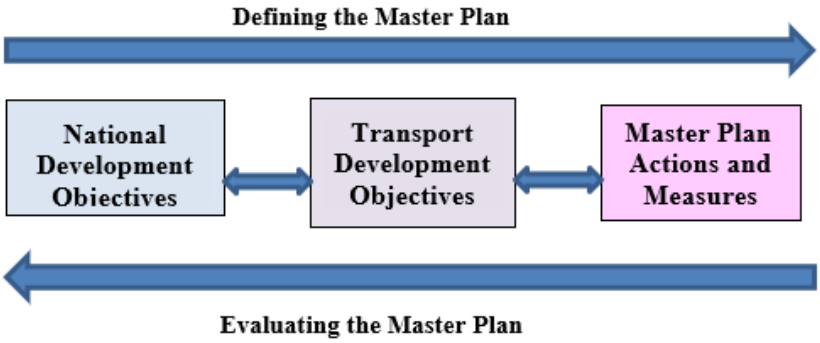
- **High level of congestions** remains at Addis urban section, Alemgena – Tiya, Modjo – Ziway, Adama – Metehara, Adama – Dera, Holeta – Muger, Tiya – Butajira, Dera – Asela, Holeta – Ambo, DireDawa – Cinile and Harar – Babile, and appears in Addis – Commando, Addis – Tulubolo (Woliso), Addis – Modjo (A1), Melkasa – Metehara – Awash junction, DireDawa – Harar, Ziway. Shashamene, Butajira – Soddo, Addis – Welkite, Tulubolo-Butajira-Ziway, Commando – Dejen, Addis - Debre Berhan, Modjo – Agere – Areti- Kerem, Awash junction – Gemamitu, Arberel – DireDawa – Harar, Semera – Mile, Sekota – Agbe, Bure – dangla – BahirDar, Bati - Elwha.
- **Moderate congestions appear in:** Adabon – Mereb, Abyadi – Adua, Mekele – Same- Finawa, Serdo - Hanel, BahirDar – Woreta, Azezo – Woreta, Ataya – Robit -Debresina, Ataya – Kefarabet – Habu – Kombolcha, Sembo . kelem river, Metu – Lemi, Awash junction – Arebereketi, Harar – Janso..

7 PLANNING FRAMEWORK

7.1 STRUCTURE OF THE PLANNING FRAMEWORK

The Planning Framework is a necessary tool for transport planning in order to align each action/measure that will be proposed in the Master Plan with the agreed Transport objectives, which are on their turn aligned with the declared national development objectives. The construction of the Planning Framework (PF) follows an inverse procedure (top-down) in comparison with its use in the Master Plan (bottom-up):

5) the PF construction starts from the clear understanding of the national development objectives, which represent the supreme social, economic objective that the Government and the community wants to attain in the medium – long run;
6) continues with the identification of the transport sector objectives which are the best streamlined and most contributing to the declared national objectives;
7) and conclude with the identification of the single action/measure of the detailed Transport Master Plan, the evaluation of their contribution to the transport and national development objectives and defines the priority Action Plan for the implementation of the Master Plan in the 30 years.



Following is the definition of the national development objectives, the derived transport objectives, the planning framework and the list of actions/measures already identified in the 5- and 10-years plan of the Ministry of Transport.

7.2 DEFINITION OF THE ETHIOPIA DEVELOPMENT OBJECTIVES

For the definition of the general development objectives of the country, the Consultant has analysed different national strategy documents (including Growth and Competitiveness Development, horn of Africa Initiative, Nationally Determined Contributions on energy, Climate Change Adaptation Plan, etc.) but focused on two official documents produced by the Federal Government, and National Planning Commission:

- The Ethiopia 2017 Review of United Nations Agenda 2030;
- The Homegrown Economic Reform Programme.

Following is a brief analysis of the two documents:

7.2.1 Ethiopia 2017 Review of Agenda 2030

The FDRE accepted and approved the 2030 Sustainable Development Agenda during the UN-member states' meeting held in New York from September 25 to 27/2015. Subsequently, it integrated the SDGs with the 2nd Growth and Transformation Plan (GTPII). High level of commitment on the part of the FDRE is thus evident in light of owning the SDGs and implementing

them.

The approved Agenda 2030 SDGs, are, as indicated in the original UN document:

Sustainable Development Goals

- Goal 1. End poverty in all its forms everywhere
- Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
- Goal 3. Ensure healthy lives and promote well-being for all at all ages
- Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
- Goal 5. Achieve gender equality and empower all women and girls
- Goal 6. Ensure availability and sustainable management of water and sanitation for all
- Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all
- Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
- Goal 10. Reduce inequality within and among countries
- Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable
- Goal 12. Ensure sustainable consumption and production patterns
- Goal 13. Take urgent action to combat climate change and its impacts*
- Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development
- Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
- Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
- Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

7.2.2 The Home-grown Economic Reform Programme

The three-year Homegrown Economic Reform Programme (HGER, 2019-22)46 is the compass of the national economic planning. It calls for building a resilient and diversified middle-income economy, driven by the private sector; eradicating extreme poverty and hunger; building human capabilities; creating a modern policy and institutional framework; and creating an efficient, resilient and well-functioning financial market.

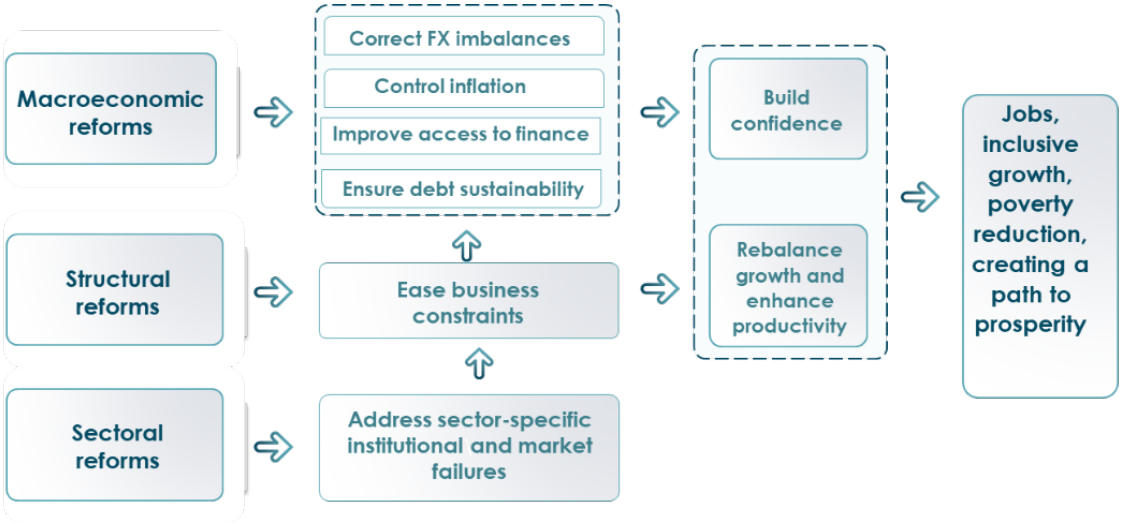
It builds on past achievements but also aims to correct macroeconomic imbalances that have emerged over time, address sector-level constraints and ease structural bottlenecks to expanded public and private investments. The HGER, in its totality, represents a major evolution in policy towards a more market-based, private sector-driven and open economy, closely integrated with regional and global markets and is structured around three economic pillars:

1. **Macroeconomic and financial sector reforms** to correct FX imbalances, control inflation, safeguard financial stability while promoting intermediation, and ensure debt sustainability;
2. **Structural reforms** to ease institutional and structural bottlenecks to productivity and job growth, and
3. **Sectorial reforms** to address institutional and market failures in key strategic sectors.

These three pillars act in an integrated way in order to correct the structural weaknesses that can undermine the macroeconomic stability of the country, including in particular the shortage of

[46] It must be specified that Homegrown Economic Reform Programme has not yet officially issued by the Authorities, therefore the Consultant deduced the guidelines of the latter, analyzing official presentations by the Office of the Prime Minister and documents from other sources (IMF, UN).

foreign exchange (FX) and the high inflation resulting from the sustained growth of recent years. Therefore, in the HGER Vision, **private sector involvement** is conceived as an essential instrument in this pathway to development, also in the light of the recent Memorandum of Understanding signed with the IMF.



In order to allow a smooth insertion of the private sector in a market hitherto dominated by massive State-Owned Enterprises (SOEs), there is a need to implement a privatization plan and to improve access to financial credit through the development of a new set of **regulatory procedures and good governance**. In particular, the HGER urges on modernizing the operations of CBE and enforcing the regulatory rules uniformly across banks. A transparent and efficient regulatory framework is essential to create a favorable business environment for both foreign and, above all, domestic private investors.

Another cornerstone of the HGER is the accent on stimulating **domestic productivity** and, especially, some key sectors where Ethiopia has a great untapped potential, which will be subject to specific sectoral reforms. The mentioned sectors are: 1) Agriculture 2) Manufacturing 3) Mining 4) Tourism and 5) ICT. In all the aforementioned sectors, it is emphasized that this pathway to development relies not on the big companies but on the small players, who are identified as the key actors of change. Hence, for the agricultural sector actions are aimed at enhancing productivity of small-holdings farmers and pastoralist through provision of modern inputs and at establishing effective linkages between producers and commodity markets as well as commercial value chain while in mining for instance, artisanal and small-scale mining are preferred instead of large-scale mining projects. Also, for manufacturing, the HGER stresses the importance of a local content, such as agro-processing, and calls for strengthening the backward linkage of emerging manufacturing value chains through encouraging domestic production of primary and intermediate industrial inputs.

The ultimate goal of the HGER is to address the country towards a rapid, inclusive and sustainable growth through a rebalanced and diversified domestic economy, driven by an increased role of the private sector in an **open market** and managed by a prudent monetary policy, able to unlocking the full potential of the country.

Another fundamental aspect introduced by the HGER is the focus on **Innovation and Creativity**, and this is evident not only from the identification of ICT sector as a key sector for the economy but also from the accent on education of the young labour force, exploring new sources of productivity and creating an enabling environment for creative industries.

In parallel, the public sector reform should foster this pathway to development guaranteeing that the aforementioned growth is inclusive and implement all the necessary actions to **eradicate**

extreme poverty and build human capabilities, providing: affordable health care, quality education to relevant school-age children, safe drinking water and affordable, reliable and clean energy and transportation services.

Lastly, even if not explicitly mentioned, the HGER reaffirms the Ethiopia's commitment to **sustainability**, as already proved by its effort to fulfill the United Nations 2030 Agenda.

7.2.3 Declared National Development Objectives

According with the analysis of the documents presented above the Consultant has elaborated the following main representative National Development Objectives:

- ***SOCIO-ECONOMIC DEVELOPMENT*** of the population, through poverty reduction, social services, job opportunities.
- ***INCREASING DOMESTIC PRODUCTIVE CAPACITY***, increasing productivity in the most promising economic sectors, like agriculture, manufacturing, mining, tourism.
- ***CREATE AN OPEN MARKET***, in order to facilitate internal trade, import/export and facilitating foreign investments in the country;
- ***GOOD GOVERNANCE***, creating an effective administration system with clear and straightforward regulations.
- ***TECHNOLOGY INNOVATION***, considering all the new advanced possibilities in ICT applications;
- ***SUSTAINABILITY***, safeguarding the environment and climate change adaptation measures

7.3 DEFINITION OF THE TRANSPORT DEVELOPMENT OBJECTIVES

Transport plays a major role in the economic, social and spatial development of a country and can substantially contribute to the general national objectives. In fact, transport investment, administration and regulation has marked effects on:

- **Social development**, providing free movement of people at rural and urban level and creating access to different social services, like education, health, markets, job opportunity, human relations and culture;
- **Economic Development**, decreasing transport cost and time between different producing areas, enlarging national and international markets, increasing business efficiency, competition and labour market opportunities;
- **Spatial asset**, influencing, in the longer run, the spatial asset of residential and economic activities, clusters agglomeration and transit oriented urban development.

Different safeguards are anyway to be respected, in order to make the **transport system sustainable** in terms of environment, safety, adapt to climate change, maintainable and congruent with transport demand, avoiding over-offering of transport infrastructure/services.

In Ethiopia the transport sector will play a fundamental role for all the declared national objectives, considering the importance of rural/urban accessibility, the international trade of a landlocked country, the good perspectives of the country in terms of agricultural, industrial, tourism and mining development in the next future.

7.3.1 Assumed Transport Development Objectives

- Transport Objective 1: **Ensuring accessibility and mobility at rural/urban level.** For the SOCIO-ECONOMIC DEVELOPMENT objective, the transport sector can contribute substantially with creating rural accessibility to basic services, like education, health, markets, jobs, creating sustainable urban mass transit transport, ensure good inter-urban services and taking into consideration transport aspects for women, youth and special need communities.

- Transport Objective 2: **Ensuring integrated connectivity at national and regional level.** For the INCREASING DOMESTIC PRODUCTIVE CAPACITY objective, the transport sector should increase the internal and regional connectivity, enlarging the road, railway, airports, logistic chain and introducing inland water services in appropriate locations, creating a modern, integrated national transport system.
- Transport Objective 3**: Liberalizing access to transport and logistic market**, facilitate custom transport procedures and create environment for domestic and international private investments. For the CREATE AN OPEN MARKET objective, the transport sector should make its part liberalizing the access to each transport sub-sector and facilitating the flow of people, vehicles and goods through the borders, in order to facilitate internal trade, import/export and facilitating foreign investments in the country, strengthening regional, continental and global linkages and make the logistic chain efficient and updated. Transport
- Transport Objective 4: **Increase effectiveness of transport administration** and its capabilities in planning, design, construction and maintenance of transport investment in all mode of transport. For the GOOD GOVERNANCE objective, the transport sector should apply this concept, with an effective transport administration system with clear and straightforward transport regulations, enhancing the effectiveness of the sector through building capabilities in all mode of transport and in the different steps of planning, design and construction of infrastructures. Appropriate level of maintenance activity and funding should be ensured by all transport organisations.
- Transport Objective 6: **Take advantage of the last transport technology and use of ICT.** For the INNOVATION objective, the transport sector should consider different mode of transport, like cable car, river/lake transport, pipeline, etc. and all the new advanced possibilities in ICT transport applications that can make transport service efficient, safe and comfortable for passengers and secure for freight. The different smart city applications in transport should be explored for the urban mobility and also new and not yet operative researches should be followed.
- Transport Objective 7: **Ensure safety, environmental respect and apply measures to adapt to climate change.** For the SUSTAINABILITY objective, the transport sector should apply all the measures that are known for transport safety, environmental respect: use of renewable energy, reducing gas emissions, infrastructure design for adapt to climate change.

The recent MoT planning activity has actually followed, without mentioning, these objectives, requesting an "*integrated, safe, equitable, efficient and accessible transport infrastructure & services*", as detailed in the specific transport objectives of recent MoT planning documents.

7.3.2 Transport Development objectives adopted by MoT planning documents

From the "**National Transport Policy of Ethiopia**" May 2020, the following transport specific objectives have been expressed:

- Foster rural, rural to urban and intercity transport linkages by ensuring accessibility and development of transport infrastructure and services,
- In addition to the in-country network the transport infrastructure and service avails, make sure our country is benefited by strengthening regional, continental and global linkages.
- Realize easy and efficient movement of people and logistics services by integrating and coordinating the transport infrastructure with transport service.
- Taking the fact that Ethiopia has no port of its own into account, the transport infrastructure and service should work to narrow the inevitable gaps that occur as a result.
- Make sure the transport infrastructure and service is safe, secured and not susceptible to accidents.
- Enable the transport sector adapts to latest technology options and make our transport system competitive and preferred.
- Encourage and expand transport systems operating on renewable energy without compromising the safety of the natural environment by ensuring that the transport sector is environmentally friendly and does not

harm the natural environment,
- Enhance the involvement of the government and private investors and encourage private investment by overcoming the various structural and procedural limitations evidently observed in the sector
- Operate a number of intercity mass transport options
- Ensure that the regions are key actors and beneficiaries by augmenting their capacity in transport infrastructure and service operation activities.

From the TYP - **Transportation Sector's Ten-Years Development Plan (2020-2030)**, the following objectives have been expressed:

- **Objective 1: Ensure fair access to transportation infrastructure**, increasing total expressways, federal and rural roads coverage, increasing the number of transport parks, building additional freight terminals, dry ports cold stores, improve urban transport services, parking lots, introducing cable-car transport, expanding the railway infrastructure, increase number of standard airports and flight control stations and build seven domestic water transport infrastructures.
- **Objective 2 Transportation Integrated, Fair and Accessible**, increasing the number of public transport passengers at urban and rural level, create mass transport in other cities, diversify urban transport modes and NMT, increase railway and aviation passengers and introduce the inland water passengers.
- **Objective 3 Making Transportation Safe**, reducing death toll from road traffic accidents and also from other modes of transport, introducing international safety standards and adequate enforcement.
- **Objective 4 Making logistics service efficient and secure**, implementing the national logistic strategy, better management of the freight corridors and increasing time and tariff performances.
- **Objective 5: Ensuring safe transport infrastructure and services for climate change**, reducing the road vehicles gas emission, applying the green development strategy, giving incentives for green vehicles, implement a non-motor transport strategy, implement environmental conservation activities to engage the community and the private sector.
- **Objective 6 - Enhance the effectiveness of the sector by building capabilities**, increasing annual capacity of road construction and maintenance, budgetary allocations to ensure proper URRAP roads, extending the existing 2nd Generation Road Fund to the 3rd Generation Fund, transport sector supported by modern information and technology, promote public-private partnerships in the sector, developing and implementing policy and legal frameworks, develop and implement a structural and operational framework to carry out the mission of the sector.

And detailed in the FYP - **Transportation Sector's Five-Years Development Plan (2020-2025),** together with detailed targets and implementation measures:

- **Objective 1 - Transportation Infrastructure economic, integrated and accessible**
  - Goal 1: Increase the total road coverage of the country from 121,052 to 165,015 km
  - Goal 2: 13,416 km Improvement and Rehabilitation of Roads
  - Goal 3: Increase road maintenance coverage from 114,000 km to 266,509 km
  - Goal 4: Increase road transport service infrastructure from 1,708 to 2,266;
  - Goal 5: Infrastructure Payment Roads: Promote the Development of Facilities
  - Goal 6: Upgrade and upgrade dry ports from 8 to 11
  - Goal 7: Building rail infrastructure projects to increase the coverage of the country's rail infrastructure from 690 km to 1,299 km
  - Goal 8: Improve the construction and standardization of air transport infrastructure;
  - Goal 9: Upgrade and upgrade the Air Navigation Facilities
  - Goal 10: Increase construction of domestic water transport infrastructure from 2 to 6;
- **Objective 2 – Travel Transportation - Coordinated, comprehensive and accessible network**
  - Goal 11: Increase the number of passengers on public transport nationwide from 682 million to 913 million
  - Goal 12: Improve urban transport service
  - Goal 13: Annual traffic flow on paved roads from 9.26 million to 15.34 million raise
  - Goal 14: Public service transport service users increase from 35.17 million to 48 million annually
  - Goal 15: Improve passenger train service delivery by increasing passenger transport per day from 75,200 to 150,841;

- Goal 16: Increase passenger traffic from 12.2 million to 36.2 million
- Goal 17: Increase the number of domestic vessels registered in Tonnage's domestic and overseas Open Registry from 11 to 26 now;
- Goal 18: Increase and improve the domestic water transport service from 2 to 6

➢ **Objective 3 – Traffic Safety**

- Goal 19: Reduce the death toll from 10,000 vehicles from 43 to 23 by road traffic accidents
- Goal 20: Reduce traffic accidents on average by 9.5 to 4.5 per cent on average,
- Goal 21: Reduce car accident death from 5 to 3 million miles a year
- Goal 22: Fully adjust the findings of the Maritime Safety Audit by international certifying organizations;
- Goal 23: Increase safety audit rate by 73.2% to 90% by International Civil Aviation

➢ **Objective 4 – Sustainability and Support of local service**

- Goal 24: To increase the global logistic performance level from 131st to the 80th
- Goal 25: Increasing the efficiency of transport and logistics of the country from 16.7 million tonnes to 33.56 million tonnes by increasing efficiency of freight transport and logistics services;

➢ **Objective 5 –Ensure safe transport infrastructure and services for climate change**

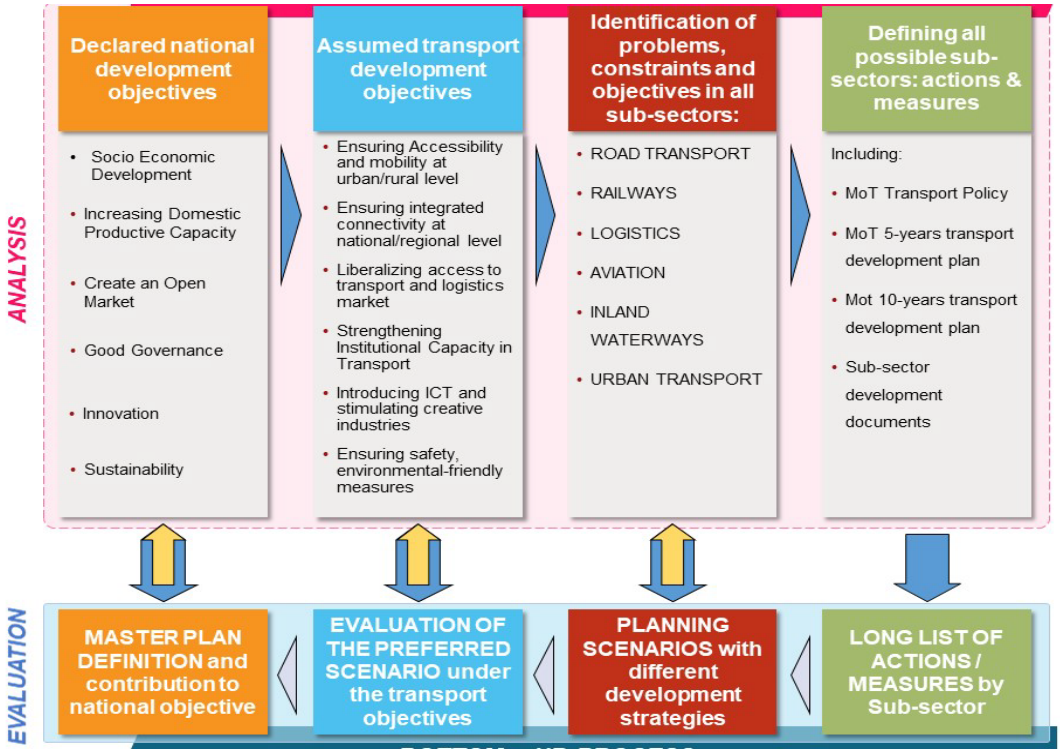
- Goal 26: Make the construction of 4 road infrastructure projects worth the climate change in the planning period;
- Goal 27: Reduce the amount of carbon emissions released by the sector to the environment
- Goal 28: Reinforce and enhance the health of the sector by maximizing its implementation
- Goal 29: Increase the capacity of road sector to increase project performance by 35% to 62%
- Goal 29: Increasing Road fundraising capacity from 2.9 billion birr annually to 8.8 billion
- Goal 30: Create capacity to cover 75% of maintenance, redevelopment and upgrade costs by extending the existing 2nd Generation Road Fund to the 3rd Generation Road Fund;
- Goal 31: Increase Fund Capacity by providing 31% off-road vehicles with 100% 3rd party insurance;
- Goal 32: Increase locally trained mariners from 7,346 to 27,216;
- Goal 33: To increase the capacity of the rail sector by providing trainings to 2,971 trainees in various train operations and maintenance sectors;
- Goal 34: Provide capacity building education (Diploma to PhD) and trainings to enhance capacity in the road transport sector;
- Goal 35: Increase annual revenues from services from the transportation sector to Birr 2.71 billion to Birr 5.4 billion
- Goal 36: Improve the transportation sector's service delivery and increase foreign exchange annual income from US $ 27.5 million to 47.2 million;
- Goal 37: Make the transport sector efficient and efficient and secure by supporting modern information and technology.
- Goal 38: Implement 11 projects in the PPP
- Goal 39: Ensure the participation and benefit of women, youth and special needs communities and increase job creation in the sector.

7.4 MASTER PLANNING FRAMEWORK

Once defined the General and Transport Objectives, the Planning Framework will be implemented through the following steps:

- **Definition of the present problems, constraints and possible solutions in each transport sub-sector** (quality of transport, accessibility, old infrastructure, high transport cost, lack of funds, low quality of transport administration, high accident rates, inadequate regulations, low technology and ICT utilization, environmental respect, climate change adaptation, etc.)
- **Identification of a long list of possible actions/measures** in each subsector that can solve the problems and develop the transport mode in the desired direction. The FYP and TYP already identified interventions will constitute a component of this long list;
- **Definition of strategy scenarios**, composing the various identified actions/measures to respond at various degrees to the problems identified and development objectives in each sub-sector.

- **Evaluation of the different sub-sector scenarios.** The preferred strategy scenario will then be chosen with the Client, according to the contributions to the transport objectives.
- **Composing the Detailed National Transport Master Plan,** identifying each single action/measure of the Preferred Scenario and evaluating the overall contribution that the Master Plan can give to the attainment of the national development objectives.



Once defined the Master Plan, this will be articulated in each transport mode and region and each action/measure will be prioritized and programmed in the thirty years, to constitute the Master Plan Action Plan in each mode of transport and strategies for their implementation. Implementation risk analysis and mitigation measures will also be presented.

7.5 VISION, STRATEGIES & CRITERIA

According with the declared national objectives, the **ETMP 2050 Vision** is that of:

A National long-term plan guiding the integrated transport development of the country, able to ensure:

1) *Full accessibility and mobility at rural/urban level;*
2) *Integrated connectivity at national and regional level*
3) *Liberalizing access to transport and logistic market*
4) *Increase effectiveness of transport administration;*
5) *Take advantage of the last transport technology and use of ICT*
6) *Ensure safety, environmental respect and apply measures to adapt to climate change*

And the **ETMP 2050 Strategies,** according with national objectives are:

1) SOCIO-ECONOMIC DEVELOPMENT - **Analysis and planning of each regional road network, identifying the appropriate all-weather roads construction and public transport**, able to ensure full accessibility to basic services, like education, health, markets,

jobs, creating sustainable urban mass transit transport, ensure good inter-urban services and taking into consideration transport aspects for women, youth and special need communities.

2) INCREASING DOMESTIC PRODUCTIVE CAPACITY - **Identifying missing links and increase the extension of quality transport infrastructures to serve the economic developing areas and ensure the integrated connectivity at national and regional level to boost the domestic productive capacity.** For this aspect, the transport sector should enlarge and improve the road, railway, airports, logistic chain and introducing inland water services in appropriate locations, creating a modern, integrated national transport system.
3) CREATE AN OPEN MARKET – **Measures able to liberalize access to transport and logistic market**, facilitate custom transport procedures and create environment for domestic and international private investments. **Creating new transport transit corridors to neighbouring ports**, strengthening regional, continental and global linkages and make the logistic chain efficient and updated.
4) TRANSPORT GOOD GOVERNANCE – **Capacity Building actions able to increase effectiveness of transport administration** and its capabilities in planning, design, construction and maintenance of transport investment in all mode of transport.
5) TRANSPORT INNOVATION – Application of **the last technology available, use of ICT in all transport sub-sectors and R&D plan to profit of the international innovation during the validity of the Master Plan. T**he transport sector should consider also different mode of transport, like cable car, river/lake transport, pipeline, etc. and all the new advanced possibilities in ICT transport applications that can make transport service efficient, safe and comfortable for passengers and secure for freight. The different smart city applications in transport should be explored for the urban mobility and also new and not yet operative researches should be followed.
6) TRANSPORT SUSTAINABILITY - **Ensure safety, environmental respect and apply measures to adapt to climate change. T**he transport sector should apply all the measures that are known for transport safety, environmental respect: use of renewable energy, reducing gas emissions, infrastructure design for adapt to climate change.

Two **main criteria** have been adopted for planning and evaluate the single action & measure proposed.

Transport System Integration – Both ***horizontally*** with the parallel social, economic and spatial changes of the country and ***vertically*** with the integration between modes of passenger and freight transport in order to optimize the use of the transport offer. Additional is the ***regional integration*** with the parallel regional infrastructure development plans.

Transport System Innovation – considering the relevant & innovative transport themes, like sustainability, green mobility, climate change adaptation, covid19 response, smart mobility, transport demand management, road safety, innovative technology.

7.6 TRANSPORT SYSTEM INTEGRATION

Transport and land use are inextricably linked: transportation infrastructure attracts land use development, while land use development is unlocked by the provision of high-quality, integrated transport infrastructure and services. The main objective of land use planning is to ensure that economic development is stimulated and that the spatial locations of activities, people and amenities, in turn, have a positive impact on the local, regional and national economy. These objectives can only be achieved with the support of transport services.

Transport integration is then a fundamental prerequisite to reach the social, economic and sustainable development of a country in the most efficient way. The ETMP 2050 is considering horizontal and vertical integration, in particular as explained below.

7.6.1 Horizontal Integration

The ttransport system has to accompany and support the desired social and economic development of the country **(transport-spatial development integration**), according with the declared national objectives and different sector planning instruments. The economic, social, spatial, trade, agricultural, industrial, tourism, mining development in Ethiopia, will create passenger and freight transport demand growth and diversification, that has to be accommodated by adequate, efficient and safe transport offer in terms of infrastructure, services and vehicles. In the next 30 years, the desired increase of per-capita income, together with the expected demographic increase will ask for an improved urban mobility system and an organized extra-urban public transport service. Rural areas development will need a more capillary all-weather rural roads to facilitate transport accessibility and **rural-urban integration**.

The new spatial corridor developments, including industrial and agro-industrial parks, will involve a **substantial increase of passengers and freight transport demand** and should be satisfied with modern and mass transport, like expressways and railway links.

The increase of regional and overseas trade will ask for an organized, effective and competitive logistic system, modern and well-managed truck industry and efficient infrastructures, using diversified trade corridors to different transit ports (**regional integration**).

Increased tourism demand, especially from abroad visitors, will ask for air and road **capillary accessibility** and comfortable local transport including inland waterways. Mining sector development will ask for specific road accessibility and, in case of large quantities of products, for railway link.

The **spatial-transport integration** in the ETMP50 is obtained serving appropriately the different spatial development corridors identified in paragraph 4.9, where, according with the different scenarios and the assignments of the transport model, a modern capable infrastructure is assigned (railway or expressway).

7.6.2 Vertical Integration

The ttransport system, for passenger and freight, is to be conceived and used as an **integrated transport network**, using the most appropriate, efficient and effective multimodal/intermodal connections, avoiding duplications of offer but ensuring free market access to different transport operators for each mode at the same time. The integration of transport modes is to be applied at national and local level, but also at the wider Africa regional level.

Both passenger and cargo transport can benefit from Intermodal transport. Intermodal transport is a complex transport system, where two or more different transport modes are used, efficiently connected and coordinated.

Intermodal passenger transport, also called mixed-mode commuting, concerns the use of two or more modes of transportation in a journey. Mixed-mode commuting is often used to combine the strengths (and offset the weaknesses) of various transportation options. A major goal of modern intermodal passenger transport is to reduce dependence on the automobile as the major mode of ground transportation and increase use of public transport. Automobiles or taxicabs are conventionally used as a single-mode form of transit, but they also find use in a variety of mixed-mode scenarios, like to provide a short commute to bus stations, train stations, airports, and piers, where all-day "park and ride" lots are often available. Used in this context, cars offer commuters the relative comfort of single-mode travel, while significantly reducing the financial and environmental costs.

The main objective of a passenger intermodal terminal is the integrated and efficient transfer of passengers between various routes and different modes of transport. In order to ensure the effectiveness of this essential function, a terminal should provide:

- reliable and adequate level of service of the means involved in the operation of the terminal

- satisfactory level of facilities serving the transfer
- provision of low-cost travel (less than or equal to the cost of travel without transfers)
- adequate accessibility of the site for all users (especially the disabled)
- reduced travel time compared to that needed for the same trip without transfer
- direct access between two different platforms of different modes of the terminal

Intermodal / multimodal freight transport (in logistics and inland distribution) involves the transportation of freight in an intermodal unit (container) or vehicle, using multiple modes of transportation (e.g., ship, rail, truck, ferry), without any handling of the freight itself when changing modes. The method reduces cargo handling, and so improves security, reduces damage and loss, and allows freight to be transported faster. Reduced costs over road trucking is the key benefit for inter-continental use. This may be offset by reduced timings for road transport over shorter distances. Crucial importance is assumed by the **freight intermodal terminals**, a location for the transfer of freight from one transport mode to another, for example transhipment terminals from between road - rail, ports, airports.

There are three major types of **intermodal terminals**, each having their own locational and equipment requirements:

- **Port terminals**. They are the most substantial intermodal terminals in terms of traffic, space consumption and capital requirements. A **container sea terminal** provides an interface between the maritime and inland systems of circulation.
- **Rail terminals**. For inland intermodal chains rail terminals are linked with port terminals. Rail terminals can be on-dock and a near-dock rail facility, depending from the terminal clearance: while for an on-dock rail terminal containers can be moved directly from the dock (or the storage areas) to a railcar using the terminal's own equipment, accessing a near-dock facility requires clearing the terminal's gate (delays), using the local road system (congestion) and clearing the gate of the near-dock rail terminal (delays). On dock terminals tend to be designed to only handle containers on flatcars (COFC). Near-dock facilities tend to have more space available and can thus play a significant role in the maritime / rail interface, particularly if they are combined with transloading activities. The satellite terminal, the load center and the transmodal terminal all qualify as a form of inland port, commonly designed to handle both COFC and trailers on flatcars (TOFC).
- **Dry Ports**. Represent a distinct category of intermodal terminals performing an array of value-added functions, with transmodal operations dominantly supported by trucking. Distribution centers can perform transloading facility mainly transfers the contents of maritime containers into domestic containers or truckloads (or vice-versa. Warehousing is a standard function still performed by a majority of distribution centers that act as buffers and points of consolidation or deconsolidation within supply chains.

7.6.3 Regional Integration

The ETMP50 should be harmonised with the wider regional development plans, in order to connect Ethiopian spatial development corridors and trade corridors with the regional or neighbouring countries infrastructure development plans.

Recently (May 2020), IGAD produced an ambitious Regional Infrastructure Master Plan (IRIMP). This plan is aligned with AU Agenda 2063 and aims to accelerate the region's growth and structural transformation. The Plan consists of policy initiatives and infrastructure investments which will significantly strengthen the process of regional economic cooperation and integration.

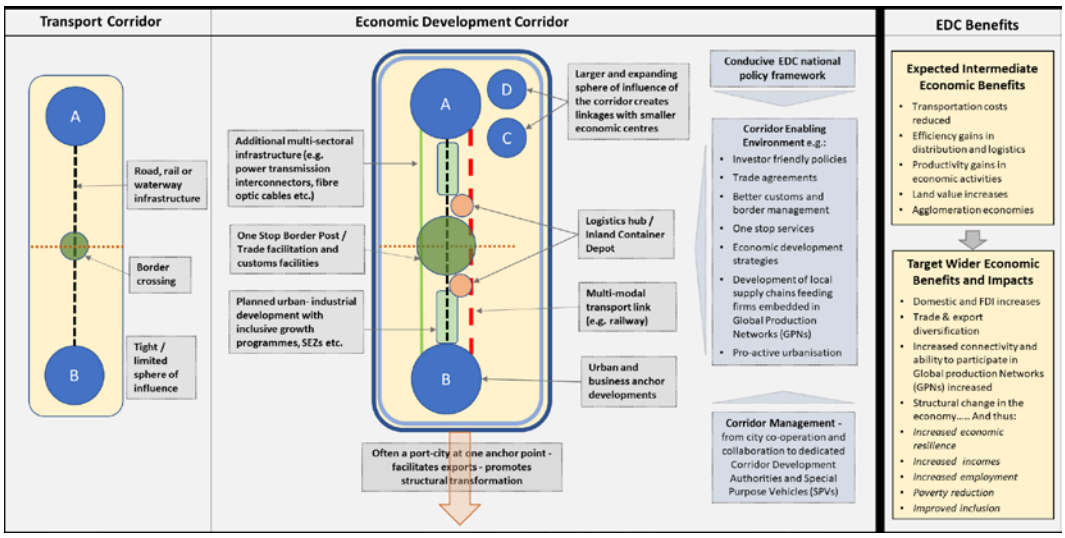
The IRIMP plan covers infrastructure in Transport, ICT, Energy and Transboundary Water Resources. The IGAD region is unfortunately characterized by the low stock of infrastructure, particularly in transport and energy, and the inadequate development of the ICT sector and digital economy. Studies have shown that inadequate infrastructure shaves off at least 2% of Africa's

annual economic growth. Adequate infrastructure would lead to productivity gains by African firms of up to 40%.

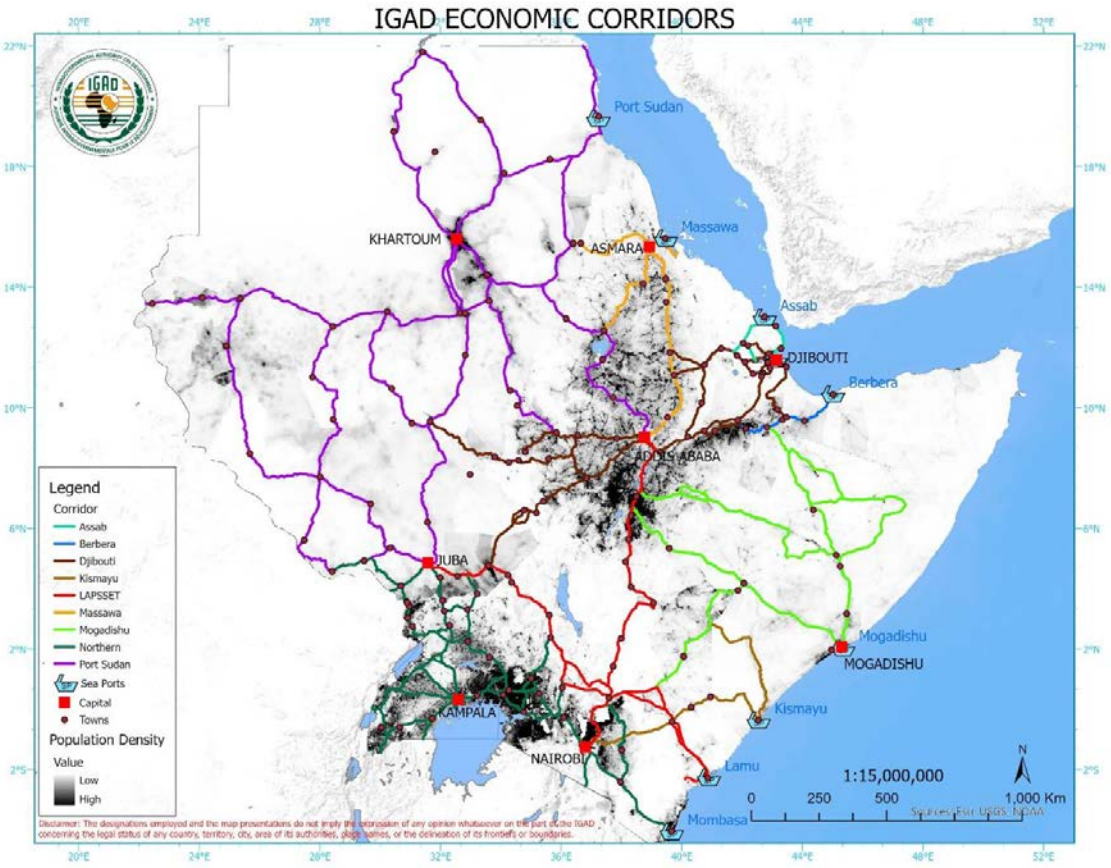
The objectives of the plan are 4, i.e., to: a) Develop a strategic framework for infrastructure development in the Transport; Energy; ICT and Water sectors. B) Facilitate intra-regional and inter-continental trade, and the flow of goods, services, and the movement of people across borders of the region. c) Support regional economic growth that is inclusive, resilient, and sustainable; and d) Reduce isolation and promote regional integration and stability.

The primary principle guiding the regional plan is to transition the present transport corridors into economic development corridors (EDCs) that maximize job creation, are resilient to climate change, are people-driven and strengthen the role of women through gender-sensitive infrastructure development. Corridors develop is conceived through four stages: 1) basic transport corridor; 2) multi-modal / multi-sectoral corridor; 3) logistics corridor; 4) EDC, as illustrated in following figure.

The EDC framework is widely used by international development organizations and national governments to direct resources to promote economic growth. An EDC most commonly contains a transportation corridor (generally a road, railway or waterway) but is much more than a linear area connecting two countries, regions or cities through which goods and people pass. An EDC is an instrument of development that is used to ensure that the transportation hard infrastructure generates important economic and social development impacts. Transforming a transport corridor into an EDC, however, is often not a straight-forward task. It demands political commitment and stakeholder involvement from all levels of government and can often require the establishment of a special purpose vehicle (SPV) to co-ordinate, direct and manage the infrastructure and policy-type initiatives required for the success of an EDC.



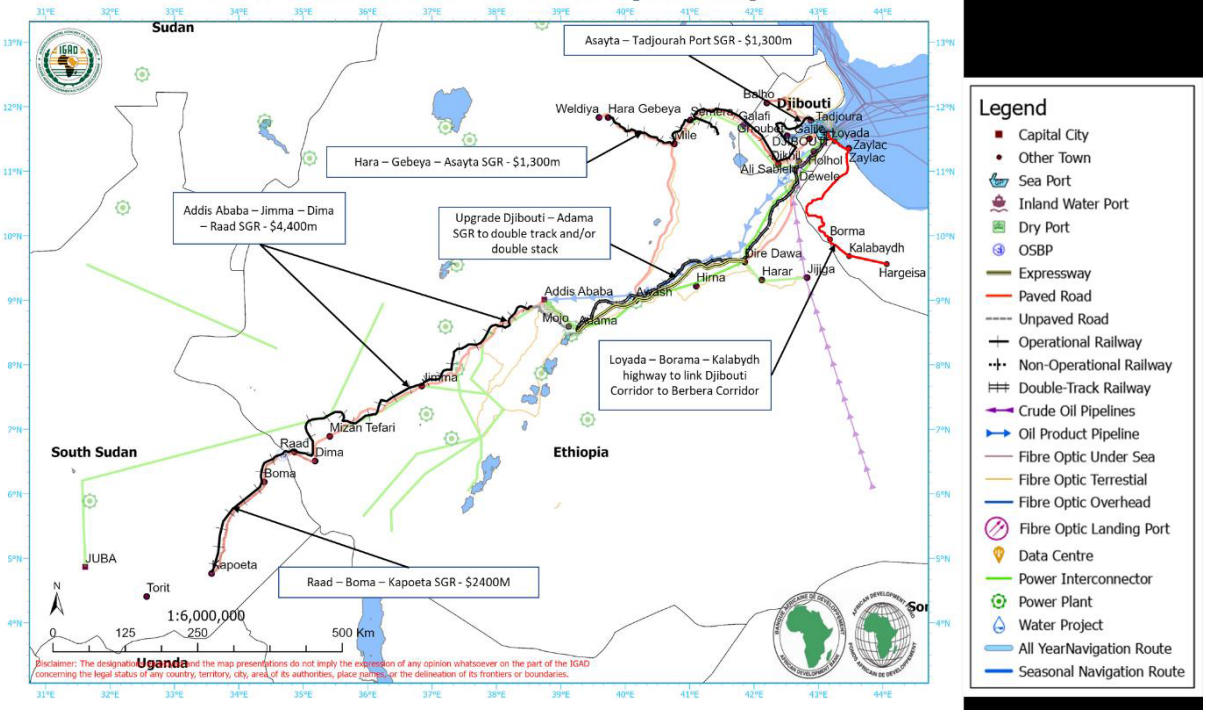
There are nine potential EDCs in the IGAD region (see following figure). At present, however, just three are functioning effectively as regional transport corridors, and these have not yet become clear drivers of economic development and structural transformation. The Northern Corridor is the most developed and is a functioning logistics corridor, while the Djibouti Corridor and Port Sudan Corridor are multi-modal / multi-sectoral corridors.



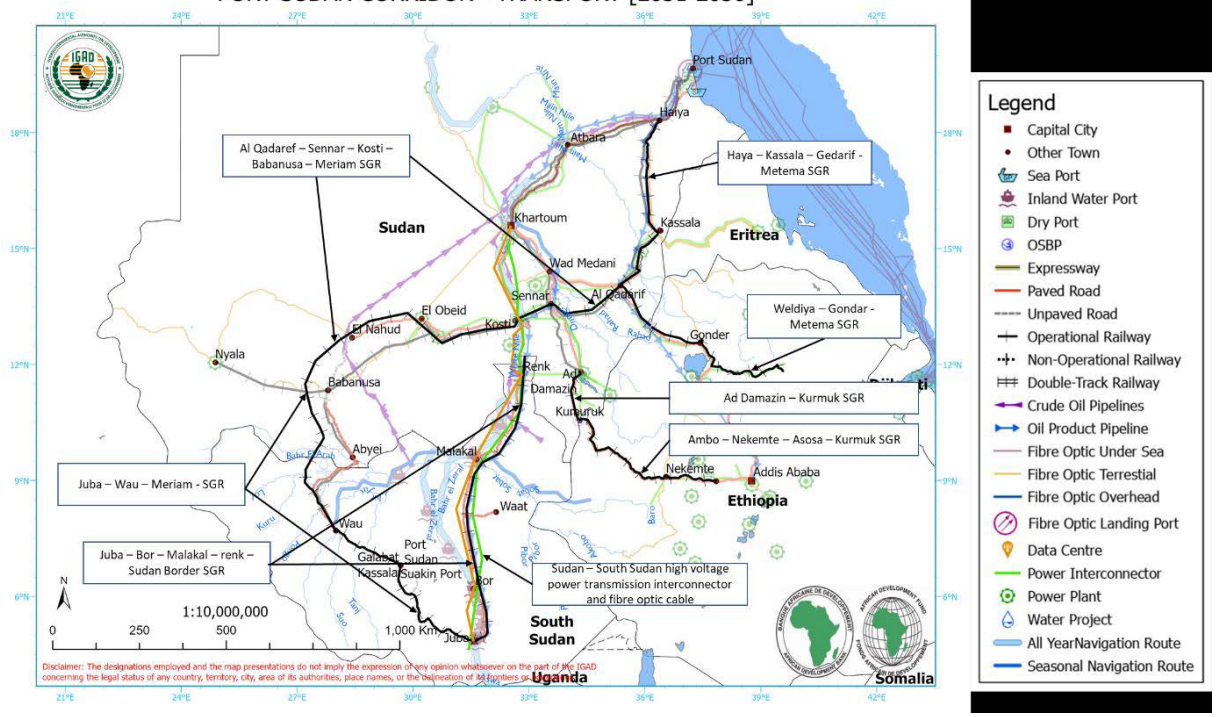
It is recommended that the IGAD region follows a Phased Corridor Development pathway, with emphasis on the following: 1. Transform the Northern, Djibouti and Port Sudan Corridors into EDCs by 2030 that are important drivers of growth, regional integration, and prosperity in the IGAD region. 2. Develop the LAPSSET, Berbera and Massawa Corridors into functional logistics corridors by 2030 that have the potential to integrate the region and serve as conduits for intra-regional and international trade; 3. Complete missing links on the Mogadishu, Kismayo and Assab Corridors to ensure functional transport corridors by 2030.

Following are the foreseen situation at year 2050, for the major corridor interesting Ethiopia:

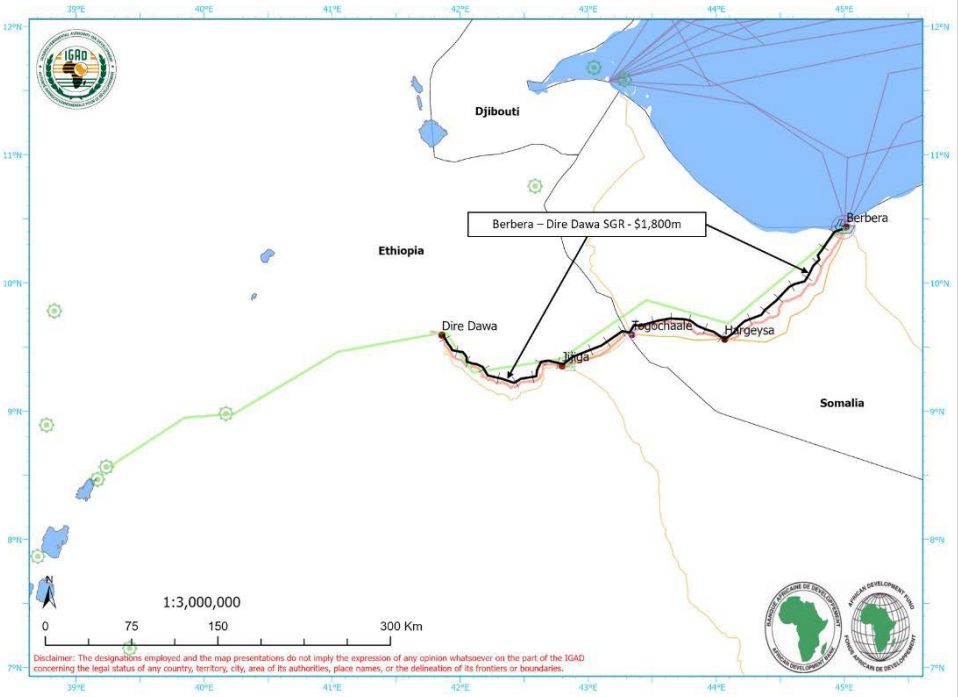
DJIBOUTI CORRIDOR INFRASTRUCTURE [2031-2050]

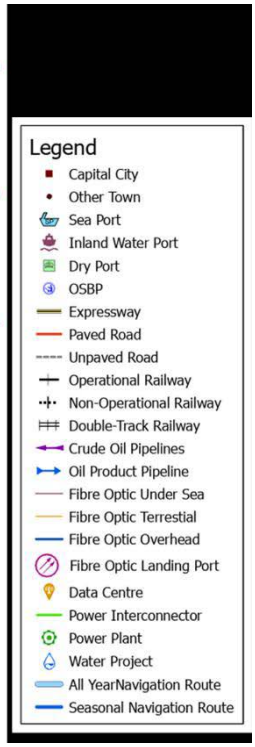


PORT SUDAN CORRIDOR - TRANSPORT [2031-2050]

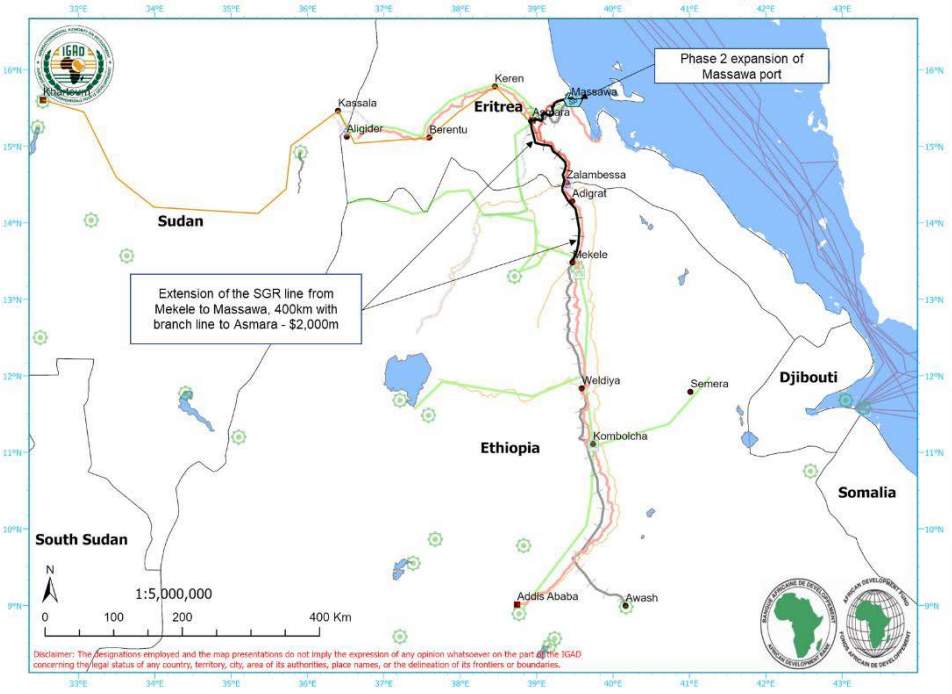


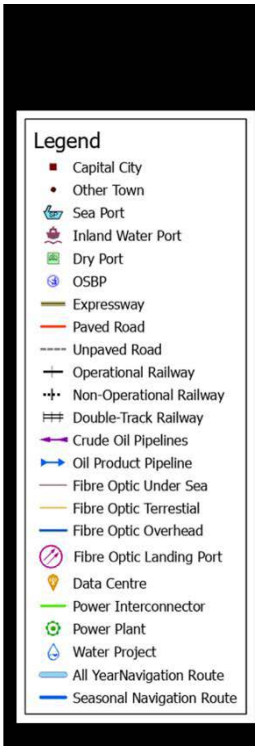
BERBERA CORRIDOR INFRASTRUCTURE [2031-2050]

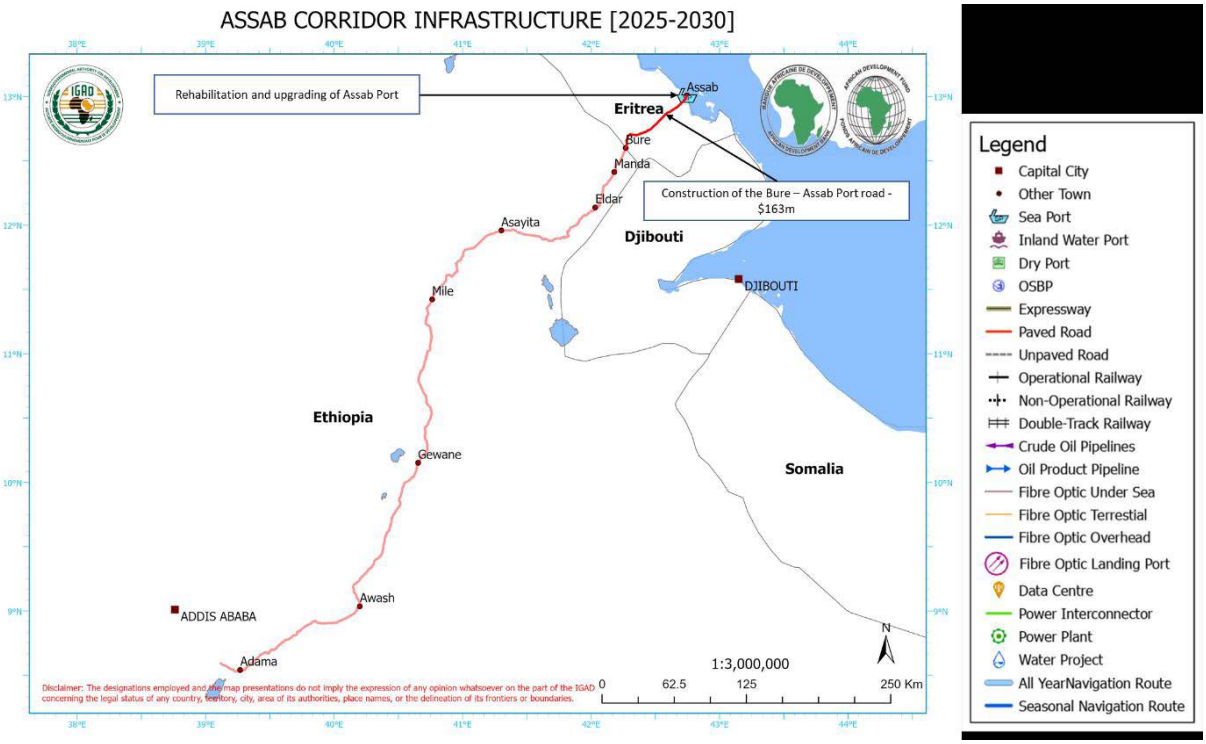


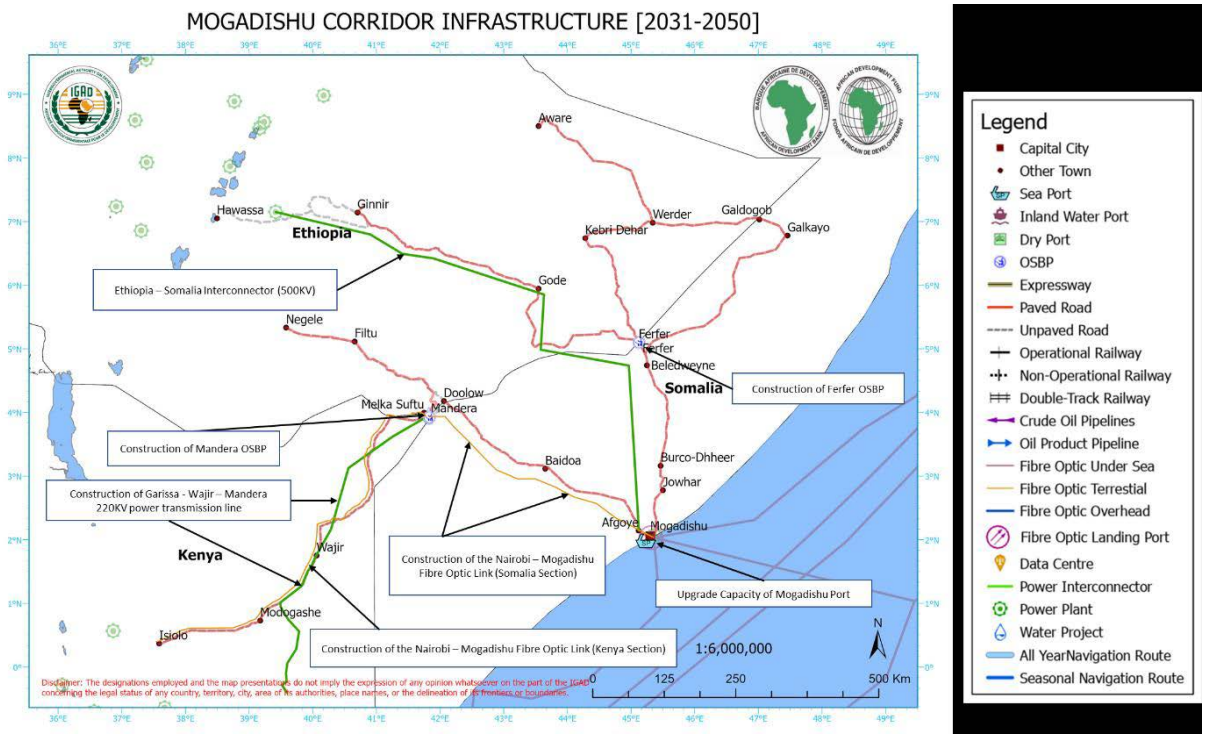


MASSAWA CORRIDOR INFRASTRUCTURE [2030-2050]









7.7 TRANSPORT SYSTEM INNOVATION.

The Ethiopia Ministry of Innovation and Technology has recently prepared, with UNCTAD assistance, a Science, Technology and Innovation Policy Document, in order to create innovation systems in the

country, implementing the Sustainable Development Goals (SDGs) and develop the export-oriented and manufacturing sector-based industrialization strategy.

The ETMP 2050 is the right chance to make the **transport system sustainable** in terms of environment, safety, adapt to climate change, maintainable and congruent with transport demand, avoiding over-offering of transport infrastructure/services. It is also the chance to introduce innovative themes in transport planning, administration, management and operation, using the most appropriate and effective tools and IT systems. In terms of **transport planning**, a holistic approach is suggested, coordinating the different vertical levels: national, regional, woreda and municipal levels and including the different modes of transport. In terms of administration, the use of transport demand management to reduce vehicular traffic and encourage the use of public and non-motorized transport, with the adoption of SUMPs - **Sustainable Urban Mobility Plans and smart city concepts** for Ethiopia cities and with the development of integrated rapid public transport network plans and transit-orientated developments (TOD) in development corridors. In terms of **transport technology**, Ethiopia should introduce different modes of transport of passengers (cable cars) where technically and economically justified, pipeline transport for the import of fuel liquid or gas and take advantages of the Internet of Things (IoT) in all transport modes and follow the ***futuribles innovations*** in terms of autonomous vehicles, hydrogen vehicles, etc. For each mode of transport, the latest technological development is highlighted in this report and also the current international research is identified, in order to be followed and best opportunities captured.

8 PLANNING SCENARIOS

8.1 EXTERNAL UNCERTAINTIES

It must be considered that, at the eleventh month of experiencing the outbreak, and after having seen moving it from Far East to West Europe, to Americas and Russia and then to south-east Asia (and marginally to Africa), after having experienced in many countries a second wave, that in some cases has been more serious than the first, it is not yet possible to predict the end of it, so any forecast and projection has limited evidence ground and high uncertainty, along the two dimensions of the depth and of the duration of the health and economic global crisis.

The pandemic is in itself an uncertainty of high magnitude, but the reactions of the States and of the Supra-National and International Organizations are opening a spectrum on new uncertainties, some of positive, others of negative sign. The European union has budgeted 1,8 Trillion Euro to be spent in six years for its Recovery and Resilience plan. Each EU Nation, that will formulate the proposals to be financed by the EU, is obliged to devote al least 32% of the resources to the environmental protection. This means the "Energetic Transition", the process of de-carbonisation of the energy sources, can count on a gigantic number of resources, that will surely speed the R&D results and the required investments. This acceleration will lead to a structural change in the transport technologies and, in the thirty years perspective, almost any kind of engine and of transport mode will be deeply involved in the change. In particular, the Hydrogen technology, used as a mean of cumulating and storing the electric energy, in order to use it in amount, places and times more effective than the traditional batteries, seems to be the preferred answer for many sectors both for the transport engines and for the industrial sector power (steel, cement, base chemistry…). A national hydrogen strategy has been already declared by some of the developed countries, and by the EU itself.

On the other side, this pandemic will worsen the debt/GDP ratio of almost all the nations, and in general will weaken the world economy, also because the most hit classes are the poorest, and the increasing inequality, in turn, brings political instability, both in developed and developing societies.

Al, these uncertainties of un-precedent magnitude bring high risks of obsolescence of the present Master plan, in the case that the future economic trends, drawn for a thirty years period, would resolve to be non-confirmed by the actual data recorded in the first years of plan.

In these highly uncertain conditions, it is not logic nor prudent to hypothesize a unique frame for the formulation of the transport policies and for the planning of the infrastructure investments.

In order to obtain a "transport master plan resilience", it is necessary to create a "multi-frame" scenario set and a number of policies and plans coherent with the specific scenario.

After the scenario definition, it is also necessary to identify the **key uncertainties** that could bring the decision, from the Governing Authorities, to switch from one scenario to another. Once defined the key uncertainties, it will be useful to find the indicators that can anticipate the understanding of the outcome of the key uncertainties and then the decision to adopt the Plan coherent with the actual Scenario.

It is highly recommended, due to the exceptional uncertainty situation, that the ENTMP will be monitored in its projection validity with a fixed frequency, that can be stated in every five years, in order to check the status of the key uncertainties and, if the case, to switch the reference scenario.

For this reason the methodology has been amended and a multi-scenario plan will be proposed, in order to strengthen the resilience of the National Transport Master Plan itself.

In amendment to what described in the inception report, there will not be anymore 2-3 scenarios to express alternative transport policies within the same international and national conditions, to be selected via a MCA Analysis, but a true multiple plan, each with specific international, national and transport sector conditions. The base scenario will necessarily be the Go-Ahead Scenario, that is

coherent with all the transport sector policies and strategies already adopted by the FRE. If one or more of the key uncertainties will materialize in terms that ore very different from the ones hypothesized in the base scenario, it will be opportune to change the reference scenario and switch to one of the others described scenarios.

8.2 IDENTIFIED SCENARIOS

Task 4 will represent the focus for the construction of the National Transport Master Plan and is based on the definition of different packages of integrated and inter -modal actions and measures, following defined development strategies. In the methodology described in the inception report, it is said that after iterative simulations at different time horizons, two/three development scenarios must be compared and their impacts on the desired national objectives evaluated.

8.2.1 The "Go-Ahead" Scenario

This is the scenario characterized by the continuity with the policies and the planning expressed by the government of Ethiopia in recent times. The macro-economic conditions hypothesized are the ones of the Base Scenario described in the paragraph 6.1.4.

International Conditions. There will be a smooth recovery from pandemic of the most developed countries, that recuperate the pre-Covid levels in two-three years, also thanks to a strong injection of public-funded investments in the economies. The trend toward globalisation will take new strength, with new records of world trade and progressive improvement of the LIC (Low Income Countries), that start experimenting autonomous growth, ignited by the Foreign Direct Investments (FDI).

National Conditions. In this frame the "*Homegrown Economic Reform Plan*" of Ethiopia keeps its objectives, even though the objectives are reached with years of delay. The International Organizations like FMI and WB express a strong support to the national objectives. Ethiopia is able to leverage on its points of strength, as to be the logistic hub of the Continent for the air transport, and becomes a preferred destination of the Foreign direct investments, with significant injection of know-how and new technologies.

Transport sector Conditions. The railway reform is implemented and the commercial performance substantially improved. As a logical consequence, international investors and operators show interest in entering the sector and position themselves through their investments. In a mix of PPP initiatives and of direct investments by the public rail operator, the reformed Railway is able to integrate and implement the Ethiopian Railway National Network.

This scenario can, in principle, fully incorporate the "Ten years Perspective Plan" of the transport sector.

In road sector a substantial number of infrastructures are built, in order to avoid the bottlenecks and to improve the service ratios.

International corridors are opened for the logistic integration of the horn of Africa, to connect Ethiopia to the ports of Berbera and Lamu via road, and to the ports of Port Sudan, Assab and again Lamu via rail.

Here the economic forecasts and the traffic demand for this scenario:

Table 77: GDP forecast

Year	ET GDP (constant 2010 US bn $)	Year over Year %	CAGR of the period %
2003	14,06	-	
2004	15,97	13,6	
2005	17,86	11,8	
2006	19,8	10,8	
2007	22,06	11,5	
2008	24,44	10,8	
2009	26,6	8,8	11,2
2010	29,93	12,6	
2011	33,28	11,2	
2012	36,16	8,6	
2013	39,98	10,6	
2014	44,09	10,3	10,6
2015	48,67	10,4	
2016	52,56	8	
2017	57,92	10,2	
2018	62,38	7,7	
2019	68	9	9,1
2020	69,29	1,9	
2021	69,29	0	
2022	71,09	2,6	
2023	73,51	3,4	
2024	75,45	4	2.4
2025	79,5	4	
2026	82,68	4	
2027	85,99	4	
2028	89,43	4	
2029	93,01	4	4
2030	98,59	6	
2031	104,5	6	
2032	110,78	6	
2033	117,42	6	
2034	124,47	6	6
2035	133,18	7	
2036	142,5	7	
2037	152,48	7	
2038	163,15	7	
2039	174,57	7	7
2040	185,04	6	
2041	196,15	6	
2042	207,92	6	
2043	220,39	6	
2044	233,61	6	6
2045	245,29	5	
2046	257,56	5	
2047	270,44	5	
2048	283,96	5	
2049	298,16	5	5

Table 78: Transport demand forecast

Year	GDP Year over Year %	ETA PASSENGERS	Passenger Transport Demand Year over year %	ETA FREIGHTS	Freights transport Demand Year over year %
2020					
2021					
2022					
2023					
2024	2,4	1,09	2,62	1,12	2,69
2025					
2026					
2027					
2028					
2029	4	1,09	4,36	1,12	4,48
2030					
2031					
2032					
2033					
2034	6	1,09	6,54	1,12	6,72
2035					
2036					
2037					
2038					
2039	7	1,09	7,63	1,12	7,84

Year	GDP Year over Year %	ETA PASSENGERS	Passenger Transport Demand Year over year %	ETA FREIGHTS	Freights transport Demand Year over year %
2040					
2041					
2042					
2043					
2044	6	1,09	6,54	1,12	6,72
2045					
2046					
2047					
2048					
2049	5	1,09	5,45	1,12	5,6

8.2.2 The "Next Generation" Scenario

International conditions. The guiding idea under this scenario is that the technologies and the energy sources used in motorizing the transport means have shown in the last months an astonishing acceleration, thanks to the political actions in response of the global warming, and the major economies will invest unprecedented amounts of money in the re-conversion of their transport systems in order to reduce emissions. The Recovery plan of EU, financed with 1.800 billion Euro, will support many of these re-conversions in view of the new challenging objectives of EU and this will give momentum to the new technologies to evolve from the research and development phase to the mass production phase.

It is now clearer which technologies will dominate the next phase: electric and hybrid engines for the small and medium land vehicles and Hydrogen fuel cell engines for the large vehicles and for the sea vessels.

About Hydrogen engines for heavy trucks, it is a matter of fact that during 2020 almost all the leading world producers have announced the commercialisation of a new Hydrogen model:

- **Hunday** has already started to deliver its first fleet to Switzerland, where this kind of vehicle has total fiscal exemption.
- **Iveco** will start the production of its Fuel Cell Electric Vehicle (FCEV) in 2023, in partnership with Nikola
- **Bosch** will start the series production of its hydrogen engine in 2022-23;
- **Toyota** has announced the production in 2021 and the experimental use is already started
- **Daimler** trucks has announced its hydrogen model, with 1.000 km of autonomy for 2023.
- **Scania** has announced four new cell fuel vehicle and its partner ASKO has started building the network of the hydro-gas stations in Norway.

National Conditions. The production of the hydrogen as fuel will require high amounts of electricity, and the nations with relative abundant electric generation through green sources will have a comparative advantage in competition. Ethiopia, thanks to its hydroelectric massive investments, will be in that position.

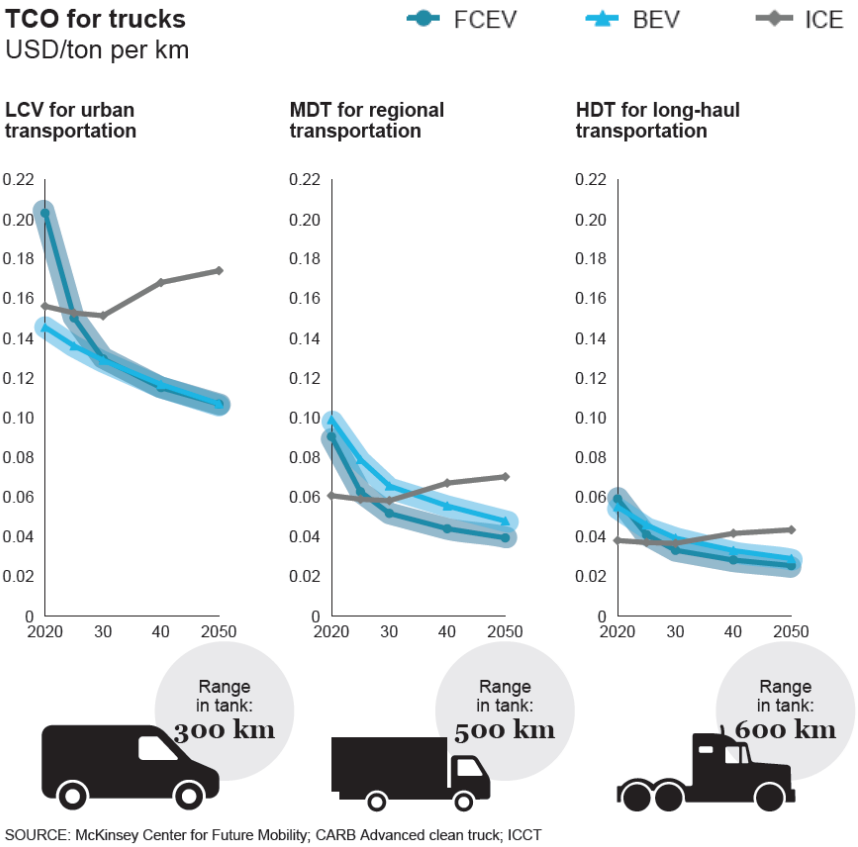
Transport Sector Conditions. The Ethiopian approach to the de-carbonisation, declared in Paris in occasion of the COP 21- Hydroelectric generation and electrified railway- has also the road alternative of zero emission via the use of coaches and trucks with fuel cell engines. This can reduce the risk of the start-up of new railways lines and better capitalize the recent and future investments in roads.

This scenario is based on a policy that is anyway coherent with previous initiatives of the government: the always declared approach to zero emissions policy and the start of the production in the Ethiopian transplant that produces electric cars as a initiative in cooperation between the Ethiopian Government and the Korean corporation Hunday.

It must be also considered that recent forecasts, done by Mc Kinsey and Co. locate in the Masterplan horizon the cost neutrality between the road freight traditional internal combustion vehicles (ICE) and Fuel Cell Electric Vehicles (FCEV), that use Hydrogen as fuel and produce zero emissions.

In particular, as the following picture shows, in the case of the Heavy-Duty Trucks (HDT), the total cost of operation is calculated as being four USD Cents per ton/km for ICE and six for FCEV in 2020. The projection to 2050 brings to invert the convenience: it will be 4,5 cents for ICE and just 3,5 cents for FCEV.

Figure 131: Total Cost of operations for ICE; BEV and FCEV Trucks



SOURCE: McKinsey Center for Future Mobility; CARB Advanced clean truck; ICCT

In these conditions, the investment plan will be much more focused on the road infrastructures, that become more efficient and far more environmentally friend. The railways investment is reduced and focused on the strategic lines, like the ones for the main international corridors.

The GDP forecast and the transport demand forecasts of this scenario coincides with the ones of the previous scenario:

Table 74: GDP forecast

Year	ET GDP (constant 2010 US bn $)	Year over Year %	CAGR of the period %
2003	14,06	-	
2004	15,97	13,6	
2005	17,86	11,8	
2006	19,8	10,8	
2007	22,06	11,5	
2008	24,44	10,8	
2009	26,6	8,8	11,2
2010	29,93	12,6	
2011	33,28	11,2	
2012	36,16	8,6	
2013	39,98	10,6	
2014	44,09	10,3	10,6
2015	48,67	10,4	
2016	52,56	8	
2017	57,92	10,2	
2018	62,38	7,7	
2019	68	9	9,1
2020	69,29	1,9	
2021	69,29	0	
2022	71,09	2,6	
2023	73,51	3,4	
2024	75,45	4	2.4
2025	79,5	4	
2026	82,68	4	
2027	85,99	4	
2028	89,43	4	
2029	93,01	4	4
2030	98,59	6	
2031	104,5	6	
2032	110,78	6	
2033	117,42	6	
2034	124,47	6	6
2035	133,18	7	
2036	142,5	7	
2037	152,48	7	
2038	163,15	7	
2039	174,57	7	7
2040	185,04	6	
2041	196,15	6	
2042	207,92	6	
2043	220,39	6	
2044	233,61	6	6
2045	245,29	5	
2046	257,56	5	
2047	270,44	5	
2048	283,96	5	
2049	298,16	5	5

Table 75: Transport demand forecast

Year	GDP Year over Year %	ETA PASSENGERS	Passenger Transport Demand Year over year %	ETA FREIGHTS	Freights Transport Demand Year over year %
2020					
2021					
2022					
2023					
2024	2,4	1,09	2,58	1,12	2,66
2025					
2026					
2027					
2028					
2029	4	1,09	4,36	1,12	4,48
2030					
2031					
2032					
2033					
2034	6	1,09	6,54	1,12	6,72
2035					
2036					
2037					
2038	7	1,09	7,63	1,12	7,84

Year	GDP Year over Year %	ETA PASSENGERS	Passenger Transport Demand Year over year %	ETA FREIGHTS	Freights Transport Demand Year over year %
2039					
2040					
2041					
2042					
2043					
2044	6	1,09	6,54	1,12	6,72
2045					
2046					
2047					
2048					
2049	5	1,09	5,45	1,12	5,6

8.2.3 The "Limits to Growth" scenario

International Conditions. This scenario could materialize if the economic effect of the pandemic will be much worse than the ones assumed in the World economic Outlook of October 2020 by IMF.

This would reflect in a deep economic, fiscal and employment crisis in the most developed western countries –particularly EU and USA – that would take years to recuperate the pre-Covid levels. In turn, the necessary measures to reduce the fast-growing public debt would resolve in cutting resourced for the bilateral cooperation and in reluctance to grant growing financial resourced to the international Development banks. The world trade growth rates would be hit by the reduction both of consumptions and of investments, and, in general, the interaction between developed and developing countries would decrease.

In this situation, the crisis would be quickly transferred to the Low-Income Countries (LIC).

National Conditions. For what concerns Ethiopia, the "*Homegrown Economic Reform Plan*" that continued to be vulnerable to external shocks, would see these vulnerabilities materialize.

In particular, it was already declared that potential shocks due to rising protectionism and weaker-than-expected global growth would negatively affect exports further exacerbating FX and debt vulnerabilities. Also, international air transport market, that brings relevant amounts of FX to Ethiopia, would see its perspectives worsening.

Under this scenario, the PPP attractiveness for international investors would be much reduced, and at the same time the public-owned transport and infrastructure Companies would have limited resources to be invested, in a general situation of shortage of FX and consequent difficulty to introduce foreign technologies to improve the national infrastructures and transport services.

Transport Sector Conditions. In this situation, it would be perfectly logic for the central Government to abandon the Go-Ahead scenario Master Plan and to recur to a Contingency Plan, coherent with the present Scenario.

The rational strategic approach to this Contingency Plan is to concentrate the investment spending to the ongoing projects, in order to complete them and avoid that the relevant investment expenses already borne would remain without benefits.

The new investment projects would be limited to the ones that can really make a strong difference and open a new business perspective. To finance these projects, the central Government should be able to provide the sovereign guaranties. A stronger investment activity can be borne in the second decade and third decade, when the conditions for a new growth phase will have been restored.

Furthermore, the investments less impacting in the short run on the FX need would have more

possibility to be approved and carried on not incurring in the typical stop-and-go situation.

The Investment Plan accelerates after the first ten years, in parallel with the recovery.

Here the economic forecasts and the traffic demand for this scenario

Table 76: GDP forecast

Year	ET GDP (constant 2010 US bn $)	Year over Year %	CAGR of the period %
2003	14,06	-	
2004	15,97	13,6	
2005	17,86	11,8	
2006	19,8	10,8	11,2
2007	22,06	11,5	
2008	24,44	10,8	
2009	26,6	8,8	
2010	29,93	12,6	
2011	33,28	11,2	
2012	36,16	8,6	10,6
2013	39,98	10,6	
2014	44,09	10,3	
2015	48,67	10,4	
2016	52,56	8	
2017	57,92	10,2	9,1
2018	62,38	7,7	
2019	68	9	
2020	69,29	1,9	
2021	69,29	0	
2022	70,12	1,2	
2023	70,96	1,2	
2024	71,81	1,2	1,1
2025	72,68	1,2	
2026	73,55	1,2	
2027	74,43	1,2	2,3
2028	77,41	4	
2029	80,50	4	
2030	85,33	6	
2031	90,45	6	
2032	95,88	6	6
2033	101,64	6	
2034	107,73	6	
2035	115,27	7	
2036	123,34	7	
2037	131,98	7	7
2038	141,22	7	
2039	151,10	7	
2040	160,17	6	
2041	169,78	6	
2042	179,96	6	6
2043	190,76	6	
2044	202,21	6	
2045	212,32	5	
2046	222,93	5	
2047	234,08	5	5
2048	245,78	5	
2049	258,07	5	

Table 77: Transport Demand forecast

Year	GDP Year over Year %	ETA PASSENGERS	Passenger Transport Demand Year over year %	ETA FREIGHTS	Freights Transport Demand Year over year %
2020					
2021					
2022					
2023					
2024	1,1	1,09	1,4	1,12	1,23
2025					
2026					
2027					
2028					
2029	2,3	1,09	2,52	1,12	2,59
2030					
2031					
2032					
2033					
2034	6	1,09	6,54	1,12	6,72
2035					
2036					
2037					
2038					
2039	7	1,09	7,63	1,12	7,84
2040					
2041					
2042					
2043					
2044	6	1,09	6,54	1,12	6,72
2045					
2046					
2047					
2048					
2049	5	1,09	5,45	1,12	5,60

8.2.4 The key Uncertainties and their timing

As said in paragraph. 8.1, it is now necessary, after the scenario definition, to identify the key uncertainties that could bring the decision, from the Governing Authorities, to switch from one scenario to another.

The first key uncertainty to face in the time scale will be about the depth of the global economic crisis deriving from the pandemic and the recovery times at international and national level.
Within year 2023 it will be already time to ask the following question:

- **will economic growth recover and Homegrown economic reform plan can be respected?**

As a matter of fact, if the national GDP growth has not restored and reached a yearly rate of at least 3-4%, the transport infrastructure investment planned in the go-ahead Scenario will hardly be financially sustainable by the State Treasury, and will be necessary to reduce the investment plan, or, in other words, to switch to the Limits-to-growth Scenario. In that scenario the stagnation will last about seven years, probably coupled with general instability, and then the path of growth will be restored and a more significant amount of infrastructure investments can be performed.

In the hopefully case that the *Homegrown economic reform plan* can be respected, then the next key uncertainty will materialize around the year 2025, a time span sufficient to understand if the

complex process of railway reform, at present under study by the MOT, will have started having encouraging results, both in terms of institutional capacity and in terms of commercial and production performance of the operating railway lines, particularly the Addis- Djibouti one.
So, the question to be answered around year 2025 is the following:

- **will Ethiopian railway reform be successful and its commercial performance accelerates?**

If the answer will be positive, then the Go-Ahead Scenario will still be on and its policies and investment plan, with a huge part dedicated to railway lines, can continue. If the answer, at the opposite, will be negative, to invest very relevant resources in a modality that still has institutional, organization and technical problems unresolved will be a hazard. In this case it will be logical to bet more on the road modality, and, in order to mitigate the environmental impact of this policy, it will be opportune to structure a policy of incentives and of direct intervention by the SOE to anticipate the introduction of less impacting vehicles. In other words, it will be the case to switch to the Next Generation Scenario.

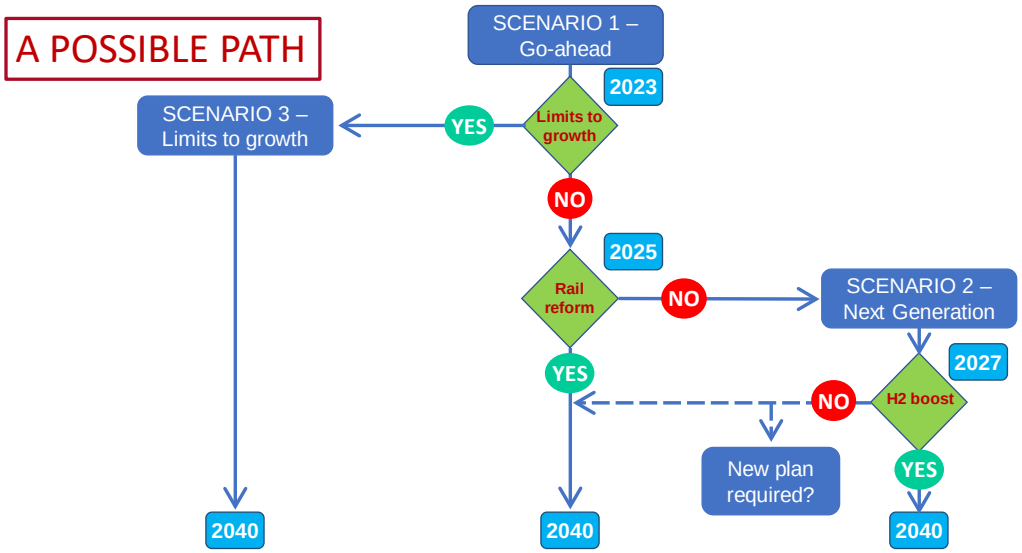
Also, in this scenario a key uncertainty will be faced, presumably around the year 2027. At that period, it will be much easier to answer the question about the third key uncertainty:

- **is the "energy transition" and the Hydrogen technologic shift materializing?**

In case of positive answer, the relevant road investments can be effectively complemented with the incentives policy, and the effect in the medium-long term will be a significant development of the road transport in a framework of economic and environmental sustainability. In case of negative answer, it will be necessary to make a technology assessment and coherently define a "road vehicles strategy", that can assume as "bridge policy" an intermediate stage of promotion of more mature and low impacting technologies, as hybrid motorization and/or LNG engines.

At the same time the status of the railway sector can be re-evaluated. At that point an "extraordinary maintenance" of the NTMP can be recommended.

Figure 132: A possible path for the Scenarios Shifting



In general, to find the right path, and to make the right shift between scenarios, a monitoring procedure of the plan projections and implementation. It will be proposed by the Consultant within the capacity-building part of the assignment. As anticipated, a five-years revision of the hypotheses underlying the Plan is opportune. The results of this revision should guide any decision to switch

to another scenario as baseline, or eventually to reformulate the Scenario and to have a new run of the Master Plan Model with different value of the variables exogenous to the model itself.

8.2.5 The key Uncertainties Indicators

In order to anticipate the understanding of the phenomenon about the key uncertainties, it is hypothesized here a number of indicators to be monitored for each key uncertainty. A precise list, together with the guiding values, will be supplied within the procedure for the ETMP five-years revision.

It will be preferred to select a main indicator, in order to have precise threshold values and minor ambiguities in the data interpretation. A number of ancillary indicators can complete the picture.

Indicators for Key Uncertainty 1: will economic growth recover and *Homegrown economic reform plan* can be respected?

The grow rate of GDP should be the principal indicator. Ancillary positive indicators can be a good FX availability, the export of goods increase, the balance of trade improvement, the foreign exchange stability.

Indicators for Key Uncertainty 2: will Ethiopian railway reform be successful and its commercial performance accelerates?

The main indicator should be the percentage of increase in Tonnes-km transported on the Addis-Djibouti line, that nowadays is below the expected results and needs to be almost doubled to allow a better profitability of the line.

Ancillary variable as positive indicators can be:

- Good organization integration and clear command-and-control-line-between the former ERC, EDR and CDE;
- Full institutional implementation of the Railway Safety Regulatory Body;
- Start of private investments in railway sector in accordance of approved schemes of PPP.
- Indicators for Key Uncertainty 3: is the “energy transition” and the Hydrogen technologic shift materializing?

The main indicator should be the Hydrogen Fuel cell engines as percentage of the delivery of new heavy trucks in Developed countries.

Ancillary variable as positive indicators can be:

- delivery of new electric cars (battery electric + Hydrogen fuel cell) in the Developed countries become more than the 50% of the total in the period.
- GOE officialises its own “Hydrogen Strategy”
- Ethiopia start using part of the surplus of hydroelectric energy to produce “green hydrogen

8.3 TRANSPORT INVESTMENTS BY SCENARIOS & TERMS

According with the scenarios described above and the foreseen implementation of the different economic plans, the following intervention packages have been defined. The detailed intervention packages will be detailed in the ETMP – Sectorial Report and agreed with the Client and stakeholders.

Table 79: List of Interventions by scenario and terms (short, medium, long)

Sectors	ACTIONS	1 - Go-Ahead Scenario			2 - Next-Generation Scenario			3 - Limits-to-Growth Scenario		
		Short Term 2025	Medium Term 2035	Long Term 2050	Short Term 2025	Medium Term 2035	Long Term 2050	Short Term 2025	Medium Term 2035	Long Term 2050
ROAD NETWORK PROJECTS	FYP - Ongoing Road Projects List	X			X			X		
	Mojo-Awassa Expressway	X			X			X		
	Dire Dawa – Dewele Expressway Completion	X			X			X		
	Addis Ababa - Holeta-Ambo Expressway	X			X					X
	Addis Ababa - Alemgena-Woliso Expressway	X			X					X
	Addis Ababa-Debrebirhan Expressway		X			X				X
	Alemgena-Butajira Expressway			X		X				X
	Dire Dawa-Dengego-Harar Expressway	X			X					X
	Awash Junction-Adaitu Expressway		X		X					X
	Awash Junction -DireDawa Expressway		X			X			X	
	Adaitu-Mille-Semera Expressway			X		X				X
	Addis Ababa-Commando Expressway		X			X				X
	Melkasa - Meteara - Awash Junction Expressway	X			X					
	Semera - Djibouti/Eritrean border Expressways			X			X			
	Debre Berhan - Mekele - Eritrea border Expressway			X			X			
	Commando - Bahir Dar - Metema - Sudan border Expressway			X			X			
	Ambo - Gimbi - Asosa - Sudan border Expressway						X			
	Gimbi - Gambela - South Sudan border Expressways			X			X			
	Woliso - Jimma - Mizan Teferi - South Sudan Border Expressway			X			X			
	Awassa - Moyale - Kenya border Expressway			X			X			
	Awassa - Bilata - Filtu - Somalia border Expressway						X			
	Enlarging 3+3 lanes Addis – Nekemte Expr.						X			
	Enlarging 3+3 lanes Modjo – Ziway Expr.					X				
	Enlarging 3+3 lanes Ziway - Awassa Expr.						X			
	Enlarging 2+2 lanes Harar -Bombas Expressway	X			X					
	Enlarging 2+2 lanes Bombas - Giggiga Expressway			X						
	Giggiga - Kebridehar - Somaliland border Expressway						X			
	RING ROAD 0: Addia Ababa New Ring Road	X			X				X	
	RING ROAD 1: Ambo - Weliso - Welkite - Butajra - Ziway - Sagure - Asela			X		X				
	RING ROAD 2: Semera -Maychew –Gondar –Nekemte -Jimma-Awassa- Shikhussein-Dodoma						X			
	Enlarging 3+3 lanes Addis – Butajira Expressway			X			X			
	Enlarging 3+3 lanes Addis Ababa - Modjo Exprssway.		X			X				
	Enlarging 2+2 lanes Dire Dawa - Dewelle- Djibouti border,			X			X			
	Enlarging 2+2 lanes Holeta - Muger	X			X					
	Enlarging 2+2 Lanes Commando - Bahir Dar - Metema - Sudan border						X			
	Enlarging 2+2 lanes Adama -Melkasa - Asela	X			X					
	Interventions for road capacity adaptation			X			X			
RAILWAY	Awash-Kombolcha – Haragaria	X			X			X		
	Mekele – Haragaba	X			X			X		
	Mekelle-Assab Port Railway		X			X			X	
	Weldia-Wereta-Matema			X			X			
	Mojo-Hawassa		X			X			X	
	Hawassa-Woo-Moyale		X				X			
	Sebeta-Jimma-Bedele-Booma South Sudan			X			X			

Sectors	ACTIONS	1 - Go-Ahead Scenario			2 - Next-Generation Scenario			3 - Limits-to-Growth Scenario		
		Short Term 2025	Medium Term 2035	Long Term 2050	Short Term 2025	Medium Term 2035	Long Term 2050	Short Term 2025	Medium Term 2035	Long Term 2050
	Aisha-Berbera			X						
	Link rail lines (AA junction and freight sidings)	X			X			X		
	Addis Ababa Light Rail Expansion		X			X				X
	Wereta- Finote Selam			X			X			
	Adama- Gasera			X						
	Ejaji- Kurmuk			X						
	Signal/Interop AA- Dibouti & Awash-Haragaria	X			X			X		
	Addis Ababa-Djibouti Upgrade 1	X			X			X		
	Addis Ababa-Djibouti Upgrade 2	X			X			X		
	Addis Ababa-Djibouti Upgrade 3	X			X			X		
	Mekelle -Asmara			X						
	Addis Ababa -Finote Selam			X						
	Double track Adama – Djibouti border			X			X			
LOGISTIC INFRASTRUCTURES DRY PORTS	New Dry Ports in Jimma, Hawassa and Assosa	X			X				X	
	DP-Baeker (IAIP) Integrated Agro-Industrial Park		X			X				X
	DP-Yirgalem (IAIP) Integrated Agro-Industrial Park		X			X				X
	DP-Bure (IAIP) Integrated Agro-Industrial Park		X			X				X
	DP-Bulbula(IAIP) Integrated Agro-Industrial Park		X			X				X
	DP-Bole Lemi Industrial Park 2	X			X			X		
	DP-Kilinto Industrial Park	X			X			X		
	DP-Dire Dawa Industrial Park	X			X			X		
	DP-Adama Industrial Park 2			X			X			
	DP-Semera Industrial Park			X			X			
	DP-Assosa Industrial Park			X			X			
	DP-Aysha Indistrial Park			X			X			
	DP-Airline and Logistic Park			X			X			
	DP-Kindom Linen Industry Zone			X			X			
AIRPORTS PROJECTS	**A-Aerodrome projects**									
	Headquarter construction in Addis Ababa	X			X				X	
	New tower in Addis Ababa airport expansion	X			X				X	
	Tower and related construction in Shire Airport	X			X				X	
	Tower and related construction in Jinka Airport		X			X				X
	Tower and construction in Hawassa Airport		X			X				X
	Tower and related construction in Assosa Airport		X			X				X
	Tower and related construction in Semera Airport		X			X				X
	Addis Ababa Bole airport radar	X			X			X		
	ADS-B devices purchase and installation project	X			X			X		
	Different facilities for airports		X			X			X	
	SSR observation devices		X			X			X	
	B-New projects to start									
	T & a/n Bahirdar, Nekemt and Dembidolo airp.		X			X				X
	Bridge from the Dire dawa airport to Biken Bet	X			X					X
	T&a/n Mizanaman, Gore Metu, DebreMarkos, Yabelo and Negeleborena airports			X			X			X
	Building aviation academy center in head office		X			X				X
	Ugrading Aeronautical Information Service (AIS) & Aeronautical Information Management (AIM)	X			X					X
	C-Projects on designing stage									
	Aerodrome Projects									

Sectors	ACTIONS	1 - Go-Ahead Scenario			2 - Next-Generation Scenario			3 - Limits-to-Growth Scenario		
		Short Term 2025	Medium Term 2035	Long Term 2050	Short Term 2025	Medium Term 2035	Long Term 2050	Short Term 2025	Medium Term 2035	Long Term 2050
	Tower for Bahir dar, Nekemt and Dembidolo airp.	X			X				X	
	Design bridge Dire Dawa airport to Biken Bet	X			X				X	
	Tower designing for Jimma, Mizanaman, Gore mettu, Debre markos, Yabelo and Negeleborena		X			X				X
	Aviation academy center in head office	X			X				X	
	Completing air navigation in regional airports			X			X			X
	Upgrading the aeronautical voice information exchange		X			X	X			X
	Changing the Navigation Aids from Ground Based to satellite (GNSS)		X			X				X
	Upgrading the country's surveillance to WAM		X			X				X
	D-New infrastructures & facilities									
	New Ethiopia International Airport in Bishoftu			X			X			
	New airport in Nekemt	X				X			X	
	New airport in Mizan Aman and Gore Metu		X			X				X
	New airp. Debre Markos, Negele Borena & Yabelo			X			X			X
	N. 6 new passenger terminals		X			X				X
	N. 10 new airstrips included in 10 Years Plan		X			X				X
	Additional N. 10 new airstrips			X			X			X
	Additional N. 10 new airstrips			X			X			X
IWT Projects	Tana Lake- Bahar Dahr Port	X			X			X		
	Chamo Lake-Arba Minch Port	X			X			X		
	Abaya Lake-Dila Port	X			X			X		
	Gibe River-Tama Wildlife Reserve Port		X			X			X	
	Gibe River Mago National Park Port		X			X			X	
	Baro River-Gambela Port		X			X			X	
	Baro River-Yuddo		X			X			X	
	Blue Nile-Renaissance Dam			X			X			X
	Blue Nile-Bazbes			X			X			X
	Blue Nile-Cherasi			X			X			X

8.3.1 Go Ahead Scenario

The Go-Ahead scenario foresees the following interventions in each sector:

Table 80: Go-Ahead Scenario

ROAD NETWORK PROJECTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
FYP - Ongoing Road Projects List	X		
Mojo-Awassa Expressway	X		
Dire Dawa – Dewele Expressway Completion	X		
Addis Ababa - Holeta-Ambo Expressway	X		
Addis Ababa - Alemgena-Woliso Expressway	X		
Addis Ababa-Debrebirhan Expressway		X	
Alemgena-Butajira Expressway			X
Dire Dawa-Dengego-Harar Expressway	X		
Awash Junction-Adaitu Expressway		X	
Awash junction – Dire Dawa Expressway		X	
Adaitu-Mille-Semera Expressway			X
Addis Ababa-Commando Expressway		X	

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
Melkasa - Meteara - Awash Junction Expressway	X		
Semera - Djibouti/Eritrean border Expressways			X
Debre Berhan - Mekele - Eritrea border Expressway			X
Commando - Bahir Dar - Metema - Sudan border Expressway			X
Ambo - Gimbi - Asosa - Sudan border Expressway			
Gimbi - Gambela - South Sudan border Expressways			X
Woliso - Jimma - Mizan Teferi - South Sudan Border Expressway			X
Awassa - Moyale - Kenya border Expressway			X
Awassa - Bilata - Filtu - Somalia border Expressway			
Enlarging 3+3 lanes Addis – Nekemte Expr.			
Enlarging 3+3 lanes Modjo – Ziway Expr.			
Enlarging 3+3 lanes Ziway - Awassa Expr.			
Enlarging 2+2 lanes Harar -Bombas Expressway	X		
Enlarging 2+2 lanes Bombas - Giggiga Expressway			X
Giggiga - Kebridehar - Somaliland border Expressway			
RING ROAD 0: Addia Ababa New Ring Road	X		
RING ROAD 1: Ambo - Weliso - Welkite - Butajra - Ziway - Sagure - Asela			X
RING ROAD 2: Semera -Maychew –Gondar –Nekemte -Jimma-Awassa- Shikhussein-Dodoma			
Enlarging 3+3 lanes Addis – Butajira Expressway			X
Enlarging 3+3 lanes Addis Ababa - Modjo Exprssway.		X	
Enlarging 2+2 lanes Dire Dawa - Dewelle- Djibouti border,			X
Enlarging 2+2 lanes Holeta - Muger	X		
Enlarging 2+2 Lanes Commando - Bahir Dar - Metema - Sudan border			
Enlarging 2+2 lanes Adama -Melkasa - Asela	X		
Interventions for road capacity adaptation			X

RAILWAY PROJECTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
Awash-Kombolcha – Haragaria	X		
Mekele – Haragaba	X		
Mekelle-Assab Port Railway		X	
Weldia-Wereta-Matema			X
Mojo-Hawassa		X	
Hawassa-Woo-Moyale		X	
Sebeta-Jimma-Bedele-Booma South Sudan			X
Aisha-Berbera			X
Link rail lines (AA junction and freight sidings)	X		
Addis Ababa Light Rail Expansion		X	
Wereta- Finote Selam			X
Adama- Gasera			X
Ejaji- Kurmuk			X
Signal/Interop AA- Dibouti & Awash-Haragaria	X		
Addis Ababa-Djibouti Upgrade 1	X		
Addis Ababa-Djibouti Upgrade 2	X		
Addis Ababa-Djibouti Upgrade 3	X		
Mekelle -Asmara			X
Addis Ababa -Finote Selam			X
Double track Adama – Djibouti border			X

LOGISTIC INFRASTRUCTURES DRY PORTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
New Dry Ports in Jimma, Hawassa and Assosa	X		
DP-Baeker (IAIP) Integrated Agro-Industrial Park		X	

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
DP-Yirgalem (IAIP) Integrated Agro-Industrial Park		X	
DP-Bure (IAIP) Integrated Agro-Industrial Park		X	
DP-Bulbula(IAIP) Integrated Agro-Industrial Park		X	
DP-Bole Lemi Industrial Park 2	X		
DP-Kilinto Industrial Park	X		
DP-Dire Dawa Industrial Park	X		
DP-Adama Industrial Park 2			X
DP-Semera Industrial Park			X
DP-Assosa Industrial Park			X
DP-Aysha Indistrial Park			X
DP-Airline and Logistic Park			X
DP-Kindom Linen Industry Zone			X

AIRPORTS PROJECTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
A-Aerodrome projects			
Headquarter construction in Addis Ababa	X		
New tower in Addis Ababa airport expansion	X		
Tower and related construction in Shire Airport	X		
Tower and related construction in Jinka Airport		X	
Tower and construction in Hawassa Airport		X	
Tower and related construction in Assosa Airport		X	
Tower and related construction in Semera Airport		X	
Addis Ababa Bole airport radar	X		
ADS-B devices purchase and installation project	X		
Different facilities for airports		X	
SSR observation devices		X	
B-New projects to start			
T & a/n Bahirdar, Nekemt and Dembidolo airp.		X	
Bridge from the Dire dawa airport to Biken Bet	X		
T&a/n Mizanaman, Gore Metu, DebreMarkos, Yabelo and Negeleborena airports			X
Building aviation academy center in head office		X	
Ugrading Aeronautical Information Service (AIS) & Aeronautical Information Management (AIM)	X		
C-Projects on designing stage			
Aerodrome Projects			
Tower for Bahir dar, Nekemt and Dembidolo airp.	X		
Design bridge Dire Dawa airport to Biken Bet	X		
Tower designing for Jimma, Mizanaman, Gore mettu, Debre markos, Yabelo and Negeleborena		X	
Aviation academy center in head office	X		
Completing air navigation in regional airports			X
Upgrading the aeronautical voice information exchange		X	
Changing the Navigation Aids from Ground Based to satellite (GNSS)		X	
Upgrading the country's surveillance to WAM		X	
D-New infrastructures & facilities			
New Ethiopia International Airport in Bishoftu			X
New airport in Nekemt	X		
New airport in Mizan Aman and Gore Metu		X	
New airp. Debre Markos, Negele Borena & Yabelo			X
N. 6 new passenger terminals		X	
N. 10 new airstrips included in 10 Years Plan		X	

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
Additional N. 10 new airstrips			X
Additional N. 10 new airstrips			X

IWT PROJECTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
Tana Lake- Bahar Dahr Port	X		
Chamo Lake-Arba Minch Port	X		
Abaya Lake-Dila Port	X		
Gibe River-Tama Wildlife Reserve Port		X	
Gibe River Mago National Park Port		X	
Baro River-Gambela Port		X	
Baro River-Yuddo		X	
Blue Nile-Renaissance Dam			X
Blue Nile-Bazbes			X
Blue Nile-Cherasi			X

Figure 133: Go-Ahead Scenario 2025

Figure 134: Go-Ahead Scenario 2035

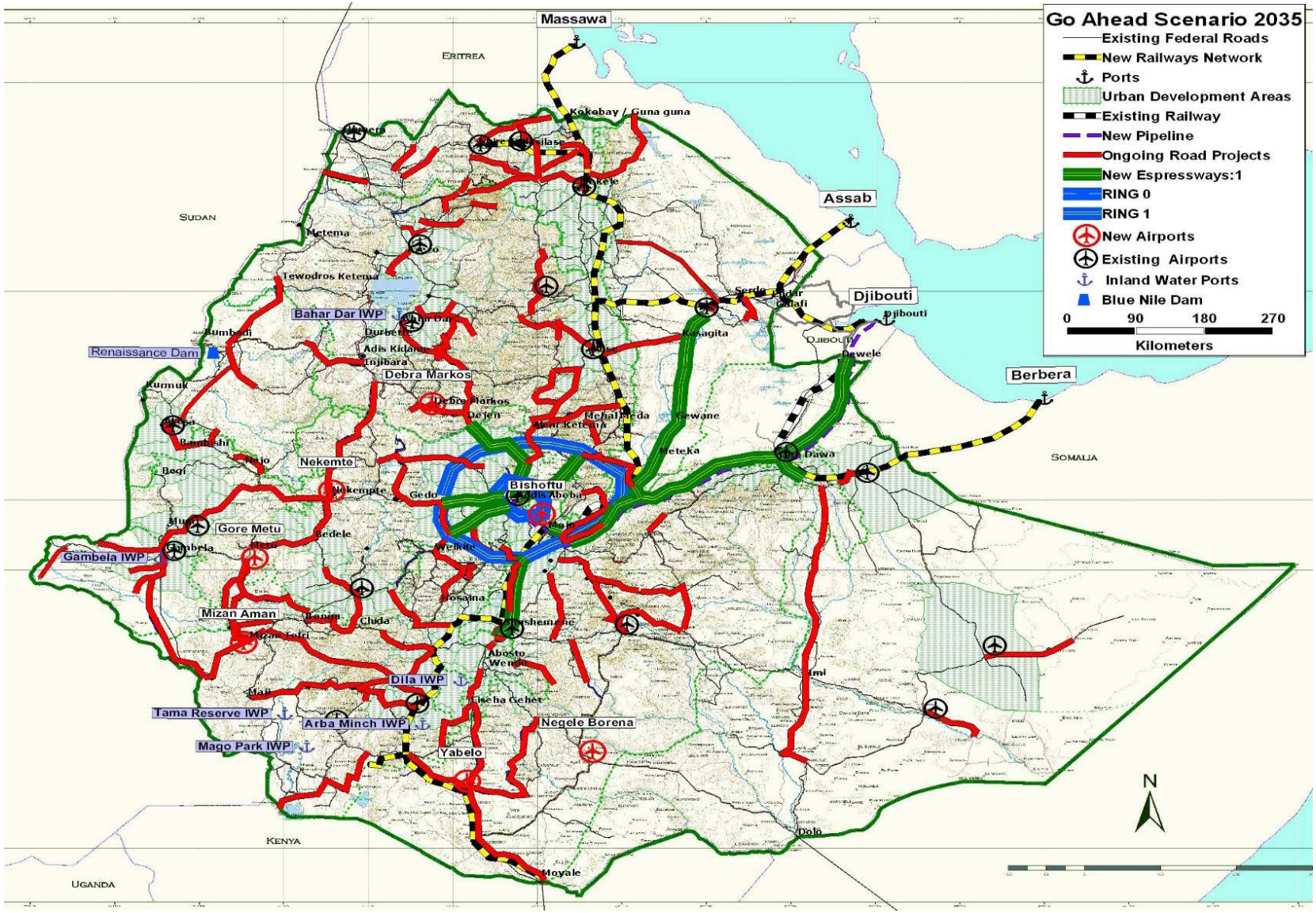
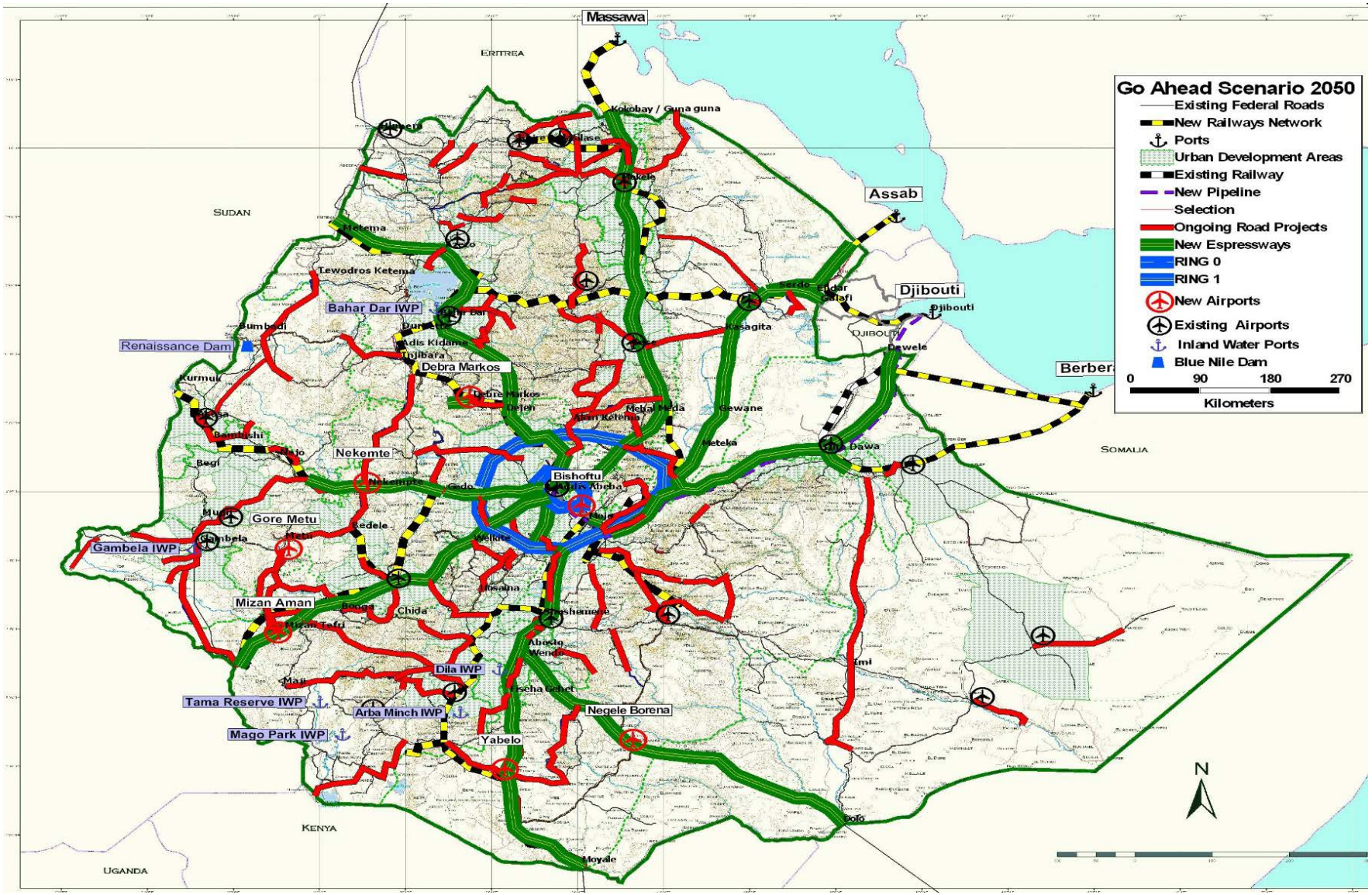


Figure 135: Go-Ahead Scenario 2050



8.3.2 *Next generation Scenario*

Table 81: Next-Generation Scenario

ROAD NETWORK PROJECTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
FYP - Ongoing Road Projects List	X		
Mojo-Awassa Expressway	X		
Dire Dawa – Dewele Expressway Completion	X		
Addis Ababa - Holeta-Ambo Expressway	X		
Addis Ababa - Alemgena-Woliso Expressway	X		
Addis Ababa-Debrebirhan Expressway		X	
Alemgena-Butajira Expressway		X	
Dire Dawa-Dengego-Harar Expressway	X		
Awash Junction-Adaitu Expressway	X		
Awash Junction-DireDawa Expressway		X	
Adaitu-Mille-Semera Expressway		X	
Addis Ababa-Commando Expressway		X	
Melkasa - Meteara - Awash Junction Expressway	X		
Semera - Djibouti/Eritrean border Expressways			X
Debre Berhan - Mekele - Eritrea border Expressway			X
Commando - Bahir Dar - Metema - Sudan border Expressway			X
Ambo - Gimbi - Asosa - Sudan border Expressway			X
Gimbi - Gambela - South Sudan border Expressways			X
Woliso - Jimma - Mizan Teferi - South Sudan Border Expressway			X
Awassa - Moyale - Kenya border Expressway			X
Awassa - Bilata - Filtu - Somalia border Expressway			X
Enlarging 3+3 lanes Addis – Nekemte Expr.			X
Enlarging 3+3 lanes Modjo – Ziway Expr.		X	
Enlarging 3+3 lanes Ziway - Awassa Expr.			X
Enlarging 2+2 lanes Harar -Bombas Expressway	X		
Enlarging 2+2 lanes Bombas - Giggiga Expressway			X
Giggiga - Kebridehar - Somaliland border Expressway			X
RING ROAD 0: Addia Ababa New Ring Road	X		
RING ROAD 1: Ambo - Weliso - Welkite - Butajra - Ziway - Sagure - Asela		X	
RING ROAD 2: Semera -Maychew –Gondar –Nekemte -Jimma-Awassa- Shikhussein-Dodoma			X
Enlarging 3+3 lanes Addis – Butajira Expressway			X
Enlarging 3+3 lanes Addis Ababa - Modjo Exprssway.		X	
Enlarging 2+2 lanes Dire Dawa - Dewelle- Djibouti border,			X
Enlarging 2+2 lanes Holeta - Muger	X		
Enlarging 2+2 Lanes Commando - Bahir Dar - Metema - Sudan border			X
Enlarging 2+2 lanes Adama -Melkasa - Asela	X		
Interventions for road capacity adaptation			X

RAILWAY PROJECTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
Awash-Kombolcha – Haragaria	X		
Mekele – Haragaba	X		
Mekelle-Assab Port Railway		X	
Weldia-Wereta-Matema			X
Mojo-Hawassa		X	
Hawassa-Woo-Moyale			X
Sebeta-Jimma-Bedele-Booma South Sudan			X
Aisha-Berbera			
Link rail lines (AA junction and freight sidings)	X		

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
Addis Ababa Light Rail Expansion		X	
Wereta- Finote Selam			X
Adama- Gasera			
Ejaji- Kurmuk			
Signal/Interop AA- Dibouti & Awash-Haragaria	X		
Addis Ababa-Djibouti Upgrade 1	X		
Addis Ababa-Djibouti Upgrade 2	X		
Addis Ababa-Djibouti Upgrade 3	X		
Mekelle -Asmara			
Addis Ababa -Finote Selam			
Double track Adama – Djibouti border			X

LOGISTIC INFRASTRUCTURES DRY PORTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
New Dry Ports in Jimma, Hawassa and Assosa	X		
DP-Baeker (IAIP) Integrated Agro-Industrial Park		X	
DP-Yirgalem (IAIP) Integrated Agro-Industrial Park		X	
DP-Bure (IAIP) Integrated Agro-Industrial Park		X	
DP-Bulbula(IAIP) Integrated Agro-Industrial Park		X	
DP-Bole Lemi Industrial Park 2	X		
DP-Kilinto Industrial Park	X		
DP-Dire Dawa Industrial Park	X		
DP-Adama Industrial Park 2			X
DP-Semera Industrial Park			X
DP-Assosa Industrial Park			X
DP-Aysha Indistrial Park			X
DP-Airline and Logistic Park			X
DP-Kindom Linen Industry Zone			X

AIRPORTS PROJECTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
A-Aerodrome projects			
Headquarter construction in Addis Ababa	X		
New tower in Addis Ababa airport expansion	X		
Tower and related construction in Shire Airport	X		
Tower and related construction in Jinka Airport		X	
Tower and construction in Hawassa Airport		X	
Tower and related construction in Assosa Airport		X	
Tower and related construction in Semera Airport		X	
Addis Ababa Bole airport radar	X		
ADS-B devices purchase and installation project	X		
Different facilities for airports		X	
SSR observation devices		X	
B-New projects to start			
T & a/n Bahirdar, Nekemt and Dembidolo airp.		X	
Bridge from the Dire dawa airport to Biken Bet	X		
T&a/n Mizanaman, Gore Metu, DebreMarkos, Yabelo and Negeleborena airports			X
Building aviation academy center in head office		X	
Ugrading Aeronautical Information Service (AIS) & Aeronautical Information Management (AIM)	X		
C-Projects on designing stage			
Aerodrome Projects			
Tower for Bahir dar, Nekemt and Dembidolo airp.	X		

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
Design bridge Dire Dawa airport to Biken Bet	X		
Tower designing for Jimma, Mizanaman, Gore mettu, Debre markos, Yabelo and Negeleborena		X	
Aviation academy center in head office	X		
Completing air navigation in regional airports			X
Upgrading the aeronautical voice information exchange		X	x
Changing the Navigation Aids from Ground Based to satellite (GNSS)		X	
Upgrading the country's surveillance to WAM		X	
D-New infrastructures & facilities			
New Ethiopia International Airport in Bishoftu			X
New airport in Nekemt		X	
New airport in Mizan Aman and Gore Metu		X	
New airp. Debre Markos, Negele Borena & Yabelo			X
N. 6 new passenger terminals		X	
N. 10 new airstrips included in 10 Years Plan		X	
Additional N. 10 new airstrips			X
Additional N. 10 new airstrips			X

IWT PROJECTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
Tana Lake- Bahar Dahr Port	X		
Chamo Lake-Arba Minch Port	X		
Abaya Lake-Dila Port	X		
Gibe River-Tama Wildlife Reserve Port		X	
Gibe River Mago National Park Port		X	
Baro River-Gambela Port		X	
Baro River-Yuddo		X	
Blue Nile-Renaissance Dam			X
Blue Nile-Bazbes			X
Blue Nile-Cherasi			X

Figure 136: Next Generation Scenario 2025

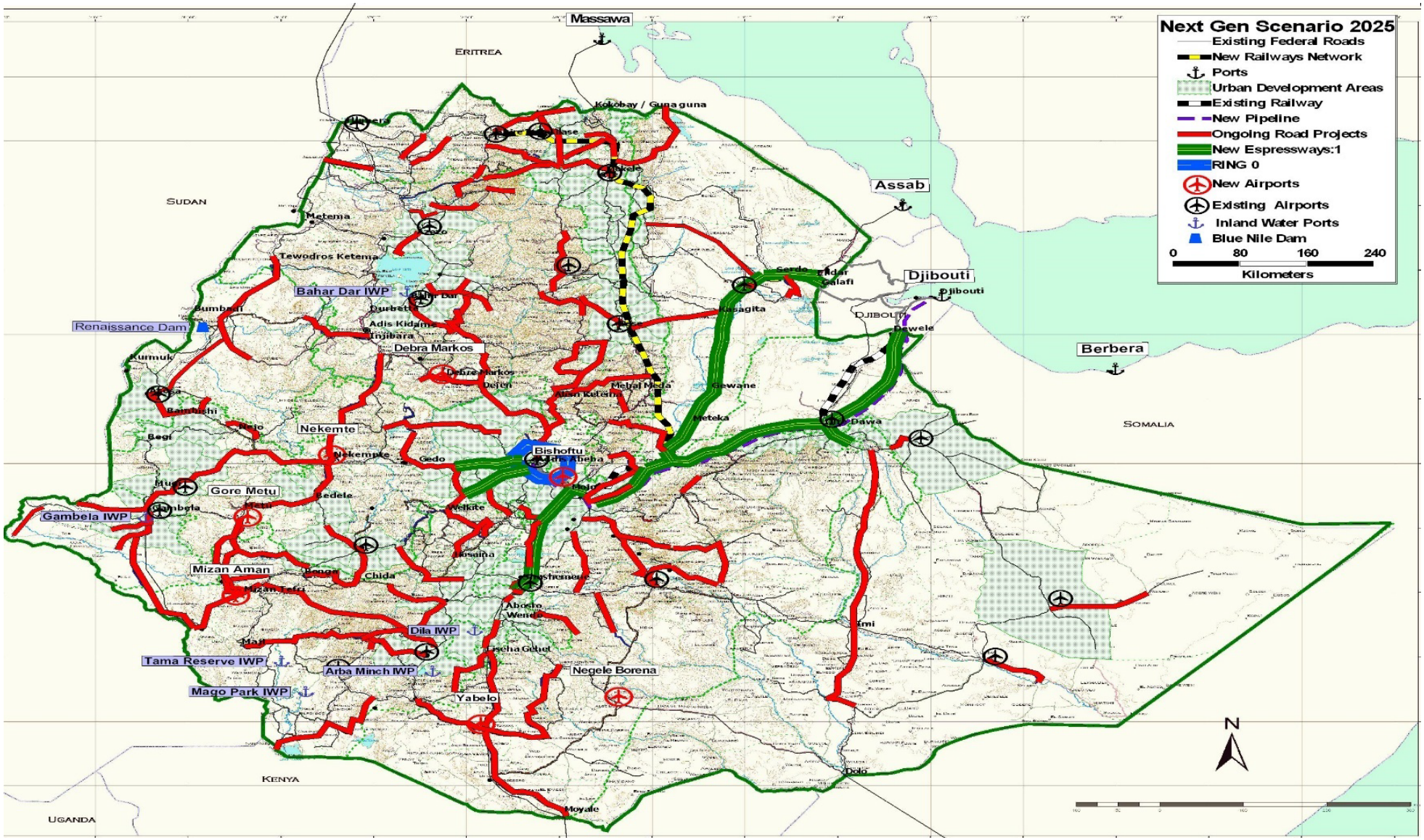


Figure 137: Next Generation Scenario 2035

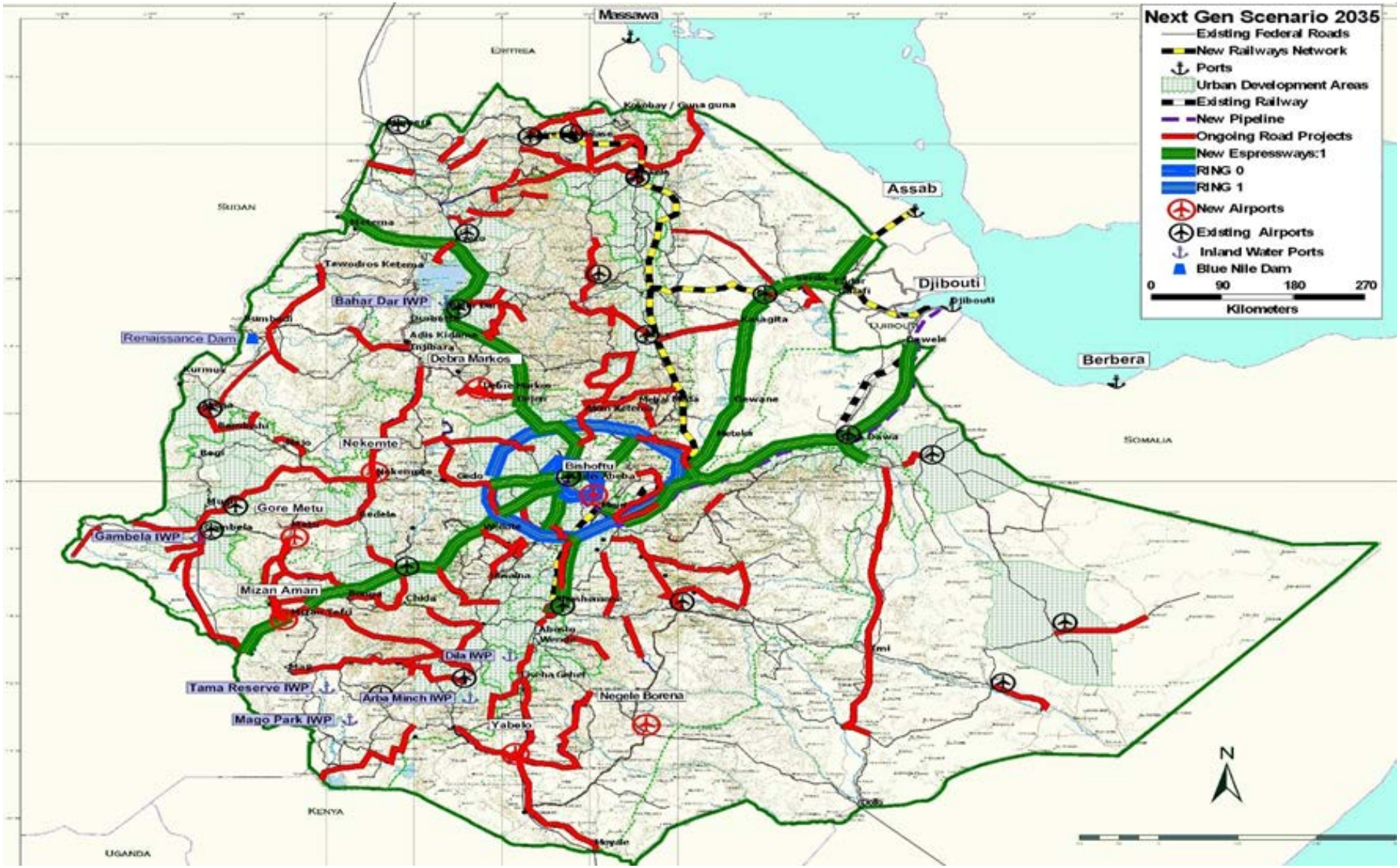
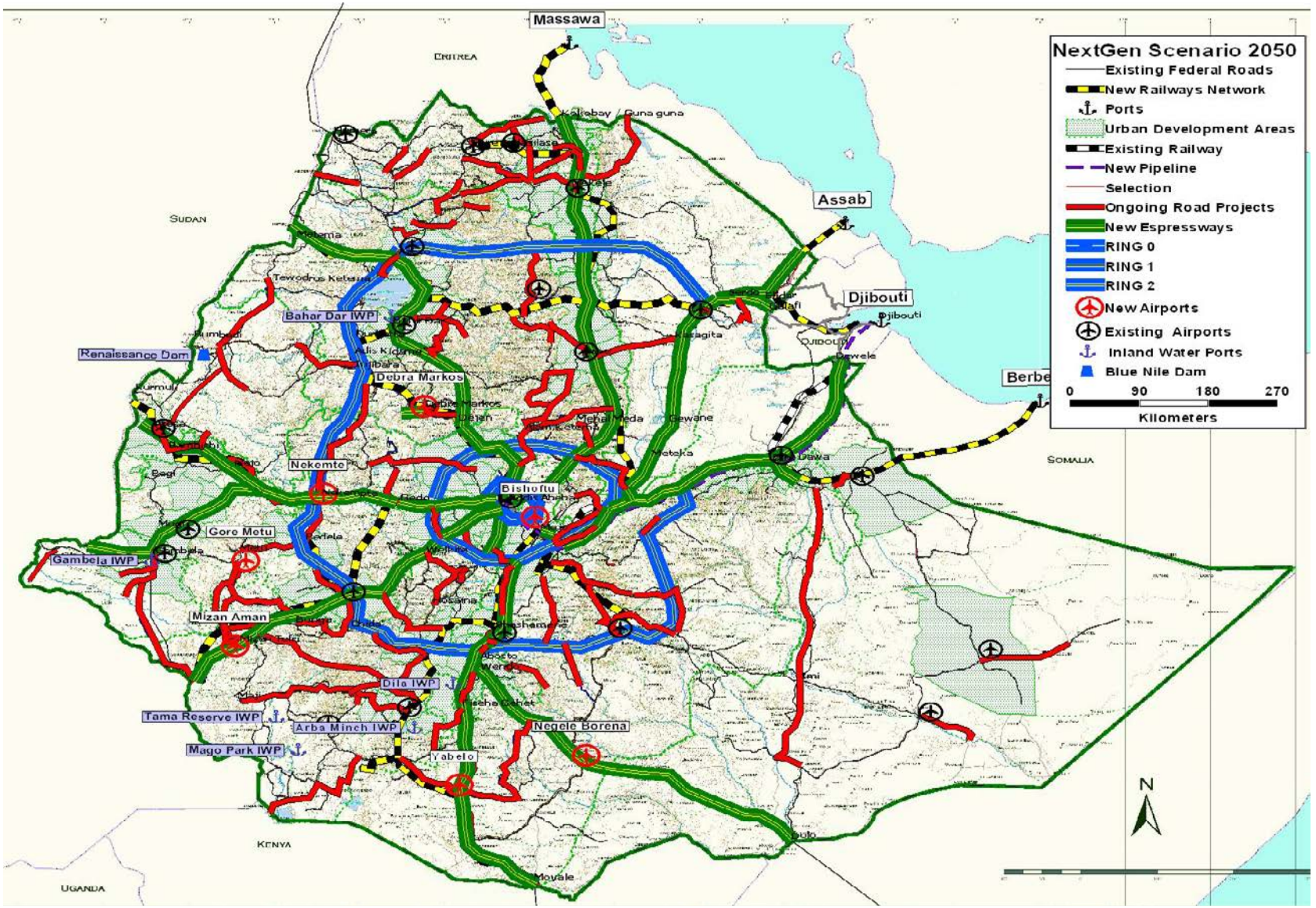


Figure 138: Next Generation Scenario 2050



8.3.3 *Limits-to-growth Scenario*

Table 82: Limits-to-Growth Scenario

ROAD NETWORK PROJECTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
FYP - Ongoing Road Projects List	X		
Mojo-Awassa Expressway	X		
Dire Dawa – Dewele Expressway Completion	X		
Addis Ababa - Holeta-Ambo Expressway			X
Addis Ababa - Alemgena-Woliso Expressway			X
Addis Ababa-Debrebirhan Expressway			X
Alemgena-Butajira Expressway			X
Dire Dawa-Dengego-Harar Expressway			X
Awash Junction-Adaitu Expressway			X
Awash Junction-Dire Dawa Expressway		X	
Adaitu-Mille-Semera Expressway			X
Addis Ababa-Commando Expressway			X
Melkasa - Meteara - Awash Junction Expressway			
Semera - Djibouti/Eritrean border Expressways			
Debre Berhan - Mekele - Eritrea border Expressway			
Commando - Bahir Dar - Metema - Sudan border Expressway			
Ambo - Gimbi - Asosa - Sudan border Expressway			
Gimbi - Gambela - South Sudan border Expressways			
Woliso - Jimma - Mizan Teferi - South Sudan Border Expressway			
Awassa - Moyale - Kenya border Expressway			
Awassa - Bilata - Filtu - Somalia border Expressway			
Enlarging 3+3 lanes Addis – Nekemte Expr.			
Enlarging 3+3 lanes Modjo – Ziway Expr.			
Enlarging 3+3 lanes Ziway - Awassa Expr.			
Enlarging 2+2 lanes Harar -Bombas Expressway			
Enlarging 2+2 lanes Bombas - Giggiga Expressway			
Giggiga - Kebridehar - Somaliland border Expressway			
RING ROAD 0: Addia Ababa New Ring Road		X	
RING ROAD 1: Ambo - Weliso - Welkite - Butajra - Ziway - Sagure - Asela			
RING ROAD 2: Semera -Maychew –Gondar –Nekemte -Jimma-Awassa-Shikhussein-Dodoma			
Enlarging 3+3 lanes Addis – Butajira Expressway			
Enlarging 3+3 lanes Addis Ababa - Modjo Exprssway.			
Enlarging 2+2 lanes Dire Dawa - Dewelle- Djibouti border,			
Enlarging 2+2 lanes Holeta - Muger			
Enlarging 2+2 Lanes Commando - Bahir Dar - Metema - Sudan border			
Enlarging 2+2 lanes Adama -Melkasa - Asela			
Interventions for road capacity adaptation			

RAILWAY PROJECTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
Awash-Kombolcha – Haragaria	X		
Mekele – Haragaba	X		
Mekelle-Assab Port Railway		X	
Weldia-Wereta-Matema			
Mojo-Hawassa		X	
Hawassa-Woo-Moyale			
Sebeta-Jimma-Bedele-Booma South Sudan			
Aisha-Berbera			
Link rail lines (AA junction and freight sidings)	X		

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
Addis Ababa Light Rail Expansion			X
Wereta- Finote Selam			
Adama- Gasera			
Ejaji- Kurmuk			
Signal/Interop AA- Dibouti & Awash-Haragaria	X		
Addis Ababa-Djibouti Upgrade 1	X		
Addis Ababa-Djibouti Upgrade 2	X		
Addis Ababa-Djibouti Upgrade 3	X		
Mekelle -Asmara			
Addis Ababa -Finote Selam			
Double track Adama – Djibouti border			

LOGISTIC INFRASTRUCTURES DRY PORTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
New Dry Ports in Jimma, Hawassa and Assosa		X	
DP-Baeker (IAIP) Integrated Agro-Industrial Park			X
DP-Yirgalem (IAIP) Integrated Agro-Industrial Park			X
DP-Bure (IAIP) Integrated Agro-Industrial Park			X
DP-Bulbula(IAIP) Integrated Agro-Industrial Park			X
DP-Bole Lemi Industrial Park 2	X		
DP-Kilinto Industrial Park	X		
DP-Dire Dawa Industrial Park	X		
DP-Adama Industrial Park 2			
DP-Semera Industrial Park			
DP-Assosa Industrial Park			
DP-Aysha Indistrial Park			
DP-Airline and Logistic Park			
DP-Kindom Linen Industry Zone			

AIRPORTS PROJECTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
A-Aerodrome projects			
Headquarter construction in Addis Ababa		X	
New tower in Addis Ababa airport expansion		X	
Tower and related construction in Shire Airport		X	
Tower and related construction in Jinka Airport			X
Tower and construction in Hawassa Airport			X
Tower and related construction in Assosa Airport			X
Tower and related construction in Semera Airport			X
Addis Ababa Bole airport radar	X		
ADS-B devices purchase and installation project	X		
Different facilities for airports		X	
SSR observation devices		X	
B-New projects to start			
T & a/n Bahirdar, Nekemt and Dembidolo airp.			X
Bridge from the Dire dawa airport to Biken Bet			X
T&a/n Mizanaman, Gore Metu, DebreMarkos, Yabelo and Negeleborena airports			X
Building aviation academy center in head office			X
Ugrading Aeronautical Information Service (AIS) & Aeronautical Information Management (AIM)			X
C-Projects on designing stage			
Aerodrome Projects			
Tower for Bahir dar, Nekemt and Dembidolo airp.		X	

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
Design bridge Dire Dawa airport to Biken Bet		X	
Tower designing for Jimma, Mizanaman, Gore mettu, Debre markos, Yabelo and Negeleborena			X
Aviation academy center in head office		X	
Completing air navigation in regional airports			X
Upgrading the aeronautical voice information exchange			X
Changing the Navigation Aids from Ground Based to satellite (GNSS)			X
Upgrading the country's surveillance to WAM			X
D-New infrastructures & facilities			
New Ethiopia International Airport in Bishoftu			
New airport in Nekemt		X	
New airport in Mizan Aman and Gore Metu			X
New airp. Debre Markos, Negele Borena & Yabelo			X
N. 6 new passenger terminals			X
N. 10 new airstrips included in 10 Years Plan			X
Additional N. 10 new airstrips			X
Additional N. 10 new airstrips			X

IWT PROJECTS

ACTIONS	Short Term 2025	Medium Term 2035	Long Term 2050
Tana Lake- Bahar Dahr Port	X		
Chamo Lake-Arba Minch Port	X		
Abaya Lake-Dila Port	X		
Gibe River-Tama Wildlife Reserve Port		X	
Gibe River Mago National Park Port		X	
Baro River-Gambela Port		X	
Baro River-Yuddo		X	
Blue Nile-Renaissance Dam			X
Blue Nile-Bazbes			X
Blue Nile-Cherasi			X

Figure 139: Limits to growth Scenario 2025

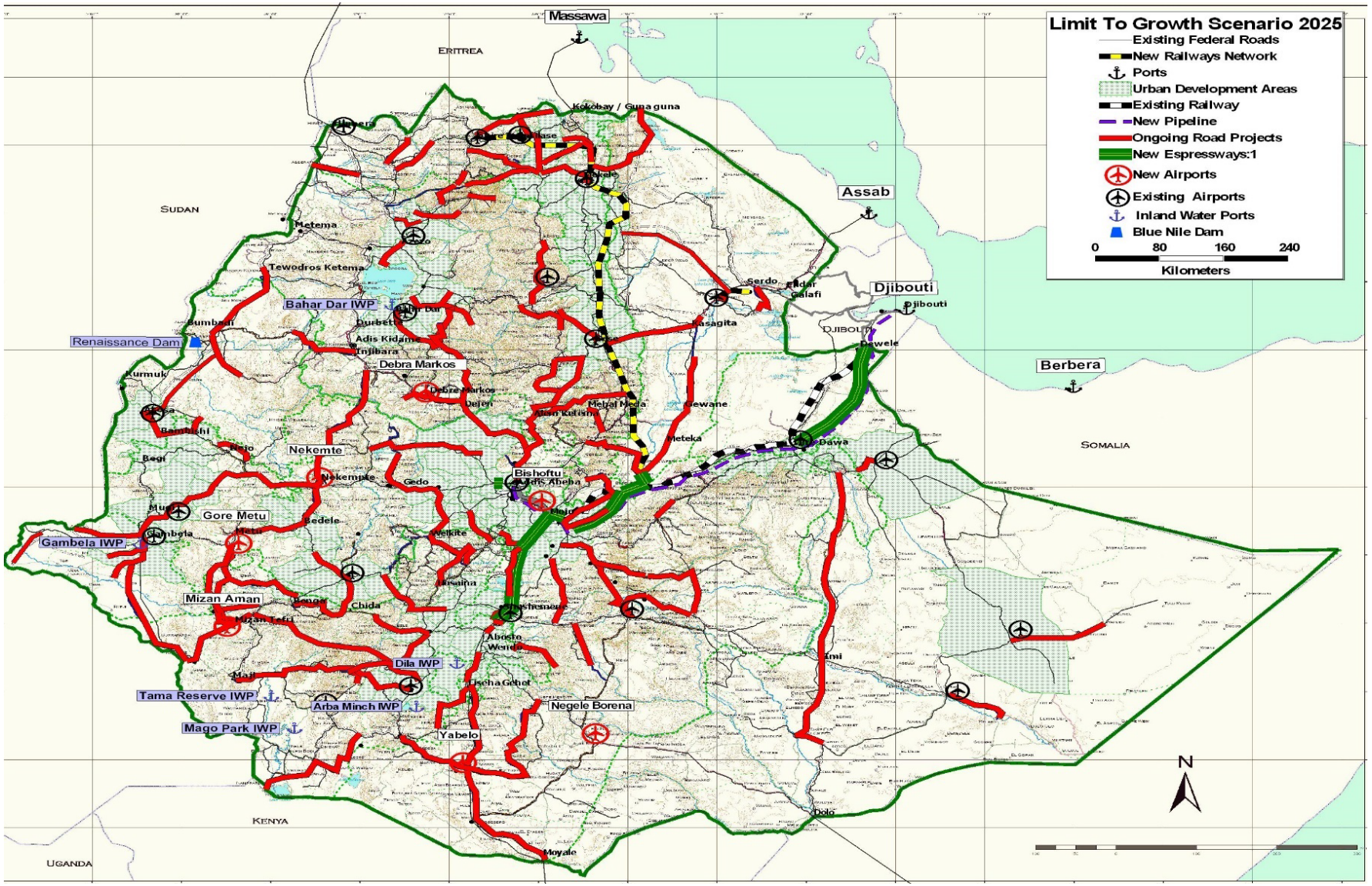


Figure 140: Limits to growth Scenario 2035

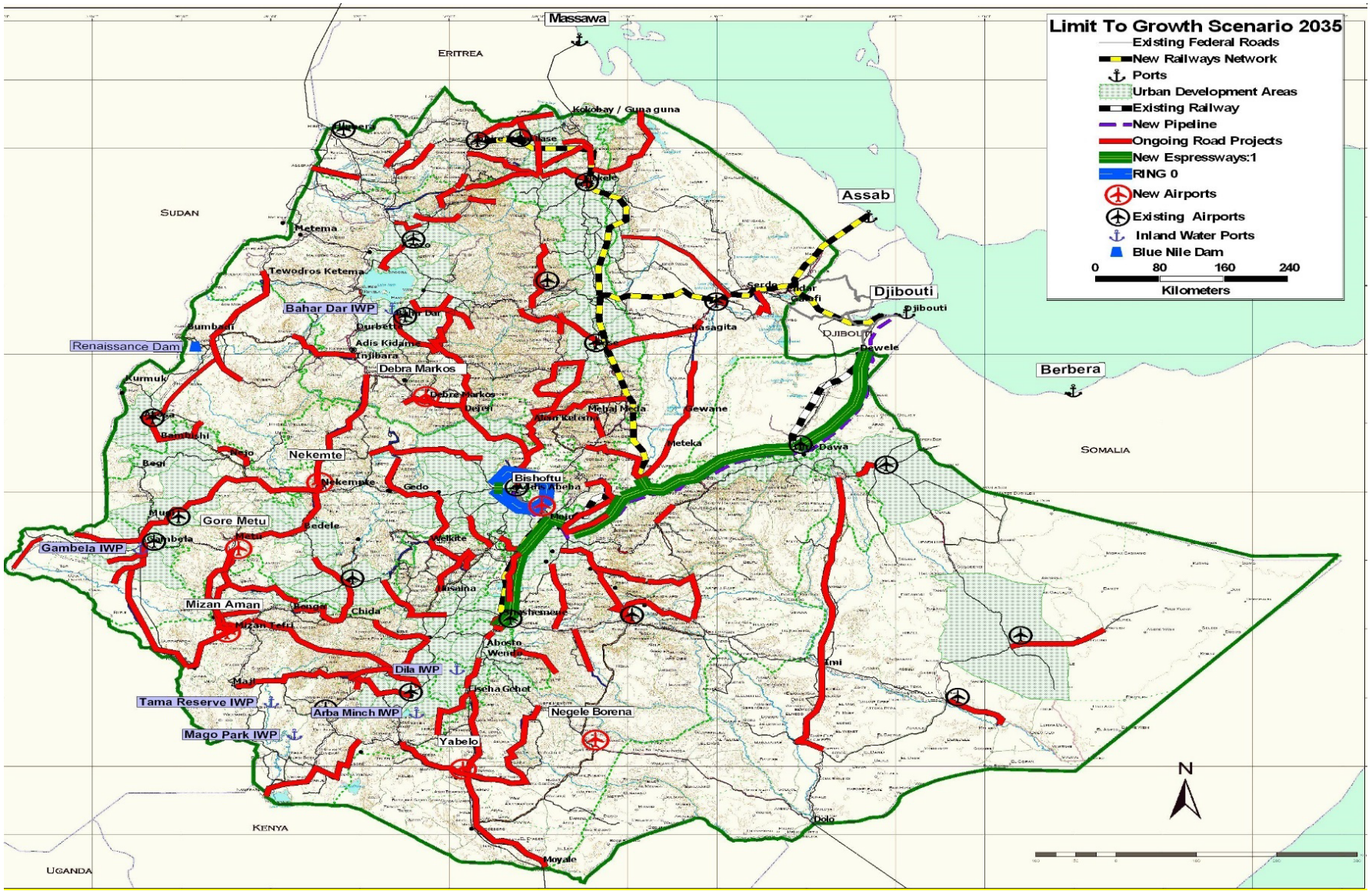
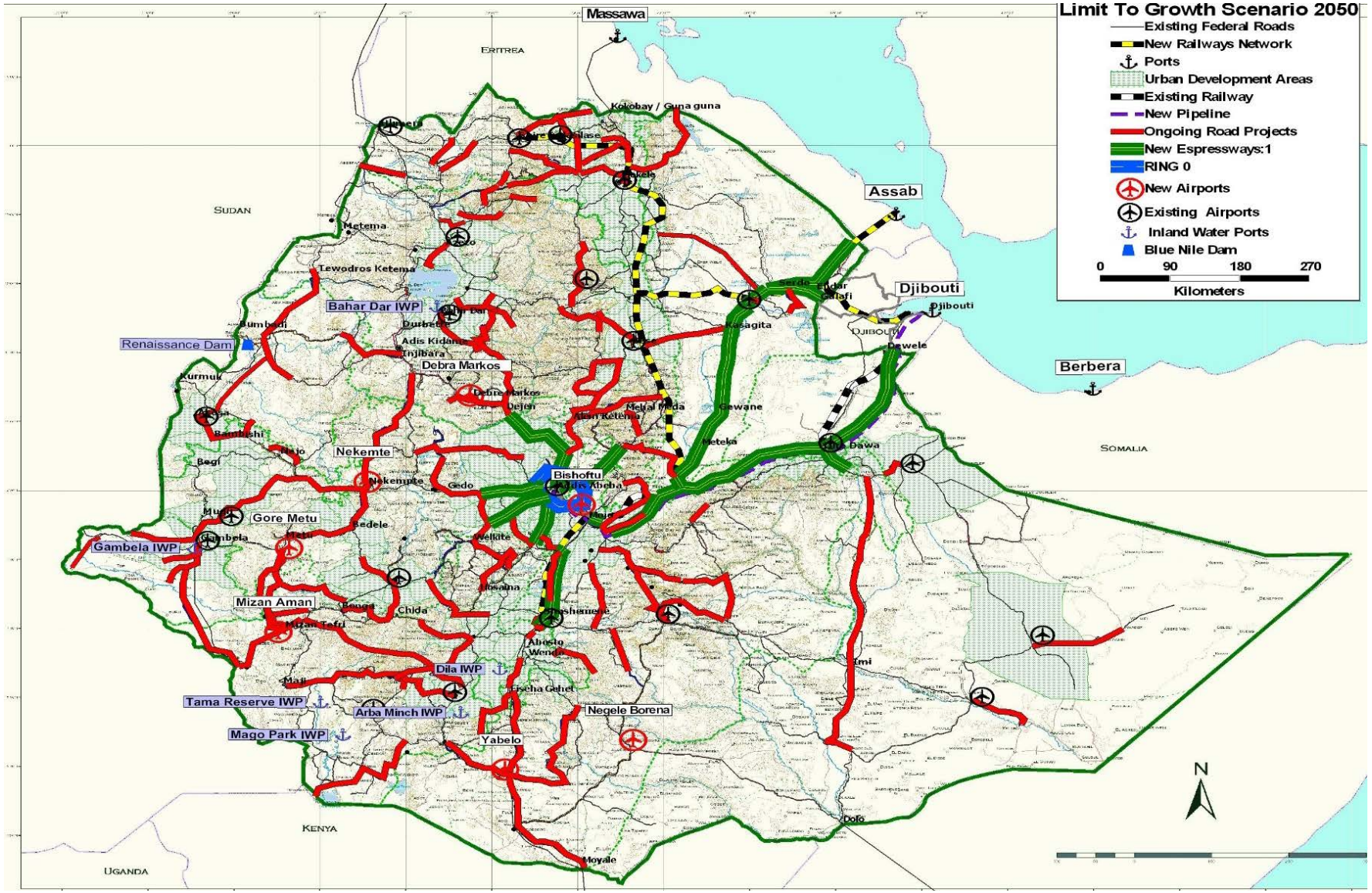


Figure 141: Limits to growth Scenario 2050



8.4 FUTURE POLICIES BY SCENARIOS

8.4.1 Introduction

To introduce an examination of the guidelines of future transport policies, it is required to start from two essential points:

- the evaluation of current and planned sectoral policies,
- the future planning scenarios of the sector proposed by the Consultant.

While the first point seeks to answer the question "which gaps to be filled" in transport policies, the question the last point refers to is "which directions and priorities" for future transport policies.

In each sectoral part of Chapter 5 and, in a wider way, in 5.1 an assessment of the measures undertaken and of the ongoing policies have been provided. What is highlighted, in summary, is that the country's great effort to develop the transport sector and make it instrumental to a general progress in the well-being and living conditions of citizens has produced great results in the provision of physical infrastructures and, in a minor extent in the provision of services. This effort was designed and carried out almost exclusively by government structures, technical and administrative public authorities and state-owned enterprises.

Given this undoubted (and not obvious) success, the next phase requires to change the approach of public intervention in order to cope with a growing demand for mobility of people and goods that already features, and will even more characterize the country, due to the increase in population, disposable income, production activities and providing of services. To tackle this process and furthermore increase the services' quantity and quality level it is necessary to mobilise a high level of resources, not only financial but also managerial and technical, to be invested in the further development of the sector.

It has been keenly observed in the Homegrown Economic Reform Agenda that this effort is not sustainable by state financial resources alone, much less by all the public enterprises that were protagonists of the first phase of development of the sector. The involvement of the private sector thus becomes an essential point of Ethiopia's future transport policies and this means to create a favourable environment to private's economic initiative.

The gaps to be filled here are concerned with the prominent role of state enterprises which often play not only the role of simple economic actor but also of direct arm of the political willingness. The regulatory framework functional to this model of intervention it is not able to ensure a level playing field among public and private operators while this point it is exactly one of the conditions which makes a country an attractive place to invest in. In short, the country's regulatory framework must be adapted to this new role of private investors. As far as this issue is concerned, it must be enlightened that the first steps of the ongoing economic reform (new Investment Proclamation and Regulation, PPP policy, etc.) are going on this path. At the same time, there should be the awareness that this process will take time to develop its effects.

Furthermore, it does not seem paradoxical but quite normal that the successes of a first phase of development of the country's transport sector involve having to face the problems of a subsequent phase of development. It is the case of two other main critical points pointed out in 5.1: i) the relationship between the growth of the sector and the national strategy of industrial development, and, ii) the policies to develop the international transport connections.

Though Ethiopia's manufacturing development has been leaded by a strategy of import-substitution industrialization, the sectors involved in infrastructure machinery and vehicles, appears currently unable to act as a real alternative supply channel. This sector does not seem to have an adequate priority from the Government and the Ethiopian Agenda for Industrialization seems to think of infrastructures only as a logistic tool while it fails to consider the other side of the problem, namely its important role on the side of the demand's growth.

As pointed out in 8.2 the innovation trend of low (or zero) emissions technology could be one of the opportunities to be caught as a powerful development driver for the country. Though the infrastructure machinery / apparels are not at the core of this trend, the increase in quantity of demand induced by the growth of infrastructures may be the leverage to develop a domestic industry able to cope with this process. This, in turn, could allow the country to seize opportunities to increase its continental positioning and become a successful continental producer for Africa.

As the international connections are concerned, Ethiopia needs to have a strong international projection because of its nature and its ambition in the African continent. The country is already the African leader in the aviation sector but its landlocked status is a structural weakness which needs to be carefully managed. The gaps to be filled here are that of physical connections, both landside and, above all, seaside, and that of financial resources to be invested.

Being the long-term target that to have both a number of ports connections adequate for modern vessels and land connections with good carrying capacity, the main gap on policy side is to realize effective progresses on both the port diversification strategy and the Multilateral Cross-border Road Transport Agreement.

Coming to the second main point mentioned above, it is necessary to return to the planning scenarios identified in 8.2, remembering that they will give rise to different investment hypotheses and actions / implementation measures. It must also be noted that the scenarios can be distinguished according to the macroeconomic trend: two of the three scenarios share the same macroeconomic conditions while the third is affected by a lower level of growth. Finally, the essential difference between Go Ahead and Next Generation scenarios lays in the response of the transport system to the political actions of the institutions in implementing the planning framework.

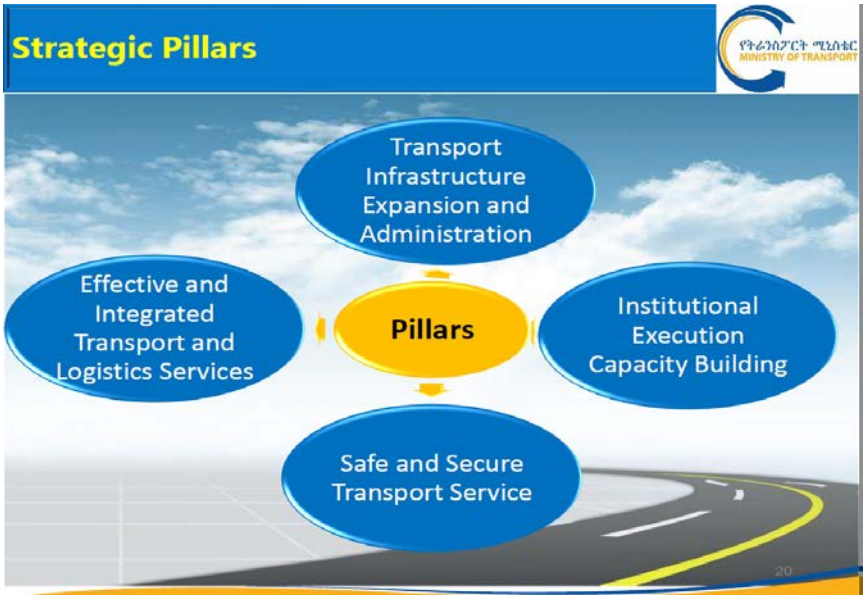
On this basis, the guidelines of the policies in the transport sector will differ according to: i) the different growth horizons of the economy and the demand for mobility and, ii) the capacity of the transport system to carry out investments and to react to the implementation measures taken in place by the GoE.

However, notwithstanding the different scenarios, there is a set of policy measures that, irrespective to the scenario that will become actual, will have to be undertaken in order to enhance the future transport system of the country. Guidelines for this core of common policies is described in the following sub chapter, while the following sub chapters will provide policies' guidelines for each of the scenarios described in 8.2. In the future Deliverable “Development of a National Transport Strategy” it will be provided the analysis of the actual condition and the adaptations of the transport policy in view of the present and foreseeable economic and social conditions, in order to meet at the best the involvement of the private sector.

8.4.2 Beyond scenarios: guidelines for a core of common policies

To provide the guidelines which represent an invariant core of the future transport policy of Ethiopia it is useful to go to the official planning document issued by the MOT, the TYP. A synthetic representation of the strategic pillars of intervention is presented in the following figure.

Figure 142: Strategic Pillars of the TYP



Source: MOT, Transport Sector's 10 Years Perspective Development Plan (2013-2022 EC), August 27 2020

Taking as reference the four strategic pillars described by the MOT's document and given that infrastructures and services to be offered will be proportional to the future demand of mobility, the areas that are little or not at all influenced by the quantitative factors affecting the growth of the transport system are:

- institutional (and sectoral) capacity building,
- safety and security of transport.

However, there are other issues embedded in the planning framework that have to be underlined.

A further pillar that must be taken in account is that of digitalisation. As a Digitalisation Strategy for Ethiopia does exists[47], the Consultant considers the framework depicted in the official document of the GoE as an exogenous component of the national policies which will act as an horizontal set of measures influencing all sectors and industries of the country.

In the same way the issue of innovation must be taken in account. In this case the official reference document has been prepared by the UNCTAD in 2019[48] at the request of the GoE to assist the Ministry of Innovation and Technology in preparing a new Science, Technology and Innovation policy.

To summarize, three themes account for the invariant core of the transport policies to be developed and implemented regardless of the quantitative growth scenarios of the country:

- capacity building,
- safety of transport,
- digitalization and innovation.

Institutional and sectoral capacity building

An assessment of the administrative capabilities of the government bodies and of the authorities of the transport sector is provided in 10.1. It is useful here to anticipate in brief some results of this activity in order to lay down some guidelines of the institutional and sectoral capacity building.

The undoubted success achieved in creating a central administrative level is presently hindered by broad gaps at regional states' level or below. What has been achieved (or is being achieved) at the

[47] FDRE, Digital Ethiopia 2025. A digital strategy for Ethiopia inclusive prosperity, 2020.

[48] UNCTAD, Ethiopia Science, Technology and Innovation review, Geneva 2019.

administrative center, in terms of leadership and management capacity by public bodies, is far from being achieved at regional or local level. There are evidences of ineffectiveness in the administrative action which results in non-homogenous or partial enforcement of the legal framework.

This means a risk of a serious administrative divide between the two levels of governance, federal and regional/local, as regards the ability to implement general or sectoral objectives. The country has to undertake efforts both to build and consolidate the basic skills at local level and reinforce the ability of the weaker institutions at national level.

At the same time, Ethiopian government bodies and administrative technical authorities need to learn and develop a new set of skills and capabilities to manage the future development scenario. These competences are related to the functioning of markets on a contestable basis, in which public and private operators have equal obligations and rights in the sector of economic activities and, in particular, in the transport sector. Furthermore, these kinds of competencies will become crucial as Ethiopia will undertake the challenge of technical innovation. In fact, crucial decisions will have to be taken in order to make available the results of technical progresses within the transport sector by balancing the diffusion of new technologies with the defense of intellectual property rights.

By acquiring and enhancing this type of skills, public officials should be able, in their crucial activity of economic and technical regulation and administration of the sector, to plan, draft and implement actions that do not discourage private economic initiative and are based on equality treatment of economic operators regardless the kind of ownership.

To summarize, the strategy of capacity building in the transport sector will have to walk on two parallel tracks: that of strengthening capacities at the local level and that of creating new skills linked to the need to operate an economic system based on equal coexistence between economic operators both public and private.

As regards the first issue, Ethiopia can count on a competitive advantage represented by the large number of infrastructure development projects financed by banks and international development organizations. As described in 10.2.3, these projects almost always have a component focused on strengthening the capacity of the beneficiary authority / body in charge of regulating / managing the infrastructure concerned. It would be important to develop an intervention plan that allows synergy with the numerous programs, already active or planned, financed by international organizations or development banks. As indicated in point 10.2.3, this requires the application of an information gathering system and a relevant procedure to all the beneficiaries of this type of program.

In addition to an efficient management of international capacity building projects, a further problem will be to focus efforts on the weakest part of the administrative bodies with the aim of bridging the gap between this group of entities and the best ones. This requires the establishment of a central management point focused on monitoring the implementation of capacity building programs on a periodic basis, measuring the achievement of set objectives.

It has to be noted that these matters are strictly linked with the future structure of the governance of the transport sector which will be discussed below.

As regards the second point, as previously mentioned, the new skills to be acquired are essential to manage a mixed type economic system, in which private and public operators compete on an equal basis. This scenario is a novelty for the country's experience, which has freed itself from poverty and has embraced the path of accelerated development thanks to an economic system essentially based on direct public intervention.

However, over the years, also thanks to the experience acquired through international cooperation projects, Ethiopia has shown that it is able to operate successfully in competitive contexts such as that of the aviation sector.

The public officials of the MOT and of the technical-economic sectoral authorities will have to become increasingly familiar with the principles of economic regulation of the different sectors in order to allow private investors, both international and domestic, to invest in the sector and try to

exploit the opportunities of development offered by the sector in all modes of transport. Far from being a part of the economic discipline, the regulation of single transport sub sectors requires a mix of technical, administrative and economic skills which is not commonly embedded in the training course at university level. It is not casual that often this kind of roles are charged to experienced engineers with at least a part of their careers spent in public administration.

Therefore, specific programs will have to be developed to enrich the economic regulation skills of public officials at the level of each transport subsector. Also in this case, capacity building programs are closely linked to the governance structure of the transport sector which will be described below.

Safety and security of transport

As stated in the sectoral analysis the huge development of roads length and the increase of traffic flows has results in a big number of accidents, deaths and injured. The magnitude of the problem is so important that it is possible to speak about a road safety crisis in Ethiopia. For this reason, speaking about transport safety in Ethiopia means to tackle firstly the impacts of road flows increase. On the other hand, the measures to be undertaken to face the issue of transport safety will cover not only the road safety matters but also railways, maritime and aviation sectors.

The country tackled road safety phenomena by establishing over time insurance systems, driver license rules, law enforcement policies, educational campaigns. Moreover, in order to have safer infrastructures the field of roads design has been improved. Finally, a dedicated body, the National Road Traffic Safety Council (NRTSC) with a dedicated support Office, has been established to act as the focal point of the Government on this matter.

The pillars of road safety policies have been sufficiently identified by the competent authorities:

- infrastructure quality,
- adequacy of the regulatory framework
- ability to enforce the rules by the authorities
- adequacy of the vehicle fleet (age, maintenance)
- drivers' behavior
- design and implementation of a Non-Motorised Strategy

The issue of infrastructure quality appears to be critical because it involves two crucial and consecutive phases at the same time: the design process and the maintenance process. While on the first point progresses have been recorded, the latter calls for a deep cultural change that means to switch from a reactive to preventive maintenance approach. Under this point of view the adoption of a Road Asset Management System approach is for sure a long-term guideline to be followed. ERA is implementing this type of approach which will be applied on the network managed by the authority (the national network) and, hopefully, on the sections of expressways in operation.

A robust program of knowledge transfer from ERA to the regional / local level must be a priority. This in order to fill the competence gap between the federal competence center and the regional / local authorities which are in charge of the regional part of the road network. The adoption of such an approach would also be included in the negotiation of the PPP schemes could be adopted for the future development of expressways, in order to define a standard on this matter. The maintenance issue is also linked with a very important organizational theme concerning the governance structure of the road sector which will be addressed below.

As the regulatory framework seems to need minor reviews, the enforcement process suffers of lacks. In this field the introduction of technological innovation like ICT systems can largely harmonise the capabilities of the local authorities to apply the rules in force. It should be a good practice to flank any introduction of new systems enhancing the authorities' enforcement powers with communication campaigns aimed at inform the citizens about the advantages in terms of equity, fairness and safety of the new technology applications.

The pedestrian and non motorised mobility in Ethiopia is the main way of transport, both in cities and rural areas. The increase of road mobility by motorised vehicles make all the non motorised

mobility highly exposed to potential risks of accidents and this is exactly what is revealed by the statistics of accidents. The Non Motorised Strategy adopted by the Government in 2020 aims at limiting the risky and unprotected interactions between the two kind of mobility and, in a wider sense, at protecting the weaker part of population. Besides, the NMT is a way to incentivise the adoption of sustainable cities models.

To sum up, road safety policies in the country appear to be well set up although they will need careful implementation to begin to show tangible effects.

On the other hand, the role of technological innovation remains, even in this field, an issue with great potential: real-time traffic management systems, automatic guided vehicles, vehicle fleet management, are just some of the possible fields of development. which are summarized in the concept of Intelligent Transport System (ITS). Therefore, it is appropriate that, in the medium term, road safety policies find points of contact and interrelationships with the country's technological innovation policies.

As mentioned above, the road sector is the main field of intervention for transport safety but it is not the only one. The other sectors, where collective transport is the mandatory mode of use, involve a different type of approach as safety becomes a prerequisite for offering and performing transport services. Each sector, in line with its own technical characteristics, establishes its own safety standards, often defined internationally to allow mobility between different countries.

Therefore, the country's aviation sector is fully in line with international safety requirements. The ECAA ensures the implementation of international standards in the national legal framework and ensures the timely updating of the rules. This process appears well set up and has been put to the test by the Covid 19 pandemic which forced the aviation sector to drastically reduce its offer and, subsequently, to adapt fleets and airports to the prevention measures adopted internationally and nationally.

The future challenge of the sector in terms of safety seems to be linked to the opening of the market to private operators. As stated in the previous point, this will mean maintaining and improving the safety level of the sector avoiding to hinder private initiatives. Accordingly, the safety regulations must follow the principles of fairness, correctness and transparency in the process of drafting and setting the rules. Since a structure that guarantees the principle of third parties (ECAA, Accident Investigation Office) has already been implemented, the next issue to be addressed will be that of the use of airport facilities connected to compliance with safety requirements, first of all that of maintenance spaces / plants.

As for railways, the situation is far from that of the aviation sector. Only a basic regulatory framework is in force, while the implementation of the safety directorate within the MOT is almost completed. The medium-term challenge is that to introduce the third party principle with the MOT rail safety directorate that will likely become an independent Rail Agency and the establishment of a separate body in charge of the accident investigations.

A second component of future policies will be that of interoperability standards. These are already foreseen by the current regulatory framework but must be implemented allowing the growth of the railway system and guaranteeing its use as an entire network, without introducing technical and safety fences for the various lines. As in the case of aviation, this problem will become of primary importance when private operators will be involved in railway development. At that moment the authority in charge of drafting and / or negotiating the conditions of entry into the railway market must be able to indicate to interested parties which technical interoperability requirements must be applied (and verified). As mentioned for the aviation sector, the point is to implement this process in a fair and transparent way. This means having defined the interoperability requirements before any process of public offer, negotiation, drafting of contractual documents, in order to i) provide interested parties with all the information necessary to formulate proposals for intervention and, ii) avoid interference in the proposal evaluation phase.

Similar to technical interoperability is the case of the safety requirements of railway personnel. Also in this case the legal acts in force have defined the framework and, in the process of implementation

training standards and mechanism of safety auditing on a third party principle base should be established.

Digitalisation and Innovation of transport sector

The impacts of both the trend towards digitalisation and technological innovation processes are potentially enormous. Ethiopia, as a developing country, can seize this opportunity starting from its specific features.

A simple non exhaustive listing of the main areas of the transport sector impacted by specific innovative applications or group of applications describes the scope of the potential progresses. The list distinguishes between the following three macro processes: infrastructure providing, services providing, relationships between public authorities and stakeholders.

- Infrastructure building (and design) — CAD / Beam
- Infrastructure maintenance — Beam / Internet of Things (IoT)
- Service providing (passengers / freight) — ICT/IoT/Intelligent Transport System (ITS)/e-commerce
- Relationships Gov / stakeholders — ICT / e-commerce / e-Government

Such a limited and generic list cannot be taken as a guideline to ground a sectoral policy. As keenly underlined by the Ethiopia STI Policy Review, the country has its specific development trajectory. Only starting from this path, which considers country's strengths and weaknesses, it should be possible to indicate which part of the potential progresses can be a possible target to be reach.

It is a matter of fact that connectivity is the prerequisite to allow the process of digitalisation to widespread throughout the country. The connectivity level of the country is still poor despite the significant growth both in internet use and mobile connections. Nevertheless, the Digitalization Strategy of Ethiopia (EDS) has been recently issued and is based on short (18 months) and medium term (three years) projects to be implemented.

In order to suggest a policies' guideline for transport sector in this field a hypothesis must be stated, that is that the projects identified in the Digitalization Strategy will be successfully completed within the time provided. Under this condition it is realistic to presume that an important improvement of connectivity will have been reached.

Therefore, the possible pillars of guidelines for a transport digitalisation policy must contain what has been already foresee within the official document of the Government. In this case the projects which directly affects MOT and transport sector seems to be the following[49]:

- CONNECTIVITY - Project 3: Build a government backbone;
- E- GOVERNMENT - Project 8 E-transaction enabled E-Government;
- E-COMMERCE - Project 9: Digital applications;
- E-COMMERCE - Project 19: E-commerce logistics;
- FINANCE - Project 20: Improve Regulatory Environment for Investments.

Given that the possibility of making significant progress in the digitalization of transport is based on connectivity prerequisites that are fully external to the sector (improvements in the energy system, improvements in the telecommunications system, improvements in the regulatory framework), the priority points on which to leverage for the transport sector are the following:

- processes of computerization and dematerialization of the administrative procedures (authorizations, licenses, customs procedures, public consultations, access to archives and documentation, etc.);
- dematerialization of transport documents among operators and between operators and public authorities (waybills, contracts, technical annexes, dangerous goods transport documents and declarations);
- implementation of advanced vehicle fleet management systems in freight transport (path

[49] The follows the project numbering used in the EDS. Among the projects listed only the nr 19 (E-commerce logistics) involve the MOT as a direct stakeholder, nevertheless the other project have a significat direct impact on the transport sector.

optimisation, fuel consumptions optimisation, maintenance cycle);
- implementation of advanced warehouse management systems in dry ports.

It is easy to see that the priority area is that concerning logistics and the transport of goods. In this context, the presence of public bodies and private operators can make projects progress faster, moreover the cooperation between private investment efforts and improvement plans of public bodies in this area could be used as a model to obtain benefits in other areas as well.

Areas of subsequent development are those related to the diffusion of ITS and of the so-called IoT technologies. The most important implementation in terms of area of intervention are as follows:

- Sustainable Cities' Mobility Systems (Integration and management of different way of transport starting from mobility data as Google, Tom-Tom Index, in order to allow citizens to plan their paths and day-by-day mobility). These kinds of system can be useful in presence of mass transport services operating on dedicated transport corridors, such as LRT and BRT. This means that the first area of application has to be that of the Capital city where this kind of systems are present of in an implementation stage. Further applications in other cities can be directly embedded in the cities' Master Plan or Mobility Plan.
- Advanced systems for the maintenance of infrastructures and vehicles (IoT technologies). As mentioned above with regard to capacity building, maintenance is a crucial area of intervention for the transport system. IoT applications, by equipping the components of the systems (sub-infrastructure systems, vehicles and their components) with sensors and interactive capabilities, are able to make a qualitative leap to the self-serving processes. This is possible, as already stated on several occasions, in the presence of a change of approach to the maintenance process which instead of being of a reactive type (to failures) is of a predictive type. This means being able to make real-time diagnoses on the state of the components, to predict malfunction situations and to plan interventions in an appropriate manner, guaranteeing the functioning of the subsystems and the efficiency of the process.

8.4.3 Guidelines for 'Go Ahead' policies

Among the exogenous variables which differentiate the scenarios there are the **level of growth** (transport demand) and the **uncertainty degree of the economic prospects**, both influencing the country's attractiveness for private investment. This essentially means that a first point in defining measures and actions will concern the speed to be given to the policies of liberalization and practical opening up to private investments in the sector.

Among the scenarios described in 8.2 two share the same macroeconomic conditions and, therefore, have common features, while a third is characterized by less dynamic macroeconomic conditions. In this latter scenario the speed to be given to liberalization processes is minor than in the previous two essentially because the attractiveness of the country for foreign investors does not requires a prompt implementation of such a policy. Accordingly, this does not mean that market opening and private investments are not required but only that the timeline of implementation can be more relaxed.

The 'Go Ahead' scenario is characterised by a high increase of transport demand. Accordingly, the support of private sector both for investments and managing capabilities is needed in order to allow the whole transport system to satisfy the increasing demand. The creation of a favourable environment for private operators is at high level of priority and this calls for different actions to be designed and implemented at sectoral level. At the same time an horizontal level of policies, aiming at create an institutional ability to regulate and promote competition, is requested.

In terms of areas of intervention, the main points can be summed up as follows:

1. opening of the logistics market (multimodal transport, dry ports operation and development);
2. reform of the railway sector in view of a subsequent opening of the market;
3. opening of the domestic aviation market;
4. creation of a favourable environment for private operators in the transport sector.

Before providing further details of the aforementioned points, however, it is worthwhile to list the other areas of intervention, different from that concerning the liberalization process. They can be summarised as follows:

- commitment review and re-focusing of the public enterprises in the transport sector (ESLSE, ERC, EDF, EAL Group);
- improve scope and accessibility of collective service providing (buses, BRT, RLT, suburban railways);
- road development model (PPP, concession, public management) this latter point calls for a review of the road sector governance for infrastructure management matters;
- development of port diversification (coordination with infra investments);
- revision of maritime logical framework of Ethiopia in order to i) reorganize the own fleet, making it more sustainable, and ii) improve the ability to operate in the global market as a Non-Vessel Owning Common Carrier (NVOCC).

The assessment of the logistics sector carried out in the previous reports, the issues arising from the National Logistics Strategy and the guidelines of the National Logistics Policy allow to clear identify the guidelines to be implemented in the sector. The issue of market opening is at the top of the list as a solution to enhance the sector effectiveness and its ability to bear the increasing trade flows caused by the country development.

As EMAA has already the power to issue licences what it is needed is a strong commitment to operate coherently; this commitment has been recently reinforced by the newly established National Logistics Council. The process of issuing new licences is ongoing and what become crucial here is which kind of eligibility criteria will be set to give the authorisation.

As dry ports are concerned, to allow competition requires to choose between two possible paths: i) competition between integrated operators (i.e. licensed multimodal operators with own dry ports, cranes, warehouse facilities) providing services through their network and, ii) competition between multimodal operators utilising the existing dry ports network of the public enterprise and paying a specific charge for this use. Just to make a reference, the first option is similar to the competition model in force for railways in the United States, while the second is similar to the railway competition model adopted in the European Union and based on the principle of open access.

The latter option is the preferable solution because it is immediately operational, does not involve an over-investment risk, does not require challenging eligibility requirements (in terms of financial guarantees and economic efforts) and is likely to produce a significant number of potential operators, especially national ones. The implementation of this option requires to face a review in the ESLSLE's commitment which is also in line with the statements of the National Logistics Strategy. This latter point wil be treated below in a dedicated part.

As stated in previous reports, the Ethiopian railway sector is in its initial phase of development, the lines in operation are underperforming, in particular the Addis - Djibouti link.

Opening the market in such a situation should not be a priority but a medium-term goal. What seems to be crucial here is the completion of the regulatory framework and of the institutions concerning the safety area and, successively, those concerning the economic regulation of the sector. These issues, together with the review of the commitment of the three existing companies acting in the sector, are the core component of a railway sector reform which can better focus the logical functioning of the whole sector.

The point of the market opening can be usefully faced within this kind of process: the contribution of private sector to railway development can be very important and the duty of the public power is to set rule of games useful for the country development.

Also, in this sector the liberalization issue calls for a choose between two paths that is the competition between vertical integrated operators (infrastructure and services providing) and service operators using the same infrastructure which is open to all. The present legal framework is set to this second model but, given the early status of implementation of the system, some proposals

from private operators arose on the basis of the PPP legal framework already in force with the aim to develop some railway connections included in the MOT plans.

These proposals demonstrates that there is a real interest in develop the railway sector from private investors. At the same time, what is crucial is a long-term vision of the railway system development; to this purpose the issue to be primarily preserved is that of the interoperability, that is the ability of the network to work as a whole.

As anticipated in 8.4.2.1 regarding capacity building and above regarding dry ports, what is important to avoid is a process of duplication of investments to implement competition between physical networks. For this reason, network development projects proposed by private investors will have to be formulated ensuring defined interoperability requirements and made public in advance. In addition to this, an accurate regulation of access to infrastructures, both managed by the public company and managed by private companies, will have to be developed. In essence, interoperability and economic regulation must be fundamental points of future policies in the railway sector.

The concept of market opening in the country's aviation sector concerns the domestic market. In this case, as already highlighted in the sector analysis, the entry into force of the new regulatory framework makes it possible to grant authorizations to operate domestic services on a larger scale than in the past.

The crucial point concerns the practical application of the new rules that should be implemented to effectively favour the entry of new operators and the offer of greater commercial alternatives to the current offer proposed by the public operator.

Since the aviation sector is a complex system, the possible obstacles to market entry are very numerous and the limitation of technical-administrative barriers to the entry of new operators is a continually recurring theme. In this case it is clear that the safety requirements of new operators must be in line with the very high reliability required by international and national standards but, at the same time, the obstacles deriving from the existence of a large public operator that manages of de facto monopoly the sector, will have to be avoided.

In this view, some points can be highlighted as ingredients of an effective liberalization policy of the domestic market:

- a rigorous separate management of the business unit in charge of the management of the airports, through a re-corporation or, at least, a placement of the company outside the control of Ethiopian Airlines;
- a fair allocation of aircraft maintenance spaces;
- a fair set-up of the training phase of the sector's human resources which, if fully integrated into the dominant operator, can give rise to difficulties in recruiting new operators willing to open new routes.

The last point concerning liberalization is that of the horizontal measures. Given that the general aim is that of creating an environment favourable to competition in the sector the main pillars of such a target are as follows:

- ex ante sectoral regulation (technical and economical) in force and related regulating bodies in place for all subsectors;
- ex post judgement level for competition issues to be set up and established.

The first point should be tackled according to the general principle that a market opening process requires a definition of the regulatory framework before the opening itself. This means that the potential operators should be informed about the rules of games before drafting and submitting their proposals / entry strategies.

As reality is always different from theoretical framework these kinds of processes are often developing in parallel or with overlapping between rules setting and proposals evaluation with negative results in terms of effectiveness of the policy. So, it is highly recommended to have a clear

picture of the future desired development of each subsector and to set the rules coherently with the objectives and the expectations. In fact, the country has already adopted measures to improve the support of private investments to the national development but this kind of measures (Investment Proclamation and Regulation, PPP policy) regulates primarily the procedural and financial issues neglecting the way in which these potential private investors interact with each specific sectoral situation and stakeholders.

The second point is of a more general scope because involves the entire economical sector of the country. Nevertheless, it is clear that an economic environment in which public and private companies operates in the same sectors must have an independent authority in charge to evaluate the infringements of the competition principles.

Again, the ex-ante regulatory framework must be defined in a way able to fix clearly the rights and duties of the economical actors in order to allow the ex-post judgement a solid base on which base fair decisions.

Alongside the issue of liberalization, the complementary issue must be addressed. Since public enterprises have played a prominent role in the past growth of the country, liberalization calls this role into question because monopoly positions, legal or factual, are incompatible with a framework of competition between companies. This implies that, on the part of the public shareholder, a process of reviewing the mission and objectives of all public enterprises in the sector is undertaken, to make them consistent with the new framework. The involved companies are as follows:

- ESLSE,
- ERC,
- EDR,
- CDE,
- EAL Group.

This process, which is also valid outside the transport sector (for example for the telecommunications and energy sectors) must be managed at a high level with a direction likely to be placed in the office of the Prime Minister or the MOF (for instance through the PEHAA). The role of the MOT should be to provide for an autonomous revision's proposal of the mission and objectives of the companies within its competence and to stimulate the Government on this issue.

As for the further aspects of the guidelines to be developed in the Go-Ahead scenario, the main elements are described below.

The area that concerns the mobility of citizens needs to develop intervention tools and policies: the development of the road network has increased the mobility potential of citizens but the low rate of private motorization and a still insufficient offer of collective transport services make it difficult that this potential is transformed into real mobility.

The regulatory framework allows the competent authorities to intervene either through their own companies or through authorizations to private companies. A regulatory framework to tackle this issue is still missing. To this purpose measures should be taken to allow the competent authorities to request the provision of additional transport services even in the presence of commercial losses, reimbursing the operating companies according to the difference between revenues and costs of the new services performed.

Such a regulatory framework should be established both for urban and local transport, with appropriate procedures to define the geographical scope of services and their features, both quantitative and qualitative. These provisions should include the new mass transport projects like BRT and LRT, in order to have a unique environment able to satisfy the mobility needs of the citizens.

The strong and systematic road development process requires an intermediate assessment of the governance of the road development model. The great growth in physical terms of the network does not correspond to a similar speed in the growth of maintenance culture and in the diffusion of such a culture below the federal level. This problem is amplified by the uneven structure of the regional

/ local authorities responsible for the road network, both for the tasks assigned and for the organizational structure. Therefore, a policy of greater harmonization of regional road authorities must be pursued in the medium term.

At the same time, the Road Fund, an intervention tool that has so far financed the maintenance of the network, is looking for resources to cover the growing financial needs. The issue of covering the maintenance costs of the road network may need to be revised according to the ever-increasing needs. If in general the 'user pays' principle is a good leading guideline in terms of distributive equity, it may be that the transfer of part of the new financial needs to general taxation may prove indispensable to maintain an adequate level of maintenance. A fortiori, the introduction of advanced maintenance management systems is absolutely necessary for the country.

Finally, the development of the new motorway network is essential in the medium term. Here, the PPP tool, which should hold together the needs for maintaining and repaying the invested capital, cannot be the only way to achieve network expansion.

There are at least three aspects involved within the issue above:

- a definition of the managerial and administrative competences on the road network which makes it possible to make infrastructure performances and their maintenance costs sustainable;
- the introduction of a culture of road development based on the entire life cycle of the asset itself, i.e. promoting the culture of asset management at all levels of administrative competence in the country;
- support the public role of the development of the road network with that of private capital, keeping the development planning of the network in public hands and involving the private company in financing and management.

The assessment conducted in the previous reports and the government planning documents (NLS, Logistics Policy) have well focused on the issue of the need to undertake a path of diversification of ports that mitigates Ethiopia's dependence on a single supply "door".

Pursuing this goal requires first of all a level of political management that is outside the scope of this paper. However, given the willingness to pursue this goal and the deployment of related political and diplomatic efforts, transport planning experts are left with the task of providing tools to define development priorities and guidance on implementation tools.

On this last point, some points of attention must be highlighted that can guide subsequent planning. First of all, the country has an important 'asset' to present on the negotiating table represented by its potential for economic development, for flows of goods in import and export. This is a potential that can be articulated in terms of geographical location and production chains to define which maritime ports to develop.

On the other hand, the economic efforts necessary for the development of ports suitable for receiving large tonnage ships are enormous and the financial partners are not numerous and now move on a global basis. The experience of the development of the port of Berbera, in which Ethiopia has a stake in the port authority and whose financial dominus is DP World, can be replicated in other cases in the hypothesis that a partner willing to invest is found.

A further point concerns the coordination of the planning of sectoral developments, where the specific plans (roads, railways) can identify projects of infrastructural connections towards ports. In this case, what must guide the attribution of priorities are the likely completion times of the port infrastructures to which the land infrastructure intends to connect.

A review of the strategic approach to the maritime sector has been clearly stated in the Logistics Policy: to participate directly in the worldwide competition of the shipping companies is unrealistic for Ethiopia.

The guidelines to be undertaken appears to be as follows: i) reorganize the own fleet, making it financially sustainable, and ii) improve the ability to operate in the global market as a Non-Vessel Owning Common Carrier (NVOCC).

The first point has already been underlined in a general way by addressing the issue of the revision of the mission of public enterprises. The financial unsustainability of the maritime business unit pushes ESLSE to cover the losses with extra profits on land services, thus operating as a brake on the development of the sector to protect its source of income. The redefinition of the mission of the public enterprise can follow several paths:

- indicate a specific sector of activity to focus on (for example bulk carrier) and, subsequently, spin off this activity into a different company with a coherent commitment;
- provide for a public reimbursement scheme linked to the maintenance of the fleet with a plan of progressive improvements up to economic breakeven.

8.4.4 Guidelines for 'Next Generation' policies

The 'Next Generation' scenario, as mentioned above, is characterized by the same macroeconomic dynamics as the previous scenario. Even in this scenario, the role of private investors becomes crucial to support the growing demand for mobility. However, unlike the first scenario, particular attention must be paid to the development of innovative production chains linked to low or zero emission technologies.

The definition of the transport policy guidelines of this scenario therefore refers to most of the issues already highlighted for the first scenario and which need not be described again. Furthermore, this scenario shares with the other scenarios the common policies previously defined (8.4.2).

Instead, it is useful to turn to the differences between the two scenarios. As described in 8.2 the main difference lays on the reaction of the transport system (mainly the railway system) to the inputs on the institutional / political side. Under this scenario the railway reform it is not able to promptly reach the expected results in terms of transport capacity, market penetration, efficiency. At this strategic knot of the planning process, it is requested to lay down an alternative path able to guide investment choices and implementation measures.

Starting from the competitive asset of the electricity availability the path behind this scenario is to boost a fast growing of the hydrogen cell technology and, through dedicated agreements with skilled partners, to give birth to a domestic production chains able to serve a demand of low / zero emissions vehicles. This requires active policies by the government in order to: i) limit the investment costs in the development of new technologies, ii) limit the investment costs in the distribution network serving the new vehicles and iii) limit the purchase costs of the new vehicles, both for companies (bus, trucks) and citizens (cars).

From the allocative point of views this means to switch the priority (and the financial resources) from the development of new railway lines to a new generation of road vehicles able to serve the demand of mobility which is the same of the 'Go Ahead' scenario. Furthermore, this means to (partially) switch resources from investments to grants in order to incentivise the penetration of the new technologies which, otherwise, will suffer of the price competition of more pollutant vehicles.

As mentioned above the policies necessary to encourage the development of the above-mentioned technologies concern three areas:

- incentives for the automotive sector for the production of low / zero emission vehicles;
- incentive schemes for the creation of a distribution network for vehicle recharging;
- incentive schemes to neutralize the cost differential between innovative vehicles and polluting vehicles which can be accompanied by command-and-control measures.

As for the first point the measures to be undertaken can be of different kind and can be also partially grounded on the present framework of incentives provided for the industrial parks. The related agreements should anyway include clause concerning the transfer of technology and the training of local workforce.

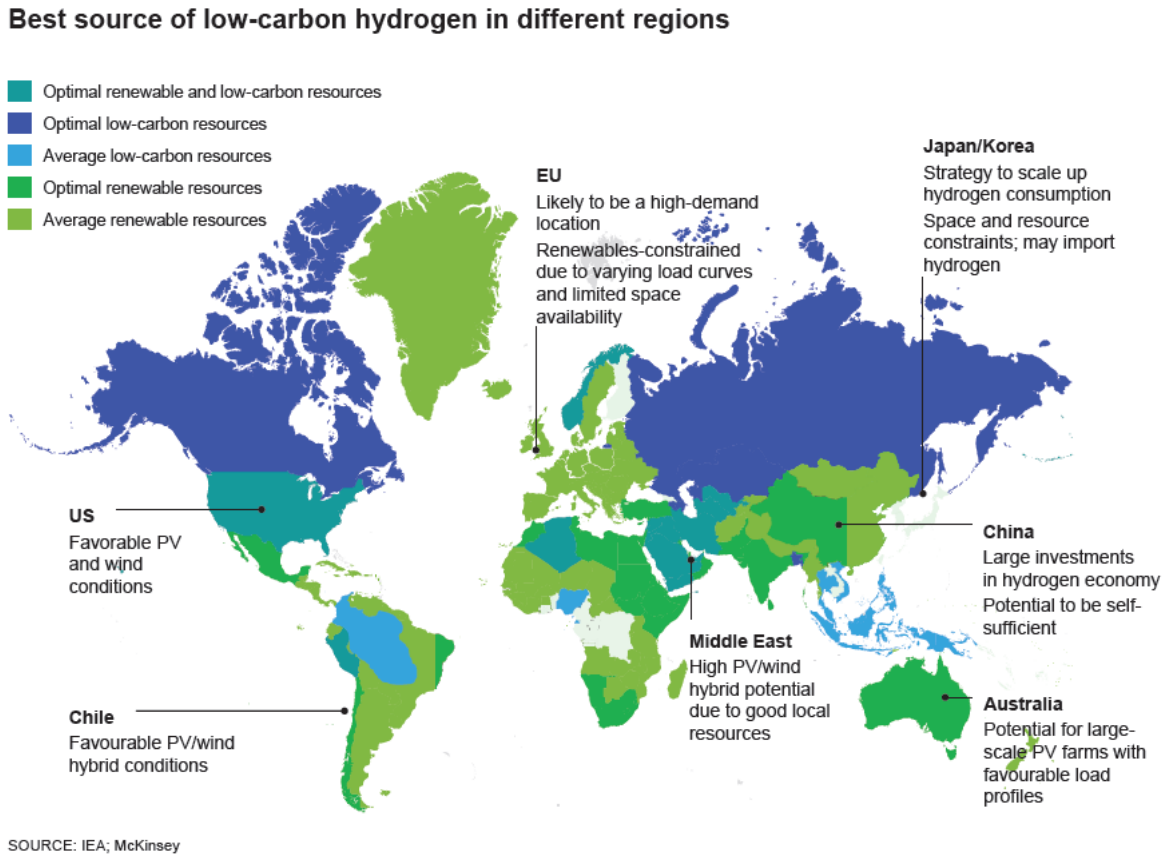
In fact, it has to be remind that one of the advantages of this approach is the coherence with the general objective of making Ethiopia as one of the manufacturing hub of Africa. But, as the Ethiopia STI Policy Review has keenly observed, this path can no longer works making the country always

depending from abroad for technical inputs. What must be put in place in this field are agreements able to generate, in the medium-long term, an endogenous stream of ideas, knowledge and competences to feed the African continent of an original approach to mobility solutions.

The second point must take into account the status of the production of hydrogen and its distribution, to this purpose some facts and evidences coming from literature will be summed up.

- Ethiopia can count on the advantage deriving from the future availability of low-cost electricity and low carbo hydrogen sources (see figure below), which are a fundamental prerequisite for both the efficient production of hydrogen and the powering of hybrid technology vehicles.

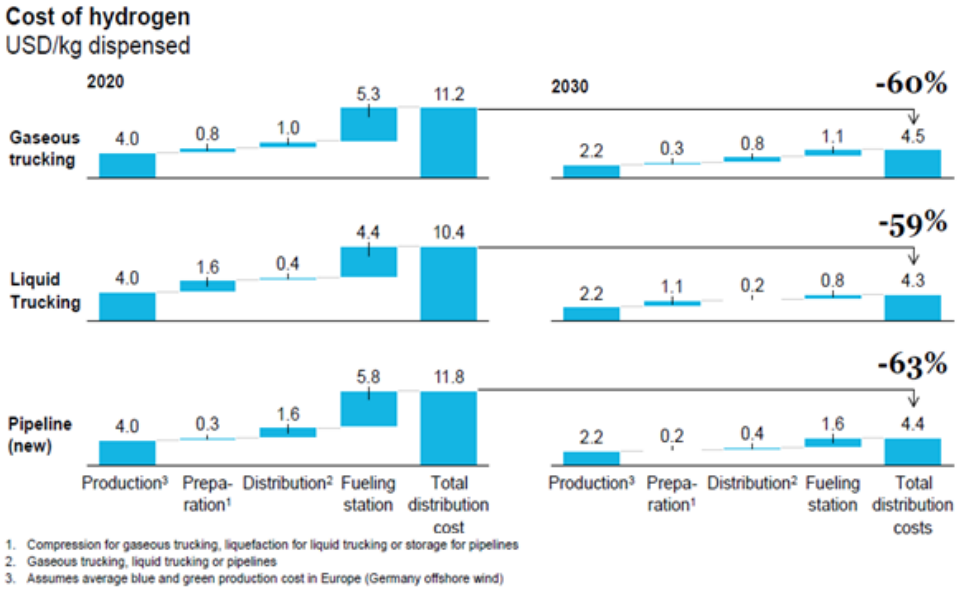
Figure 143: Worldwide sources of low-carbon hydrogen



Source: Hydrogen Council, Path to hydrogen competitiveness. A cost perspective. January 2020.

- Recent analysis indicates that the costs of the different ways of distributing hydrogen are expected to decrease significantly in costs over the next decade, with decreases of about 60% including production and about 70% when considering distribution alone. with an indicative value of less than 5 USD per kg by 2030 (see figure below).

Figure 144: Evolution of the hydrogen cost for transportation



Source: Hydrogen Council, Path to hydrogen competitiveness. A cost perspective. January 2020.

As regards the incentive measures, they must be differentiated according to the subjects to whom they are addressed. In case of legal entities (companies), the incentives could concern the tax treatment of investments in innovative vehicles (buses, trucks) or a direct contribution to reduce the purchase cost or other similar solutions. In the case of natural persons, the incentive measures could consist of a contribution to the purchase of vehicles to a variable extent up to a maximum that can neutralize the cost differential between the polluting and the innovative vehicle.

Besides the incentive measures also command and control measures can be adopted. It is the case, for instance, of provisions aimed at discouraging the use of polluting vehicles in the most polluted or congested areas (urban environment). Furthermore, this kind of measures can be coordinated with the implementation of the Non motorised strategy within the urban environment as ancillary measures.

In order to complete the policy framework for this scenario, it is necessary to underline that the relative change of priority between the railway sector and the road sector calls for a similar change in the implementation speed of the sectoral liberalization processes. This means that in this scenario there is a particular focus on the market opening in the road sector.

The main issues to be faced should be at least the following:

- liberalization focused on international road corridors through the fast implementation of the Multilateral Cross-Border Road Transport Agreement;
- reform of the road associations organization in order to enhance the access to the market of road services providing and avoiding the consolidation of dominant trusts.

8.4.5 Guidelines for 'Limits to Growth' policies

This scenario is influenced by less positive macroeconomic exogenous conditions than in the two previous scenarios. This is reflected in lower growth and an emergence of elements of uncertainty that depress the propensity to invest in LCI.

Accordingly, in this scenario the mobility demand to be served by the transport system is lower than in the previous two scenarios and the private sector's support is hampered by both high uncertainty and minor availability of financial resources to invest.

In this reference framework, the transport policy guidelines are inevitably different from those previously described, although they share the core of common policies already described with the other scenarios.

The focus of planning shifts towards a selection of investments and that of policies shifts towards the concepts of efficiency and coordination. In fact, the speed of implementation of the liberalization of the sector decreases while public enterprises are still the main instrument of intervention. Precisely for this reason, the guidelines can be briefly summarized according to the following points:

- reform / reorganization of the public enterprises of the transport sector;
- a lower priority of liberalization issue;
- a higher priority on central coordination of economic activities and a reinforcement of the public control on state owned enterprises.

The first point concerns a process of evaluation and reform / reorganization of public enterprises in the sector. The aim is to make them more efficient and able to implement the selected investments that will be planned in an "emergency scenario". This process should cover the logistics and railways sectors (ESLSE, ERC, EDR) but, although not companies but public bodies, it should also include regional and local road sector authorities responsible for the construction and maintenance of the network.

The decrease in priority of market opening does not mean putting aside the long-term orientation. On the contrary, it can represent an opportunity in terms of more time available for the development of the rules of the game, both for safety and economic regulation, that need to be known and explained in advance to potential investors. Furthermore, the time factor can make it possible, especially in the case of railways, to strengthen the familiarity of public enterprises with commercial dynamics, which in any case will not stop even in this scenario.

On the basis of the above arguments, a point becomes central in this scenario and is the one that concerns a higher priority to be assigned to the central coordination of public enterprises in the transport sector. In this context, the role of PEHAA as a holding company controlling public shareholdings becomes important. The role of this holding can be of great importance for the dissemination and implementation of efficient management methodologies, both as regards the economic-financial aspects and the more distinctly operational ones.

8.5 ASSIGNMENTS BY SCENARIO & TERM

The future traffic assignments were carried out for the combinations of transport offer/transport demand presented inside the next table.

Table 83: Combinations of demand / offer scenarios considered inside the traffic assignments

Demand / Offer	Limits to Growth o/d matrix	NextGen + Go-Ahead o/d matrix
year 2025: Limits to Growth	*	
year 2035: Limits to Growth	*	
year 2050: Limits to Growth	*	
year 2025: Next Generation		*
year 2035: Next Generation		*
year 2050: Next Generation		*
year 2025: Go Ahead		*
year 2035: Go Ahead		*
year 2050: Go Ahead		*

Yet said, traffic was assigned initially for the freight component and then for the passenger component, assuming the freight component as preload for the passenger assignments. The distribution of the demand among the different transport modes (road, rail) and among the different external maritime ports was determined based on transhipment costs that were calibrated on the present scenario for road/rail transhipment and collected from respective sources of information (mainly port authorities) regarding ports (storage). The redistribution between the different modes depended both on the interventions envisaged for each scenario (more or less rail investments), and on the different connections offered from / to the existing ports.

9 DETAILED MASTER PLAN ACTIONS

Following are reported the detailed actions that are included in the Consolidate Transport Master Plan for each sector:

9.1 ROAD NETWORK & ROAD TRANSPORT

The ETMP 2050 will consider the following interventions in the road network:

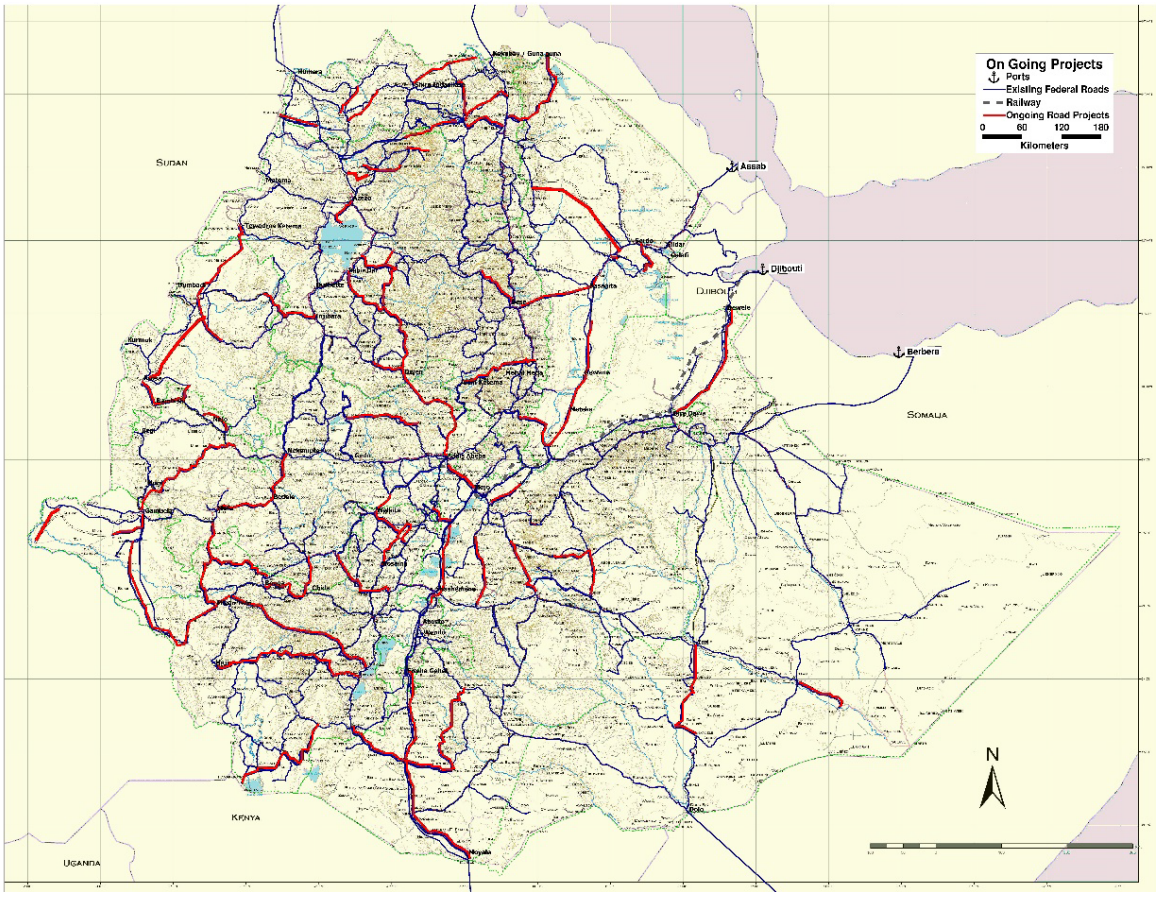
9.1.1 Federal ongoing roads projects

Regarding the federal road network, during the four years of RSDP V, were rehabilitated 1,011 km of trunk roads, in comparison with 1,200 km planned, upgraded 2,338 km of trunk and link roads (3,149 planned), constructed 3,214 km of new link roads (3,872 planned).

The MoT TYP aims at providing the upgrading of 28,000 km and regular maintenance works for the federal network. Moreover, the TYP plans to build: i) well-drained, climate change resilient and safe new roads and ii) improve the road administration capacity of road construction and maintenance (RAMS) and apply 3rd generation Road Fund.

ERA is working on a comprehensive **National Road Master Plan**, whose results are not yet approved and the Consultant was provided only with a list of **ongoing road projects** that are shown in paragraph 5.2.1 and reported in the following figure:

Figure 145: Federal roads ongoing projects



9.1.2 Missing-capacity federal links

The assignments of transport demands (freight & passengers) at different time horizons (2025, 2035 & 2050), has identified a list of missing-capacity links for each scenario and term (short, medium, long), that are reported in the following table, together with the suggested increase of capacity needed:

Go-Ahead Scenario

Table 84: Go Ahead - 2025 - Road capacity increase.

ID	Link name	Possible intervention at year 2025
591	Holeta-Ambo	General upgrade (increase of capacity about 50%)
980	Modjo - Nazreth	
1330	Sebeta-Holeta	
2509	Addis-Commodo	
1327	Alemgena - Weliso	
640	Alemgena - Butajira	
973	Addis - Modjo	
979	Nazareth - Asela	
60	Holeta - Muger	
2507	Tatek-Kolfe	
162	Harar-Bombas	

Table 85: Go Ahead - 2035 - Road capacity increase

ID	Link name	Possible intervention at year 2035
591	Holeta-Ambo	Main upgrade (additional lanes)
1330	Sebeta-Holeta	Main/General upgrade (partially additional lanes)
980	Modjo - Nazreth	
2509	Addis-Commodo	
979	Nazareth - Asela	
1326	Alemgena - Butajira	Main upgrade (additional lanes)
2507	Tatek-Kolfe	Main/General upgrade (partially additional lanes)
973	Addis - Modjo	
60	Holeta - Muger	
162	Harar-Bombas	
1382	Nazareeh - Metehara	Main upgrade (additional lanes)
1384	Modjo - Ejere - Arerti - Kesem	General upgrade (increase of capacity about 50%)
982	Nazaret-Awash Melkassa	
650	Bui - Midirekebd - Meki	
1497	Awassa - Aposto	

Table 86: Go Ahead 2050 - Road capacity increase

ID	Link name	Possible intervention at year 2050
2509	Addis-Commodo	Main upgrade (additional lanes)
980	Modjo - Nazreth	
591	Holeta-Ambo	
1330	Sebeta-Holeta	
1326	Alemgena - Butajira	
979	Nazareth - Asela	Main/General upgrade (partially additional lanes)
1382	Nazareeh - Metehara	Main upgrade (additional lanes)
973	Addis - Modjo	
650	Bui - Midirekebd - Meki	Main/General upgrade (partially additional lanes)
2507	Tatek-Kolfe	Main upgrade (additional lanes)
1335	Shashemene - Alaba	Main/General upgrade (partially additional lanes)
982	Nazaret-Awash Melkassa	Main upgrade (additional lanes)
80	Butajira - Ziway	
60	Holeta - Muger	
505	Sodo - Selam Ber	
1502	Bojeber - Butajira	

ID	Link name	Possible intervention at year 2050
584	Alemgena - Weliso	
1333	Ziway - Shashemene	Main/General upgrade (partially additional lanes)
162	Harar-Bombas	Main upgrade (additional lanes)
1032	Awassa - Aposto	Main/General upgrade (partially additional lanes)
20	Harar - Jarso	Main upgrade (additional lanes)
645	Asela - Bekoji - Dodola	
1384	Modjo - Ejere - Arerti - Kesem	
2734	koka-Adulala-D/zeit	
607	Butajira - Hossana	
1037	Aposto - Dilla	Main/General upgrade (partially additional lanes)
944	Mehoni - Maychew	Main upgrade (additional lanes)
1445	Bombas - Jijiga	
579	Giyon - Walkite	Main/General upgrade (partially additional lanes)
615	Welkite - Mazoria	
1515	Addis- Debreberehan	Main upgrade (additional lanes)
1050	Shashemene - Awassa	Main/General upgrade (partially additional lanes)
596	Addis-Holeta	Main upgrade (additional lanes)
612	Alaba Alemgebeya - Wulberg	Main/General upgrade (partially additional lanes)
77	Langano-Kersa-Bilalo	Main upgrade (additional lanes)
195	Bizet - Adiabun	General upgrade (increase of capacity about 50%)
2986	Addis - Adama (Toll Road)	
654	Eteya-Diksis-Robe	Main upgrade (additional lanes)
1418	Adigudom - Mekele	General upgrade (increase of capacity about 50%)
319	Dangla - Bahirdar	Main/General upgrade (partially additional lanes)
606	Mazoria - Hossana	
345	Adiabun-Axum	Main upgrade (additional lanes)
87	Dera - Sire	
1516	Ambo-Gedo	
1027	Hossana - Areka	
71	Shashemene - Dodola	
218	Km 35 - Arerti - Gobensa - Gendober	
623	Tulubolo - Robgebeya	Main/General upgrade (partially additional lanes)
1505	Dodola-Robe	Main upgrade (additional lanes)
996	Sembo-Kesem River	Main/General upgrade (partially additional lanes)
1026	Alaba - Sodo	General upgrade (increase of capacity about 50%)
1209	Adet - Bahirdar	Main/General upgrade (partially additional lanes)
638	Kella - Dugda	Main upgrade (additional lanes)
86	Huruta-Dera	
625	Beke - Zemute	
1425	Waja - Maychew	Main/General upgrade (partially additional lanes)
648	Modjo - Ziway	
1030	Morocho - Yirba-Dimtu-Dilbo	
2999	Gedo-Bako	Main upgrade (additional lanes)
508	Areka - Sodo	General upgrade (increase of capacity about 50%)
205	Negash - Adigrat	
111	Robe - Delosebro - Ginir	
57	Tulubolo-Ginchi	
1390	Godobert - Debreberihan	
1536	Kombolcha - Bati	
2777	Gedo - Ficha	
2774	Leme - Alem Ketema	
140	Sontom - Abay River Bridge	
1318	Chitu-Haro Wenchi	
599	Dejen - D/Markos	
1207	Zema R.Bridge - Adet	
1539	Awash Junc-Areberekeri	Main/General upgrade (partially additional lanes)
889	Abay River - Gida	General upgrade (increase of capacity about 50%)

ID	Link name	Possible intervention at year 2050
313	Bure - Sontom	
1179	Combolcha - Mekaneselam- Abay River Bridge	
88	Sire - Chole	
324	Bahirdar - Wereta	
1202	Bure - Dangla	
238	Kulubi-Dengego	
1254	Debre Sina - Gudo Beret	
960	Abiy Adi - Adwa	
999	Mukaturi - Lemi	
1396	Desse - Kombolcha	
1456	Saja-Jimma	
613	Atat Junction-Gunchere-Kese-Geja-Lera	Main/General upgrade (partially additional lanes)
1246	Mekele - Abiy Adi	General upgrade (increase of capacity about 50%)
163	Jarso - Bombas	
589	Tera - Amoute	
43	Mazoria - Durgi	
1540	Gelemso - Arba reketi	
269	Shashemene - Wondogenet	
893	Debremarkos - Bure	
116	Robe - Seru	
1227	Samera - Sardo	
1018	Mile - Samera	
1324	Tiya - Gereno - Amote	
268	GemetoMazoria - Wondo Genet	
227	Ankober - Dulecha	
723	Chole - Magna - Mechara	
1413	Azezo Airport - Gondar	
2837	Seru - Shekhusen	
263	Lesho Jun - Shishicho - Durame - Mazoria	

Next Generation Scenario

Table 87: Next Generation. - 2025 - Road capacity increase

ID	Link name	Possible intervention at year 2025
591	Holeta-Ambo	General upgrade (increase of capacity about 50%)
980	Modjo - Nazreth	
1330	Sebeta-Holeta	
2509	Addis-Commodo	
1327	Alemgena - Weliso	
640	Alemgena - Butajira	
973	Addis - Modjo	
979	Nazareth - Asela	
60	Holeta - Muger	
2507	Tatek-Kolfe	
162	Harar-Bombas	

Table 88: Next Generation. - 2035 - Road capacity increase

ID	Link name	Possible intervention at year 2035
591	Holeta-Ambo	Main upgrade (additional lanes)
1327	Alemgena - Weliso	Main/General upgrade (partially additional lanes)
980	Modjo - Nazreth	
2509	Addis-Commodo	
1330	Sebeta-Holeta	Main upgrade (additional lanes)
979	Nazareth - Asela	
973	Addis - Modjo	Main/General upgrade (partially additional lanes)
640	Alemgena - Butajira	
60	Holeta - Muger	

ID	Link name	Possible intervention at year 2035
2507	Tatek-Kolfe	Main upgrade (additional lanes)
162	Harar-Bombas	Main/General upgrade (partially additional lanes)
1382	Nazareeh - Metehara	General upgrade (increase of capacity about 50%)
982	Nazaret-Awash Melkassa	
1384	Modjo - Ejere - Arerti - Kesem	
650	Bui - Midirekebd - Meki	
925	Dengego-Harar	
1008	Dengego(dire dawa) - Harar	
623	Tulubolo - Robgebeya	
80	Butajira - Ziway	
1497	Awassa - Aposto	
625	Beke - Zemute	

Table 89: Next Generation. - 2050 - Road capacity increase

ID	Link name	Possible intervention at year 2050
980	Modjo - Nazreth	Main upgrade (additional lanes)
2509	Addis-Commodo	
1330	Sebeta-Holeta	
591	Holeta-Ambo	
1326	Alemgena - Butajira	
979	Nazareth - Asela	Main/General upgrade (partially additional lanes)
1382	Nazareeh - Metehara	Main upgrade (additional lanes)
982	Nazaret-Awash Melkassa	
650	Bui - Midirekebd - Meki	Main/General upgrade (partially additional lanes)
973	Addis - Modjo	Main upgrade (additional lanes)
2507	Tatek-Kolfe	
80	Butajira - Ziway	
60	Holeta - Muger	
1335	Shashemene - Alaba	Main/General upgrade (partially additional lanes)
505	Sodo - Selam Ber	Main upgrade (additional lanes)
645	Asela - Bekoji - Dodola	Main/General upgrade (partially additional lanes)
584	Alemgena - Weliso	Main upgrade (additional lanes)
1502	Bojeber - Butajira	
1333	Ziway - Shashemene	Main/General upgrade (partially additional lanes)
1384	Modjo - Ejere - Arerti - Kesem	Main upgrade (additional lanes)
162	Harar-Bombas	
20	Harar - Jarso	
1030	Morocho - Yirba-Dimtu-Dilbo	Main/General upgrade (partially additional lanes)
1497	Awassa - Aposto	Main/General upgrade (partially additional lanes)
944	Mehoni - Maychew	Main upgrade (additional lanes)
87	Dera - Sire	
596	Addis-Holeta	
1445	Bombas - Jijiga	
77	Langano-Kersa-Bilalo	
615	Welkite - Mazoria	Main/General upgrade (partially additional lanes)
579	Giyon - Walkite	Main upgrade (additional lanes)
607	Butajira - Hossana	
195	Bizet - Adiabun	General upgrade (increase of capacity about 50%)
319	Dangla - Bahirdar	Main/General upgrade (partially additional lanes)
212	koka-Adulala-D/zeit	Main/General upgrade (partially additional lanes)
1037	Aposto - Dilla	Main upgrade (additional lanes)
2739	Addis - Adama (Toll Road)	General upgrade (increase of capacity about 50%)
1028	Hossana - Areka	Main/General upgrade (partially additional lanes)
345	Adiabun-Axum	Main upgrade (additional lanes)
654	Eteya-Diksis-Robe	
1050	Shashemene - Awassa	

ID	Link name	Possible intervention at year 2050
612	Alaba Alemgebeya - Wulberg	Main/General upgrade (partially additional lanes)
1390	Godobert - Debreberihan	Main upgrade (additional lanes)
1516	Ambo-Gedo	
606	Mazoria - Hossana	Main/General upgrade (partially additional lanes)
1388	Addis- Debreberehan	Main upgrade (additional lanes)
996	Sembo-Kesem River	Main/General upgrade (partially additional lanes)
218	Km 35 - Arerti - Gobensa - Gendober	Main upgrade (additional lanes)
71	Shashemene - Dodola	
1026	Alaba - Sodo	Main/General upgrade (partially additional lanes)
1452	Modjo - Ziway	General upgrade (increase of capacity about 50%)
623	Tulubolo - Robgebeya	Main/General upgrade (partially additional lanes)
638	Kella - Dugda	Main upgrade (additional lanes)
1209	Adet - Bahirdar	Main/General upgrade (partially additional lanes)
88	Sire - Chole	Main upgrade (additional lanes)
205	Negash - Adigrat	Main/General upgrade (partially additional lanes)
1505	Dodola-Robe	
86	Huruta-Dera	Main upgrade (additional lanes)
227	Ankober - Dulecha	General upgrade (increase of capacity about 50%)
57	Tulubolo-Ginchi	
1425	Waja - Maychew	
2777	Gedo - Ficha	
625	Beke - Zemute	
508	Areka - Sodo	
140	Sontom - Abay River Bridge	
238	Kulubi-Dengego	
1318	Chitu-Haro Wenchi	
702	Chole - Magna - Mechara	
2837	Seru - Shekhusen	
1202	Bure - Dangla	
1456	Saja-Jimma	
889	Abay River - Gida	
1248	Ankober-Debere Berhan	
1207	Zema R.Bridge - Adet	
324	Bahirdar - Wereta	
163	Jarso - Bombas	
313	Bure - Sontom	
1005	Robit - Debre Sina	
1536	Kombolcha - Bati	
111	Robe - Delosebro - Ginir	
599	Dejen - D/Markos	
960	Abiy Adi - Adwa	
1467	Aposto - Kebremengist	
1246	Mekele - Abiy Adi	
1003	Ataye - Robit	
1496	Dilla - Fisaha Genet	
1539	Awash Junc-Arebereketi	
513	Atat Junction-Gunchere-Kese-Geja-Lera	
116	Robe - Seru	
589	Tera - Amoute	
1179	Combolcha - Mekaneselam- Abay River Bridge	
2590	Mechara - Dire shak husen	
2774	Leme - Alem Ketema	
1413	Azezo Airport - Gondar	
1219	Meksegnet - Azezo Airport	
1221	Wereta - Maksegnet	

ID	Link name	Possible intervention at year 2050
43	Mazoria - Durgi	
110	Goba - Robe	
893	Debremarkos - Bure	
326	Azezo - Gorgora	
884	Shamboo-Agemiso	

Limits-to-Growth Scenario

Table 90: Limit to Growth- 2025 - Road capacity increase.

ID	Link name	Possible intervention at year 2025
591	Holeta-Ambo	General upgrade (increase of capacity about 50%)
980	Modjo - Nazreth	
1330	Sebeta-Holeta	
2509	Addis-Commodo	
1327	Alemgena - Weliso	
1322	Alemgena - Butajira	
973	Addis - Modjo	
1384	Modjo - Ejere - Arerti - Kesem	
979	Nazareth - Asela	
1452	Modjo - Ziway	
60	Holeta - Muger	
2507	Tatek-Kolfe	

Table 91: Limit to Growth- 2035 - Road capacity increase

ID	Link name	Possible intervention at year 2035
591	Holeta-Ambo	General upgrade (increase of capacity about 50%)
1327	Alemgena - Weliso	
980	Modjo - Nazreth	
2509	Addis-Commodo	
1330	Sebeta-Holeta	
979	Nazareth - Asela	
973	Addis - Modjo	
60	Holeta - Muger	
640	Alemgena - Butajira	
2507	Tatek-Kolfe	
1384	Modjo - Ejere - Arerti - Kesem	
162	Harar-Bombas	
982	Nazaret-Awash Melkassa	
1382	Nazareeh - Metehara	
1008	Dengego(dire dawa) - Harar	
650	Bui - Midirekebd - Meki	
925	Dengego-Harar	

Table 92: Limit to Growth- 2055 - Road capacity increase.

ID	Link name	Possible intervention at year 2050
2509	Addis-Commodo	Main upgrade (additional lanes)
591	Holeta-Ambo	
980	Modjo - Nazreth	
1330	Sebeta-Holeta	
979	Nazareth - Asela	
1326	Alemgena - Butajira	
1382	Nazareeh - Metehara	
973	Addis - Modjo	
982	Nazaret-Awash Melkassa	
650	Bui - Midirekebd - Meki	
2507	Tatek-Kolfe	
60	Holeta - Muger	

ID	Link name	Possible intervention at year 2050
1384	Modjo - Ejere - Arerti - Kesem	
584	Alemgena - Weliso	
1335	Shashemene - Alaba	
162	Harar-Bombas	
80	Butajira - Ziway	
505	Sodo - Selam Ber	
1333	Ziway - Shashemene	
1502	Bojeber - Butajira	
645	Asela - Bekoji - Dodola	
1516	Ambo-Gedo	
996	Sembo-Kesem River	
1032	Awassa - Aposto	
20	Harar - Jarso	
607	Butajira - Hossana	
77	Langano-Kersa-Bilalo	
615	Welkite - Mazoria	
218	Km 35 - Arerti - Gobensa - Gendober	
1515	Addis- Debreberehan	
944	Mehoni - Maychew	
319	Dangla - Bahirdar	
579	Giyon - Walkite	
612	Alaba Alemgebeya - Wulberg	
195	Bizet - Adiabun	
596	Addis-Holeta	
1445	Bombas - Jijiga	
2739	Addis - Adama (Toll Road)	
2734	koka-Adulala-D/zeit	
1037	Aposto - Dilla	
345	Adiabun-Axum	
654	Eteya-Diksis-Robe	
606	Mazoria - Hossana	
1026	Alaba - Sodo	
87	Dera - Sire	
1027	Hossana - Areka	
1050	Shashemene - Awassa	
623	Tulubolo - Robgebeya	
1418	Adigudom - Mekele	
638	Kella - Dugda	
649	Modjo - Ziway	
86	Huruta-Dera	
1209	Adet - Bahirdar	
1318	Chitu-Haro Wenchi	
71	Shashemene - Dodola	
1030	Morocho - Yirba-Dimtu-Dilbo	
625	Beke - Zemute	
1425	Waja - Maychew	
1536	Kombolcha - Bati	
1505	Dodola-Robe	
1202	Bure - Dangla	
2774	Leme - Alem Ketema	
1390	Godobert - Debreberihan	
205	Negash - Adigrat	
88	Sire - Chole	
508	Areka - Sodo	
1396	Desse - Kombolcha	
599	Dejen - D/Markos	
324	Bahirdar - Wereta	

ID	Link name	Possible intervention at year 2050
57	Tulubolo-Ginchi	
140	Sontom - Abay River Bridge	
994	Mintamir-Meteh Bila-Metehara	
513	Atat Junction-Gunchere-Kese-Geja-Lera	
1539	Awash Junc-Arebereketi	
1207	Zema R.Bridge - Adet	
889	Abay River - Gida	
999	Mukaturi - Lemi	
589	Tera - Amoute	
313	Bure - Sontom	
1179	Combolcha - Mekaneselam- Abay River Bridge	
1254	Debre Sina - Gudo Beret	
238	Kulubi-Dengego	

9.1.3 Expressways Network Development

Presently two expressways (road with full access control and toll, which enables users for high-speed travel), are in service in 78 km of the Addis Ababa – Adama section and the 223 km of toll road with only two lanes between Dire Dawa and Dewele. A longer expressway (2+2 lanes) is under construction between Modjo and Awassa (220 km).

The Ethiopian Toll Road Enterprise (ETRE) is planning the realization of other expressway sections for a total of 1009 km.:

- Addis Ababa – Holeta – Ambo. 118 km
- Addis Ababa – Commando. 110 km
- Addis Ababa – Alemgena – Woliso. 110 km
- Addis Ababa – Debre Birhan. 129 km
- Alemgena – Butajira. 117 km
- Dire Dawa – Dengego – Harar. 50 km
- Awash junction – Adaitu. 270 km
- Adaitu – Mille – Semera. 105 km

The Consultant proposes the continuation till the Ethiopian borders of the following expressways all at 2+2 lanes.

1. Dire Dawa – Dewelle- Djibouti border, with upgrade at 2+2 lanes
2. Semera – Djibouti/Eritrean border Expressway
3. Debre Berhan - Mekele - Eritrea border Expressway
4. Commando – Bahir Dar - Metema – Sudan border Expressway
5. Ambo - Gimbi – Asosa – Sudan border Expressway/
6. Gimbi - Gambela – South Sudan border Expressways
7. Woliso – Jimma – Mizan Teferi – South Sudan Border Expressway
8. Awassa - Moyale – Kenya border Expressway
9. Harar – Giggiga – Somaliland border Expressway
10. Awassa – Bilata – Filtu – Somalia border Expressway
11. Jijiga – Kebridehar – Scilave – Ferfer - Somalia border Expressway.

At year 2050, it will be necessary to bring to 3+3 lanes, the following expressways:

a) Addis – Ambo – Nekemte (..km);
b) Addis – Butajira (..km);
c) Modjo – Awassa (..km).

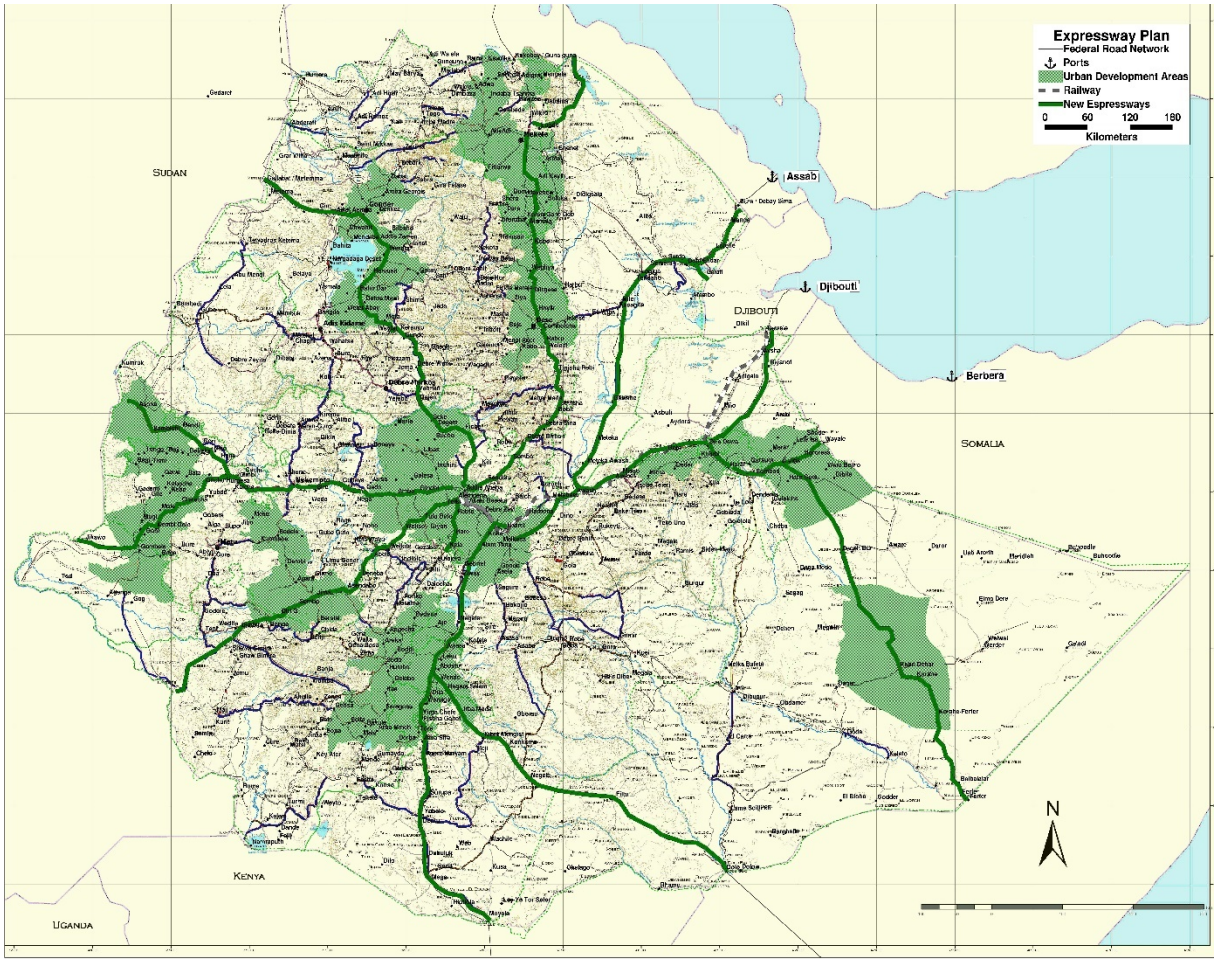
In particular:

1. **Dire Dawa – Dewelle- Djibouti border** project belongs to the overall expressway from Addis through Adama, Awash, Dire, Dewelle Djibouti border with a total of 669 kms. This expressway is composed by the already built Addis – Adama section (78 km) and Dire-Dewele (223 km,

already built as a 1+1 lane). It is proposed to upgrade the entire expressway at 2+2 lanes. This corridor will serve the trade corridor development area of Dire Dawa with 3 industrial parks and the Aisha industrial park. Excluding the Addis area. The total population served is about 9 million.

2. **Semera – Djibouti/Eritrean border Expressways**, belong to the Addis – Awash – Adaitu – Mille – Semera – Djibouti border or Bure – Eritrean border, with a total length of 708 km (Addis – Galafi) and 812 km (Addis - Bure). This expressway will serve two industrial parks near Semera and a served population of 3.1 million.
3. **Debre Berhan - Mekele - Eritrea border Expressway**, belongs to the Addis – Debre Berhan – Kombolcha – Weldiya – Mekelle – Eritrea border, with a total km of 908 km. This expressway serves the industrial corridor development area of Kombolcha-Mekelle, two industrial parks in Debre Berhan,, two in Kombolcha, two in Mekelle and a total population of 10.8 million.
4. **Commando – Bahir Dar - Metema – Sudan border Expressway**, belongs to the Addis – Debre Markos – Bahir Dar – Gondar – Metema – Sudan border (840 mkm), passing through the lake Tana corridor development area, Bure, Woreta, Bahir Dar industrial parks and serving 11.8 million population.
5. **Ambo - Gimbi – Asosa – Sudan border Expressway**, belongs to the Addis – Ambo – Nekemte – Asosa – Sudan border (760 km), passing through the Addis and Gambela export corridor development areas, Asosa industrial parks and serving 4.5 million population
6. **Gimbi - Gambela – South Sudan border Expressways**, belongs to the Addis – Ambo – Nekemte – Gimbi - Gambela – Sudan border (808 km), passing through the Addis and Gambela export corridor development areas, Asosa industrial parks and serving 4.5 million population
7. Woliso – Jimma – Mizan Teferi – South Sudan Border Expressway, belongs to the Addis – Alemgena – Jimma – Mizan – South Sudan border (660 km), passing through the Jimma agricultural corridor development areas, Jimma industrial parks and serving 8.2 million population.
8. **Awassa - Moyale – Kenya border Expressway**, belongs to the Addis – Shashamene, Awassa, - Ageremariam – Yabelo – Moyale – Kenya border (770 km), passing through the Awassa corridor development areas, Awassa industrial and agro-industrial parks, and serving 10.5 million population.
9. **Harar – Giggiga – Somaliland border Expressway**, belongs to the Dire Dawa - Harar Giggiga, Somaliland border (216 km), passing through the DireDawa – Giggiga trade corridor development areas, with 3 industrial parks serving 2.9 million population
10. **Awassa – Bilata – Filtu – Somalia border Expressway**, belongs to the Awassa, - Bilata – Filtu – Dolo – Somalia border (664 km), serving 5.5 million population
11. **Jijiga – Kebridehar – Scilave – Ferfer - Somalia border Expressway,** belongs to the Dire Dawa – Harar – Jijiga - Ferfer Somaliland border (757 km), passing through the Pastoralist corridor development areas, serving 2.1 million population.

Figure 146: Expressway Plan



9.1.4 Connecting Ring Roads

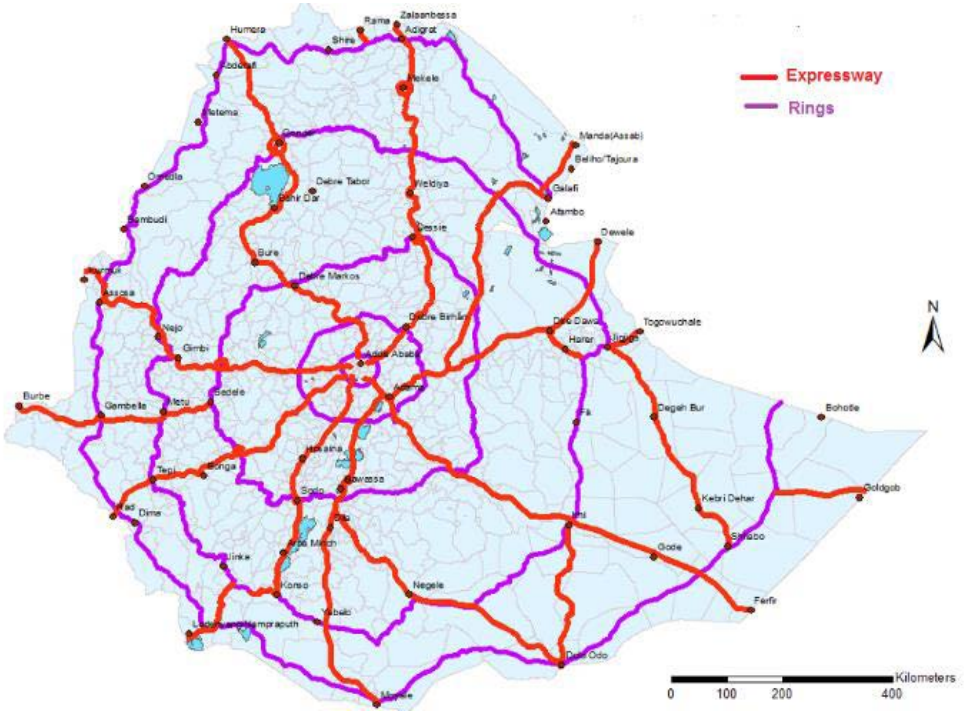
The MoT TYP, besides several expressways departing from Addis Abeba and reaching all boundaries, has identified 5 Ring Roads that will connect the radial expressways at different levels. According with model transport demand forecast, the most important Rings to be implemented at different years in the ETMP project life, would be:

Ring 0: Addis Abeba Outer Ring Road – passing through Holeta – Sebeta – Bishoftu – Sendafa – Sululeta. This ring road is to be considered as necessary in the short term and should also be validate by the ongoing Addis Ababa Transport Master Plan.

Ring 1: Metehara – DebreBerhan – Fiche - Ambo – Woliso Butajira – Meki – Dera, to be implemented in the medium term (2035).

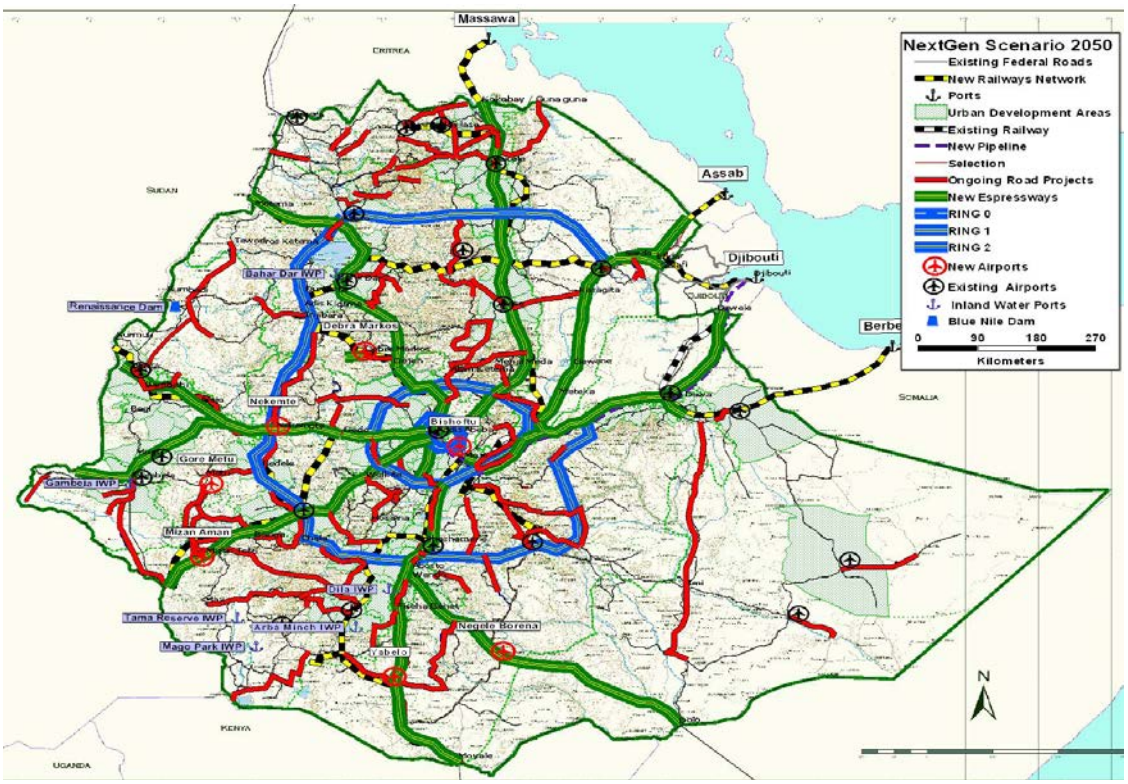
Ring 2: Semera – Maychew – Gondar – Nekemte – Jimma – Awassa – Sheikussien – Dodoma, to be implemented in the longer run, profiting of already enlarged federal roads.

Figure 147: Ten-Years Expressways & Ring Roads System



The following figure shows the Ring Road system proposed by the Consultant

Figure 148: Proposed Ring Roads System



9.1.5 Regional Roads

Regarding Regional Roads, during the four years of RSDP V, a total of 8,036 km of Regional Roads (6,600 planned) and 14,914 km of URRAP Roads (74,187 planned) were constructed.

A Regional Road Plan and accessibility will be conducted in the next deliverable for each of the 9 Regions level (Amhara, Oromia, Tigray, Ethiopia Somali, SNNP, Gambella, Benisha ngulGumz, Afar, and Harar and the two City Administrations of Addis Ababa and Dire Dawa), applying the Rural Accessibility Index and following the methodology presented in the next chapter 9,2 Rural Accessibility. The Regional Plans will define the efficient and optimum size of the network for the next 30 years (2020-2049) with the objective to improve accessibility and connectivity between regions and development centers.

9.1.6 Road sector Trainings & Capacity Building

Consultant **Training** in the road sector will be concentrated in:

- Installation and use of the Transport Master Plan TransCad Model
- Installation and use of HDM4 for road project, programming and strategy plans;
- Installation and use of a MultiCriteria model to be used for prioritization of transport projects.

The proposed **Capacity Building** activities will regard:

- Developing an efficient Road Asset Management System and interface with HDM4;
- Application of Performance Based Contracts for road maintenance;
- Use of mobile Big Data for traffic assessment and planning;
- Establish an office for research on international developing innovations, like use of IT, green fuel, autonomous vehicles, etc.

9.1.7 Road Transport Improvements

The ETMP 2050 proposes in the short term:

a) Improvement of road transport regulation quality and enforcement to comply with Vienna convention

b) the different targets, already expressed in the MoT TYP, i.e.:

- Increase cross border and domestic trucks from 14,000 to 22,000
- Building new intercity public bus stations to arrive at 732 from 690
- Increase passengers' transport capacity from 722 million to 1.5 billion;
- Increase annual coverage of public buses from 96,000 to 118,000 km;
- Increase Cross-country public transport routes from 225 to 384;
- Increase the cross-border high-capacity buses from 1,778 to 10,051;
- Increase Regular transport service coverage in rural areas from 57% to 100%;
- Decrease the road accident mortality rate from 34.4 to 10 every ten thousand vehicles;
- Increase Drivers' Competence Certification Complex from 6 to 16;
- Increasing the supply of domestic and transit trucks with high loading capacity;
- Operators of freight transport service to maintain 100% international professional standard;
- Increasing the average kilometre coverage of commercial truck from 85.6 thousand kilometres to 103,000 km.

At least two areas of intervention must be furtherly added concerning the mobility of citizens and the road development model.

On the first point, the need to complete the regulatory framework is highlighted to allow for an offer of collective mobility services that can match the growth of the population and income. Specifically, it should be established the possibility of a local competent authority to ask the providing of transport services also in case of commercial losses by reimbursing the operator the net costs incurring for this providing. This kind of intervention should be applied under a procurement framework fixing the quantitative and qualitative features of the services.

The second point calls for an assessment of the country's road development model, both on the governance and on the financing side. As pointed out below, the first issue calls for an harmonisation of the assignments and the organizational structure of the local authorities, in order

to better support the sustainability of the road network development programs. It will be also requested a revision of the financial sustainability of the road network.

9.2 RURAL ACCESSIBILITY

A Regional Road Plan and rural accessibility will be conducted in the next deliverable for each of the 9 Regions level (Amhara, Oromia, Tigray, Ethiopia Somali, SNNP, Gambella, Benisha ngulGumz, Afar, and Harar and the two City Administrations of Addis Ababa and Dire Dawa), applying the Rural Accessibility Index. The Regional Plans will define the efficient and optimum size of the network for the next 30 years (2020-2049) with the objective to improve accessibility and connectivity between regions and development centers.

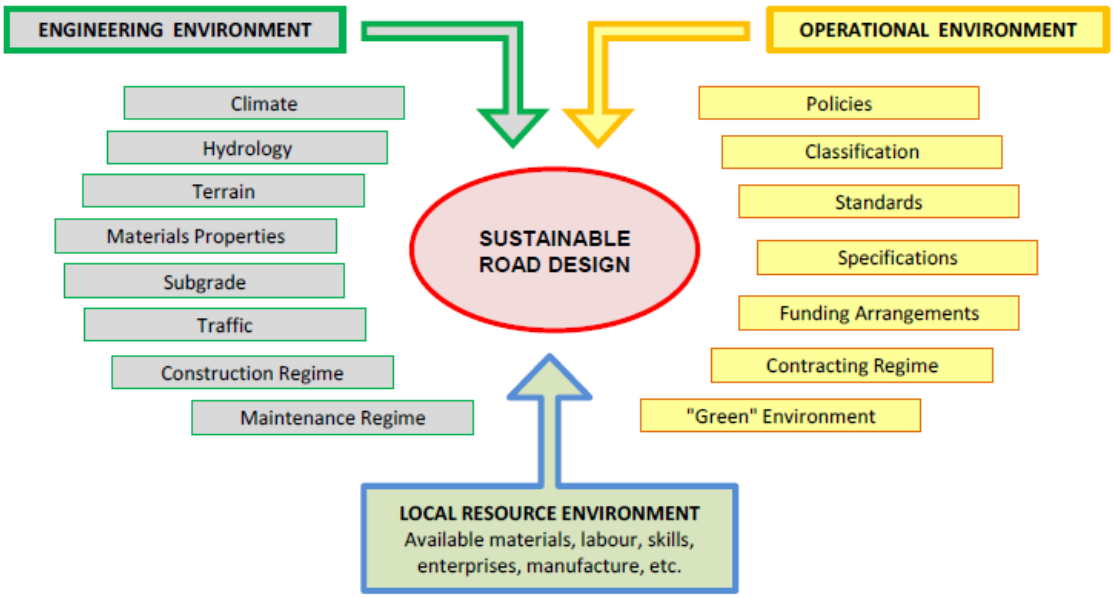
The following paragraph presents the approach that the Consultant will follow in the next step of the study, where a more detailed analysis of specific issues related to the rural roads sector and the regional agencies will be conducted. The end goal will be to define measures to be implemented at both national and local level.

Preliminary measures are also presented to improve rural accessibility both in terms of infrastructure and the so-called operational environment (Figure 149). These were defined in this document following data reviews, interviews and report reviews, as well as literature review. Such measures were also presented to the transport agencies and ministry stakeholders on 19/12/20.

While collection of reports and data as well as discussion with national experts has been fundamental in the definition of proposed measures, due to the current Covid 19 pandemic the collection of more comprehensive data has been delayed. Work is being undertaken to collect and include such information into the analysis, such as:

- contractor's data and workers' pay by region
- investments towards the regional road agencies - by region
- the level of mechanization of contractors by region
- any information/paper on the difficulty to employ workers in some regions
- data on road quality over total by region

Figure 149: Diagram from "Low Volume Rural Road Surfacing and Pavement



Source: A guide to good practice, J R Cook, R C Pett, J Rolt, 2013"

The Masterplan aims to consider all aspects that contribute to the development and maintenance of the rural road network.

9.2.1 Proposed Measures

From the analysis of the current situation a few issues are highlighted at different levels. As stated above, these should be considered preliminary and open for discussion with the national and local authorities in the following weeks.

Geospatial database – 2016 World Bank Methodology for RAI analysis

In recent years international organisations and researchers have focused their attention in the improvement of geospatial indicators. As innovative data collection methods are more and more utilised, new sources of data are available to use and methodologies to define existing and new indicators are proposed. An example is WorldPop, an independent database that is used to define human settlements and their density. Such database is built with satellite imagery and is validated. In 2016, the World Bank, which is the repository of the Rural Accessibility Index (RAI), has published an updated methodology to help calculate the RAI with the use of geospatial datasets such as WorldPoP. Therefore, it is proposed that such innovative methodology is used in the next years by regional agencies to define levels of accessibility and plan investments.

The geographical analysis undertaken in the present situation report shows that some regions have an average level of rural accessibility that is considerably below the national average (Afar, Benishangul Gumz, Gambela, Somali).

This is in line with the 22 years RSDP Asssessment which mentions that: *"There are four emerging regions in the country namely Gambella, Benishangul-Gumuz, Afar and Somali. Due to neglect in the past, distribution of main roads in these regions and some pastoral areas of the country is minimal. To bring about balanced development amongst the regions in the country, roads provision should be equitable."*

It is therefore proposed that efforts are increased in these regions to increase accessibility and reach the national average. This should be considered priority to mitigate regional disparities within the country and promote equality and access to basic services.

It should be noted that the lack of basic services in some areas is a driving factor for the low level of accessibility. In particular it is noted that large parts of the country are not served by health clinics. In particular in the regions of Afar, Gambela and Somali where more than 50% of the population is farther than 2 hours' drive from a clinic.

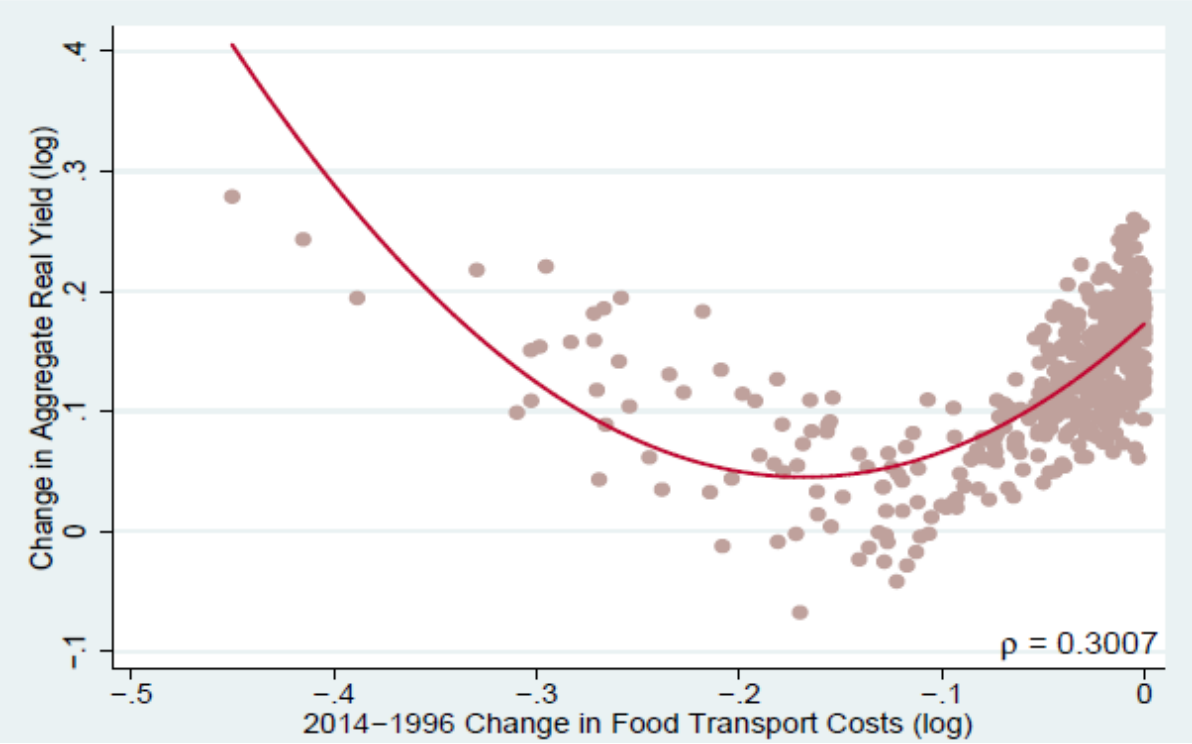
Overall, Afar, Gambela, Benishagul Gumz and Somali are the regions with the lowest average accessibility. For these regions special funding might be required to reduce gaps with other regions.

It is noted that increasing the number of paved roads may not be sufficient to reduce the gap with other regions. Thus, it is proposed that new facilities such as markets and health clinics are planned to help sustain the rural population of such regions and reduce travel times to basic services.

Literature shows that reducing travel costs to markets has already had a positive effect in the increase of crop yield in many Woredas between the 1996 and 2014 period (Figure 150 - Source: Spatial Integration, agricultural productivity, and development – Tasso Adamopoulos 2018). Therefore, it is strongly recommended that special analyses are considered when planning for accessibility. Once again it is important to highlight that the RAI calculation is not sufficient for the purpose of understand the issues of accessibility, especially at local/Woreda level.

As mentioned earlier further work will be carried out at regional level (regional plans) to identify priorities and reduce accessibility gaps in a cost-efficient manner.

Figure 150: Change in aggregate yield vs change in transport cost.



Geospatial database – Road management system

At local level, the RAI and travel times to market and hospitals are generally consistent in showing that the most accessible areas are those at the core of the country, while accessibility degrades the farther the areas are from the core. The analysis shows large disparities even within the same regions.

The work undertaken highlights the many advantages of using geospatial analysis for research and communication purposes. It is also recognised that the GIS base tool is indispensable for public organisation to plan and manage infrastructures. It is proposed that an inventory of all Ethiopian rural roads is built and managed directly by RRAs. Such an inventory will contain information on the type of roads, quality of roads, type of terrain, average traffic as well as any reported issue or accident.

It is understood from ERA that the Road Fund is currently undertaking a major work of inventory of federal and rural roads that also includes an assessment of road conditions.

Innovative and relatively inexpensive tools may be introduced by rural agencies to regularly monitor road quality such as drone surveying and road roughness index apps.

Once completed, the RRAs will use such inventory to report to the MOT on achievement of their targets. Such tool may also be used by the regional authorities to request additional funds.

Overall, it will be key that the methodology utilised to build and maintain the RRAs GIS system is consistent with national and international standards (such as those proposed by the Consultant), so that national policy makers will be able to compare and evaluate effectiveness of measures and investments and ultimately act as required to correct deviations from targets.

Finally, it is proposed a national agency of experts within the MOT is created to support rural development and planning, to train RRAs personnel and audit the planning process.

9.2.2 RRAs structure and responsibility

It is noted that some RRAs operate differently from others. The organisational structure and roles

for each RRA varies considerably. Although an effort is being made to build capacity and reduce gaps between different agencies, it is recognised that a clear structure and division of roles is key to maximise governance efficiency and help the MOT coordinate efforts at regional level. Therefore, it is proposed that the responsibilities of the RRAs are standardised.

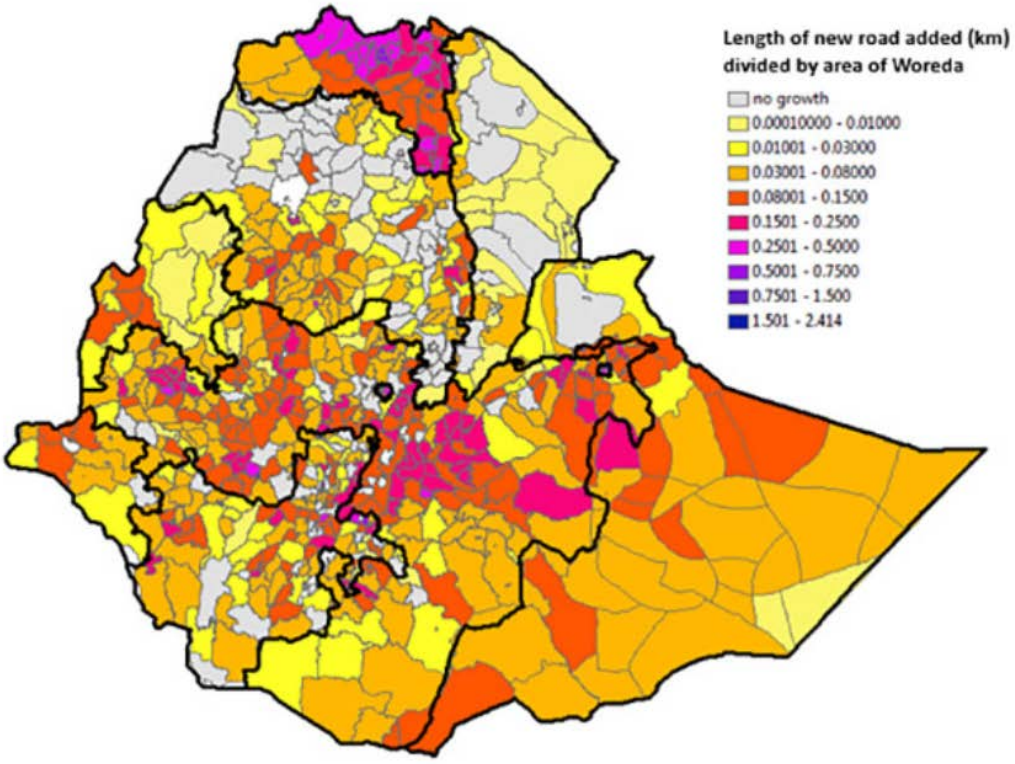
In addition, it is proposed that RRAs responsibilities are limited to:

- Building and maintaining the GIS-based road asset inventory
- Plan construction and maintenance interventions
- Search and obtain funds
- Contract works
- Provide guidance, training and support to contractors
- Audit designs and perform quality surveys
- Provide quarterly reports on advance of works and budget expenditure

RRAs Key Performance Indicators (KPI)

It is noted that the 5 Years and 10 Years plans consider the works commissioned by the RRAs suggesting that different RRAs have different performances in terms of budget spent and targets achieved.

Figure 151: Changes in road density and length between 2006 and 2016 – source: World Bank



For this reason, the proposed agency of experts at the MOT should collect data and compare the work of RRAs with the use of objective KPIs

Measures should be considered to improve RRAs performance such as support and training.

The work of the agency will be key in ensuring that RRAs budget is spent appropriately. For this reason, it is suggested that a review of the agency's work is performed on a regular basis (i.e. yearly) by a third party independent consultancy (potentially international). Laws should be enforced in case of gross mismanagement or misconduct by RRAs personnel.

Resources availability, labour conditions and level of mechanization of contractors

It is noted that the 2007 Masterplan recommended the use of labour intensive techniques to carry out road construction and maintenance works. As the rural road network expands it is crucial that the productivity is gradually increased to increase the output of works and grant contractors and employees better economic conditions.

As Ethiopia has gone through a period of rapid growth it is also noted that the cost per man/day of work that was considered at the time might not be sufficient to provide adequate pay today or in the years to come. To support this, it is understood that some regions have difficulty sourcing staff to perform road works, namely Somali and Afar, i.e., two of the regions already mentioned for their poor performance in rural accessibility.

In addition, as Ethiopia aims at becoming a middle-income country in the next years, labour intensive works should gradually be substituted with mechanized works.

It is also understood that Ethiopia has successfully started growing its own industry of roadwork machinery, which would benefit from an expansion of the sector.

Therefore, an increase in the use of machinery is recommended to improve work productivity, work conditions and attract employees. This is expected to also allow contractors to build capacity and be able to work both on rural and ERA road network.

Finally, the creation/implementation of workers category associations may be considered to:

- Provide training to unskilled and low skilled workers, including mandatory health and safety training, which has been reported to be sometimes missing
- Certify members and protecting their status as well as protecting them from unfair competition
- Define minimum and maximum hourly pay

Bidding process

It is understood that until recently contractors did not have to go through a bidding process.

It is suggested that a fair bidding system is implemented. It is proposed that the following are considered:

- The system should consider both price and quality.
- The system should promote competition and allow new contractors to win work as soon as they qualify
- Contracts may be broken down into smaller contracts such as survey, design, construction, maintenance, quality control etc.
- Anti-bribery regulations, processes, control system should be implemented by the MOT using international best practices.

Research and development

Research and development is currently undertaken at different levels. Some RRAs do this as part of their core services.

It is noted that in some regions the number of guidances is high with the risk of overcomplicating regulations. It is proposed that research and development is undertaken only under the supervision and coordination of the universities and the MOT. RRAs should help the development of guidances providing best practices for their local environment.

It is proposed that local and national guidances are merged as far as feasible into a single document to simplify regulations. Research and development should support this work. The final output of this work is to obtain a single document for all Ethiopian rural roads, which should take into account local diversities in terms of climate, geology, materials, terrain and hydrology.

This work should aim at simplifying the work of contractors and auditors. It should also help contractors operate in different regions efficiently.

Public Transport

Public transport for rural areas is costly and with limited return of investment. However, in some

areas and the weakest parts of the population it can make a real difference in terms of access to basic services such as education and health.

Potential to develop PT strategies at regional level will be considered in the regional analysis with the related cost for implementation.

Funding

It is reported that the lack of funding is one of the factors that impeded the work of RRAs and the implementation of the URRAP (see 22 years assessment).

The table below shows that Woreda/URRAP roads are the main contributor to the low performance of the latest RSDPs.

Table 93: Performance of RSDPs programmes

Program	Federal			Regional			Woreda/URRAP			Overall		
	Plan (km)	Actual (km)	% age	Plan (km)	Actual (km)	% age	Plan (km)	Actual (km)	% age	Plan (km)	Actual (km)	% age
RSDP I	3,777	2,709	72	5,131	6,000	117				8,908	8,709	98
RSDP II	5,375	7,483	139	2,877	4,106	143				8,252	11,589	140
RSDP III	8,956	7,996	89	5,730	4,399	77				14,686	12,395	84
RSDP IV	14,782	13,633	92	11,212	9,814	88	71,523	62,413	87	97,517	85,860	88
RSDP V	12,336	11,511	93	6,600	8,036	122	74,187	14,914	20	93,122	34,460	37
Total RS	45,225.5	43,332	96	31,550	32,355	102.6	145,710	77,327	53	222,485.41	153,013.13	69

Source: “Road Sector Development Programme: 22 years assessment”.

Moreover, where roads have been constructed maintenance has become a heavy burden for regions. It is key that a review of funding is undertaken to outline priorities in the implementation of plans in terms of both construction and maintenance.

As already mentioned, the development of a standardised GIS based tool for road management will help coordinate efforts and direct funding from the government to the regional agencies.

However, it is also recognised that some of the measures identified in this document may require additional funding. The next steps will identify the costs for the implementation of measures and define responsibilities at regional and national level.

9.3 RAILWAY SECTOR

The intervention included in the Draft Masterplan have considered:

- Project Ongoing that will be completed in the next period
- Project Under Implementation already foreseen in the 10 Years and 5 Years Plan
- Proposed project by the consultant basing on the result of the SWOT analysis

9.3.1 Ongoing Project

Currently in Ethiopia, two railway line is under construction:

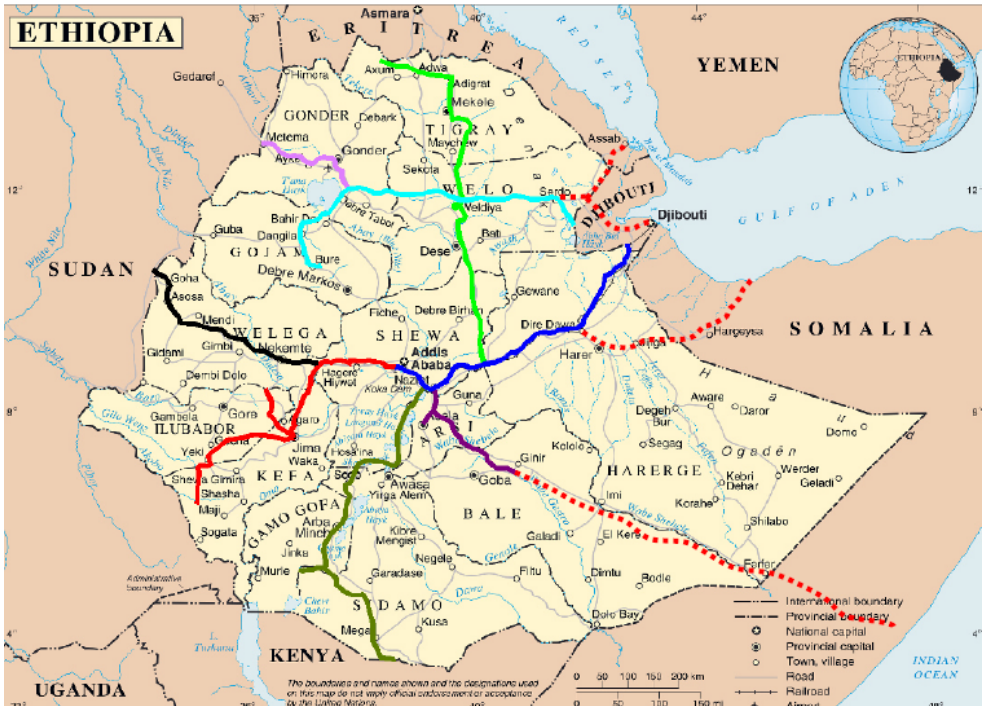
N.	Project	The owner of the project	The location of the project	Time to complete	The assigned capital [M ETB]	Current Status
1	Awash - Kombolcha – Haragebeya	Government	Amhara and Afar region	2021	7.084	under construction
2	Mekele – Haragebeya		Amhara Afar and Tigra	Not Defined, Expected about 2025	25.768	56% Constructed ceased due to budget

PROJECT UNDER IMPLEMENTATION (5 YEARS AND 10 YEARS PLAN)

According to the “Ministry of Transport's 5 Years Development Plan” and the “Ministry of Transport's 10 Years Development Plan” the ongoing project related to the railway development are summarized in the table below:

N.	Project	The location of the project	The assigned capital [M ETB]	Current Status
1	Mekelle - Assab Port Railway	Tigray region and Eritrea	93.978	Funded by ADB ongoing feasibility study
2	Weldia - Wereta - Matema - Ethiopia (Ethio Sudan) Railway	Amhara region	110.659	Team established for the study of the feasibility of the line
3	Mojo - Hawassa - Moyle	South and Oromia region	212.625	Feasibility study completed
4	Sebeta-Ijji-Jimma-Bedele - Booma South Sudan border	South and Oromia region	117.472	Feasibility study completed
5	Aisha - Berbera	Somali region	99.851	Concept study

The projects included in the above table are referred to the main corridor forseen for the entire Ethiopian National Railway Network.



The corridor will lead to the link with the neighbourhood countries; indeed, each project is foreseen not only to connect Ethiopia to a port on the Red Sea but also to connect Ethiopia with the other inland country (such as South Sudan). Due this configuration, it is expected that the finalization of the projects currently under implementation will lead to an increasing of the competitiveness of the Ethiopian products on the international markets promoting the export. In fact, the railway may lead to a decreasing of the transport cost for the products and this may lead to a more competitive price for the products.

9.3.2 Proposed projects

Basing on the SWOT analysis reported in Chapter 5 and the idea that the projects under implementation described in the previous chapter are parts of an ambitious plan that needs to be supported to reach the final aim, the Consultant has individuated the interventions required. The interventions are complementary to the projects foreseen in the 10- and 5-years plan and aim to allow a more efficient implementation of that projects.

For this reason, the, proposed projects focus on the short – medium term.

N.	Project	The owner of the project	The location of the project	Time to complete	Estimated Budget [M ETB]	Priority
1	Signalling Interoperability between Addis Ababa Dibouti and Awash - Kombolcha – Haragaria railway line	ERC /MOT		1 Year	2.400	High
2	Establishing the Ethiopian Railway Handbook for design, construction and operation	ERC /MOT		8 Months	55	High
3	Addis Ababa - Djibouti Upgrade 1	ERC	Sebeta - Dewale railway line	6 Months	95	High
4	Addis Ababa - Djibouti Upgrade 2	ERC	Sebeta - Dewale railway line	1 Year	1.360	High
5	Addis Ababa - Djibouti Upgrade 3	ERC	Sebeta - Dewale railway line	2 Years	2.240	High
6	Sector governance and Regulation's reorganization	MOT		6 Months	30	High
7	Strategic Sales and Marketing Enhancement	MOT /ERC / EDR			30	Low
8	Capacity Building	MOT /ERC / EDR			100	Medium
8	New Rail Links for private sidings	MOT /ERC / EDR			10	High

SIGNALLING INTEROPERABILITY

The Awash – Kombolcha line is equipped with Eurpoean standard signalling system (ERTMS L1) and this may lead to interoperability challenges with the Sebeta – Dewale currently equipped with Chinese standard signalling system. Moreover, the section Kombolcha- Mekelle- Shire is forseen to be equipped with Chinese signalling systems. In order to run seamlessly service between the lines it is necessary to promote the interoperability between the two systems.

Moreover, the rail link between the Sebeta – Dewale ad Awash – Kombolcha railway line is already in the finalization phase. If the signalling interoperability will not be ensured, there is two possible operational scenarios:

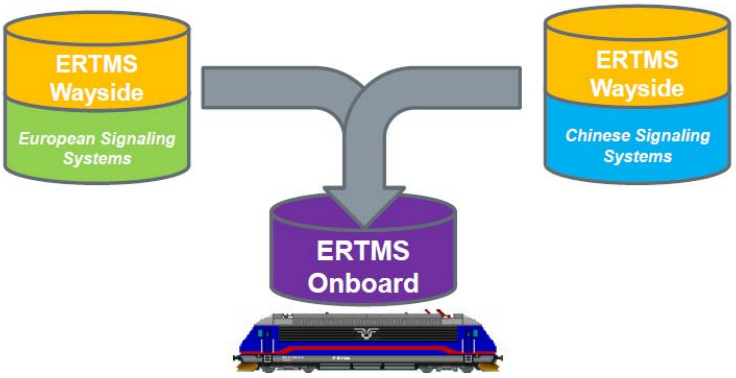
- Switch of the traction locomotive;
- Equip the locomotive with two different signalling system and create a transition area where the locomotive can switch between the two signalling systems.

These operations will lead to an increasing of the Opex costs and travel time for the passenger and goods. Moreover, the maintenance of two different system for two different lines may lead to a not optimized spare parts purchasing and stock. Moreover, it will force to provide different training for the train crew staff basing on the line limiting the interchangeability of the train driers between the lines.

In order to avoid the cost increasing, it is suggested to create an interoperable signalling system that allow the seamlessly operation of the trains along the rail network implementing an ERTMS system.

A standardized and homogeneous ATP System have to be set by ERC for the eight routes to reduce the implementation Costs and to ensure the Operational Safety.

ERTMS is a standardized ATP System design as an overlay System to be easily installed on top of any existing Signalling Systems and Vehicle's types, it means that is no necessary to completely replace the current Chinese signalling system but is possible to install only the wayside equipment in order to realize the full signalling interoperability of the lines



With ERTMS (Wayside and Onboard) trains can run safely on the whole network, no matter which Signalling System is installed along the railway line.

The implementation of a standard and wide use signalling system such us ERTMS will also support the implementation of the international cross-border corridors allowing the rolling stock currently running on the Ethiopian Network to run in the future international railway corridor minimizing the operational and transport costs.

In addition, the ERTMS system is developed and provided by several producer from several countries and this led to a competitive market where the product are constantly updated and reach the best level of quality and performance.

Summarizing, the key factors which determine the choice the ERTMS implementation are:

- Interoperability
- Safety
- High speed (ERTMS L1 allows to run up to 160 km/h and more)
- High capacity (conventional lines and nodes)
- Cost saving across the whole lifecycle

The costs reported in the above table are referred both the upgrading of the wayside equipment and to the upgrading of the rolling stock onboard equipment and include also the costs related to the design, delivery and commissioning.

ETHIOPIAN RAILWAY HANDBOOK

The implementation of a national railway network linked to the neighbour countries stand the challenge about how to ensure the interoperability between the lines and optimize the CAPEX and OPEX investment. As described in the previous paragraph, currently several standards has been implemented in Ethiopia for the different lines basing on the experience of the companies construction the lines. This, as described, led to the challenges (and then additional costs) to ensure the interoperability.

In this moment, Ethiopia is planning in the 10 Yeas and 5 Years Plan an ambitious plan for the railway development. It is required that this plan is supported by a stable technical framework. Establish a national railway code for the design, the construction and the operation of the railway line will ensure the full interoperability between the several lines in Ethiopia and to minimize the challenges for the cross-border railway lines.

Moreover, it can lead to the reduction of the investment and maintenance costs because of the standardization.

The definition of stable and fixed standard may also lead to a opportunity for the development of the local spare part supplier. Actually, the local producer can use the reference standard to optimize the production reducing the needs for the import (and then foreign currency) for the construction, the operation and the maintenance of the lines.

ADDIS ABABA – DJIBOUTI UPGRADING

The analysis of the current situation has analysed that the operation of Sebeta - Dewale line is limited by several infrastructural and safety factors. The corridor of Addis – Djibouti is one of the most important for the transport in Ethiopia and it is necessary to improve the railway line in order to provide a reliable and safe transport.

In ideal condition of operation and infrastructure:

- Average operational speed 80 km/h
- 20 h of operation /day

Implementing the standard UIC 405-1R in the single-track section has been evaluated that the line has a capacity of 15 trains/ day in the most critical section (between Bike and Dire Dawa).

From	To	Section length [km]	Estimated Capacity	Current Capacity
Adama	Feto	40,62	25	7
Feto	Metehara	63,938	17	4
Metehara	Awash	28,978	34	9
Awash	Sirba Kunkur	33,6	30	8
Sirba Kunkur	Mieso	43,46	24	6
Mieso	Bike	67,41	16	4
Bike	Dire Dawa	70,372	15	4
Dire Dawa	Arawa	48,066	22	6
Arawa	Adigala	62,014	17	5
Adigala	Aysha	50,6	21	6
Aysha	Dewale	40,438	25	7

Unfortunately, the current condition of the line is far from the ideal one:

- The average operational speed (about 50 km/h) is below the planned average speed (about 80 km /h); this because the line is not fully fenced and there are several illegal line crossings that lead to speed reduction in order to ensure the safety of the operation
- The line is not operated during the night time and this reduced the available window for the operation

Under this condition, implementing the standard UIC 405-1R has been evaluated that the capacity of the line is reduced to 4 or 5 trains /day.

Basing on the above consideration, three step of upgrading has been individuated for the Sebeta – Dewale railway line:

Addis Ababa – Djibouti Upgrading 1

The aim of the step one is to increase the Speed the Safety and Capacity of the line provind the opportunity to run trains 24 hours /day.

In order to reach this goal, it is necessary to strength power availability, purchasing shunt reactors. Moreover, in order to speed up the time for the inspection of freight cargo and passenger it would be suggested the implementation of dedicated scan that can support in this activity

According to the expected improvement, the capacity of the line can be increased up to 12 trains/day.

Addis Ababa – Djibouti Upgrading 2

The aim of the step two is to increase the Safety and Capacity of the line implement fence along all the line and installing a reliable and efficient level crossing system to increase the operational speed and avoid the risk of run over. Currently, the operation on the line is limited by intrusion on the

track that has led to minor accident.

According to the expected improvement, the capacity of the line can be increased up to 16 trains/day.

Addis Ababa – Djibouti Upgrading 3

The aim of the step three is to increase the Capacity of the line implement new sidings in order to increase the capacity achieving a maximum length of 25/30 km the single-track sections. It is important to underline that the increasing of the capacity through the increasing of the number of loop along the line may line to a minor reduction of he commercial speed along the line. According to the expected improvement, the capacity of the line can be increased up to 26 trains/day.

Track Doubling Adama – Djibouti Border

According with freight demand assignment at year 2050, there will be the need to double the railway line from Adama till the Djibouti border and require the same in the Djibouti section.

SECTOR GOVERNANCE AND REGULATIONS REORGANIZATION

With the opening to the service of the Awash – Weldiya – Kombolcha railway line the railway sector will face new challenges related to the management of the O&M of the lines. New management structure may be required to implement an efficient O&M system based on the experience of the of the Addis – Djibouti railway line.

Therefore, it is suggested to re-organize the sector governance with the aim to:

- Create reliable, safe and quality rail transport service;
- Eliminate duplication of work and reduce waste of resources by giving companies in the sector a clear assignment
- Creating a positive environment for the private sector to participate in the railway development;
- Organizing a significant, financially viable and market-oriented railway sector that contributes to the country's economic growth

Usually, infrastructure management and transport services in the international railway sector are being implemented basically in two business model options. These are:

- Vertically Integrated Business Model;

In this business model the construction and the maintenance of infrastructure, as well as the operation of railways and railways, are carried out under the responsibility of a single enterprise (public or private).

This system will provide the benefits of coordination of rail transport services and infrastructure management and reduce the additional administrative costs associated with duplication.

The main weakness of this model is that all the activities of the sector are usually monopolized by one institution, especially other railway service providers, and there is no other option, even if the existing service provider is weak.

With this model, private operators that can operate by developing their own infrastructure.

- Vertically Separated Business Model.

This model foreseen the roles of railway infrastructure management and railway undertaken to be implemented as separate entities.

Different enterprises are in charge for the construction and maintenance of railway lines (and traffic management) and for the railway service (including the collection of the revenues from the customers). The railway undertaken pay an access fee to the infrastructure manager for the usage of the line.

In this model, a transport provider (private or public) who is interested in railway infrastructure

management and transportation services and who meets the requirements of the regulatory body may enter and compete for railway infrastructure management or operation.

The advantage of this option is that there is a clear assignment of responsibilities and a better focus on the company business. For this reason, each institution is expected to be effective and profitable, which will create a driver for the growth of the sector.

The main weakness of this model is the duplication of the administrative costs associate to each enterprise. This model applies to most European countries.

Strategic Sales and Marketing Enhancement

The development of the railway network will lead to new opportunities for the development of the railway sector. For this reason, it is suggested to develop specifically sales and strategic marketing activities to capture and increase the market for rail transport and implement ancillary business (including station management and real estate) in order to secure the cargo on the railway and increase the economic and financial revenues of the railway sector

Capacity Building

Ethiopia had invested a lot of resources in the capacity building but the plan that has to be achieved required to continue to invest in a systematic capability building across the whole sector to establish key professions or capabilities that are currently missing and improve existing capacities (network operations, line operations, contracting).

New Rail Links for private sidings

Currently the Sebeta – Dewale line runs close to several industrial production site. These sites could bring benefit in terms of cargo and revenues to the railway sector if they use the railway for the transport. For this reason, it is suggested to create and implement a technical and regulatory framework where is possible (for the private or the public sector according to specific agreement) to invest in private junctions, sidings, last mile transport and handling facilities in order to increase and secure the cargo carried out by rail. The framework should facilitate the investment defining the role of each actor and the related cost for the investment, the operation and the maintenance of the sidings.

9.3.3 Rail transport

The five years plan envisages the implementation of 8 railway corridors, selected on the basis of criteria such as using alternative port routes, including development corridors, ensuring product distribution, connecting regions with the central economy, including high-traffic areas, and strengthening economic development in the African region, and implementing various technical processes and taking into account existing conditions.

The Awash-Kombolcha-Hara Market railway line is 389 km (completed at 95.8%) and the Addis Ababa Light Railway (34 km) and the Addis Ababa-Djibouti (656 km) railway line have been completed. Mekelle- Haragebya Railway 220 km (54%) railway infrastructure has been implemented. The first phase of the Awash-Kombolcha- Haragebya railway line (from Awash-Kombolcha) is part of the project and will be operational as soon as electricity is available. Construction of the second section of the Kombolcha-Haragebia railway line has reached 77%. Out of the 2,801 km railway line planned during the plan period, 609 km (22 percent) has been completed.

There are sixteen (16) corridors connecting the Addis Ababa-Djibouti railway stations to the main roads and the construction work has been completed. There are also two dry ports (Mojo and Dire Dawa Dry Port) along the line. The construction of the Dire Dawa Railway has been completed and the dry port operated by the Ethiopian Maritime Transport Logistics Service Enterprise has not yet started operating. In order to utilize the full potential of the Addis Ababa-Djibouti operation, the

railway line needs to be connected to the Awash Petrol Depot on the Ethiopian side and the Horizon Terminal on the Djibouti side. Accordingly, a bid was issued to connect Awash Petroleum Depot.

The construction of the first phase of the Awash-Kombolcha-Haragebeya project has been completed and the construction of the second phase of the project is delayed. In general, the lack of electricity supply for the project on time has led to the completion of the project. The overall performance of the Haragebeya-Mekelle project has reached 54%.

The main objectives defined by Transport sector's 10 Years Perspective Development Plan (2013-2022) for the railway transport in Ethiopia are:

- Increase the daily passenger number of LRT from 120,000 to 200,000;
- Increase daily passenger number of EDR from 120,000 to 548,600;
- Ethio Djibouti's Railways Freight Capacity will reach 5 Million tonnes/annum;

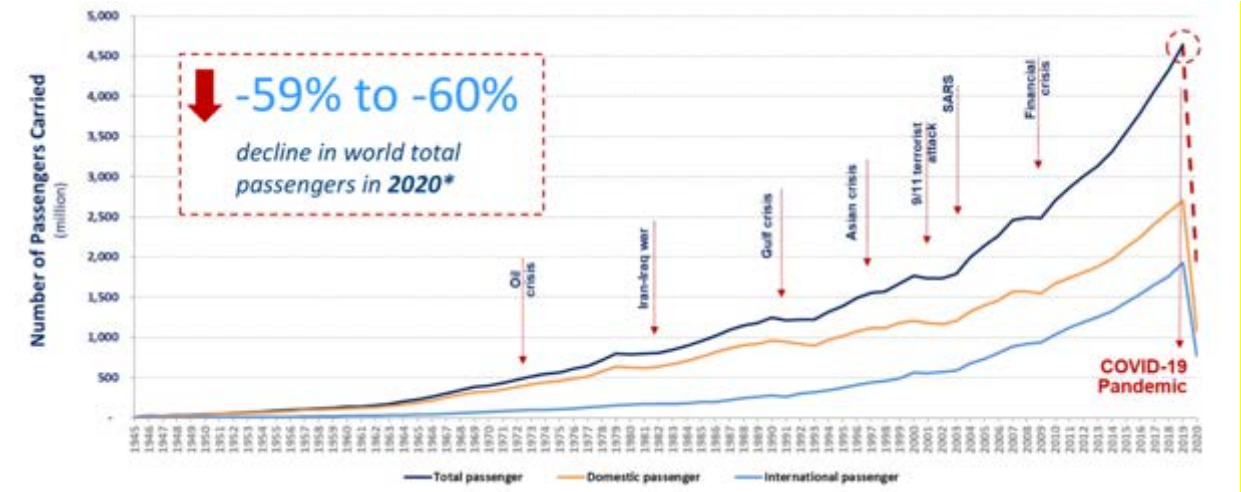
9.4 AVIATION SECTOR

9.4.1 Global air transport demand

Global passenger air transport demand has enjoyed steady growth, with some slow moments, from 1945 to the first month of 2020. The outbreak of Covid-19 pandemic has dramatically changed the picture for the global industry. And, from March 2020, passenger air transport demand has fallen sharply compared to previous year. In some cases, in spring, many airlines have recorded a fall in demand up to -90%.

The following figure shows the decline in passenger traffic worldwide. All crises of air traffic that have characterized the industry history, starting with the oil crisis of 1972, can be considered been trivial cold compared to the current one. Covid-19 has brought a crisis of significant magnitude to the aviation industry both in terms of immediate impact and duration.

Figure 152: Passenger air traffic demand50 (World passenger traffic evolution 1945-2020)



It goes without saying that the decline in air traffic has had dramatic impacts on airlines' profitability and balance sheet. On the air side, the most recent IATA[51] estimates are summarized in the table below, with a net loss for African carriers of USD 2 billion in 2020 and of USD 1.7 billion expected in 2021.

[50] ICAO, Effects of Novel Coronavirus (COVID-19) on Civil Aviation: Economic Impact Analysis, November 12th, 2020, p. 6.

[51] IATA, Airlines Industry Economic Performance - Tables, 14 November 2020.

Table 94: Global carriers' financial results estimates 2020 – 2021

System-wide global commercial airlines	EB1T margin. % revenues							Net profit$ billion						
	2015	2016	2017	2018	2019	2020E	2021F	2015	2016	2017	2018	2019	2020E	2021F
Global	8.6	8.5	7.5	5.7	5.2	31	-7.1	36.0	34.2	37.6	27.3	26.4	-118.5	-38.7
Regions														
North Muerte	14.4	13.7	11.2	9.1	9.5	-40	-5.6	21.7	17.0	17.8	14.5	17.4	-45.8	-11.0
Europe	5.5	6.1	7.9	6.2	4.8	-38	9.5	7.1	8.5	8.9	9.1	6.5	-26.9	-11.9
Asia-Peak	6.9	7.4	6.3	4.7	3.7	-18	-4.6	7.5	7.4	10.5	6.1	4.9	31.7	7.5
Mic% East	6.3	2.2	-3.0	-45	-5.2	-34	-14	2.1	1.3	0.1	-1.5	-1.5	-7.1	-3.3
Sri *Mira	5.0	5.5	6.2	2.7	2.9	-26	-13	-1.6	0.4	0.5	-0.8	-0.7	-5.0	-3.3
Africa	-2.1	1.1	0.8	1.5	1.0	-37	-19	-0.8	-0.4	4.2	-0.1	0.3	-2.0	-1.7

Sources: IATA estimates for regions. IATA forecast for 2020 and 2021.

Note: Bankruptcy reorganization & large non-cash costs are excluded. Includes all commercial airlines. Historical data are subject to revision.
Updated: 11/2020 Next Update: **06/2021**

The general situation is not good for Africa aviation and tourism industries. ICAO has forecasted significant losses in terms of seat supply, passengers demand, potential revenue losses for African airlines, and jobs for both aviation and tourism industries. A fierce GDP loss has been also forecasted for travel and tourism sectors. At global level, aviation and tourism are possibly the industries that were recorded the highest damage by Covid-19 pandemic outbreak.

Figure 153: ICAO Estimated COVID-19 impact on African air transport and tourism for 2020[52]

According to IATA[53] State of the region report – see next figure - industry-wide revenue passenger-kilometers (RPKs) fell by 70.6% year-on-year in October, showing a modest improvement from the previous months. Domestic market demand drove the small recovery. Data for Africa are better, the October data of RPKs of – 76.3% is a good improvement from previous months (-86.8% in August 2020). In terms of routes, Africa-Middle East and Africa-Asia were among the ones that suffered most between August and October 2020 compared to 2019. While Africa-Europe show better results for the same period.

Table 95: Revenue passenger-kilometers per world region.

% change on a yr ago	2019	ago-20	set-20	ott-20
Region (registration basis)				
Middle East	2.3	-90.6	-88.1	-85.5
Africa	4.7	-86.8	-82.9	-76.3
World	4.1	-74.8	-72.2	-70.6
Routes (segment basis)				
Middle East-Asia	4.2	-91.4	-88.9	-86.6
Middle East - Europe	4.4	-91.3	-89.1	-87.5
Africa - Europe	4.5	-85.9	-83.0	-77.9
Middle East - Nth America	0.0	-88.5	-84.6	-82.2
Africa - Middle East	-1.6	-92.3	-86.8	-76.9
Africa - Asia	3.5	-94.7	-93.5	-93.1

Source: ITA Economics. Note: historical data may be subject to revision

[52] ICAO, "An Effective Response To Covid-19 Impacts On Africa's Aviation Sector", Draft Background Paper, November 2020.
[53] IATA, State of the region: Africa & Middle East, December 2020.

For the global air cargo market the situation is very different. The industry suffered market contraction of 3.2% already in 2019 in terms of cargo tonne -kilometers (CTKs). At October 2020 CTKs fell by 6.2% year-on-year, showing a significant improvement on August levels. Africa enjoyed a better 2019 with CTKs growth of 4.7%. and between August and October 2020 the continental market achieved continuous growth, especially in August. Africa remained the second-best performer of all regions after North America. In addition, Africa-Asia routes were the ones that performed well in 2019 as well as in the second half of 2020, as shown in the following figure.

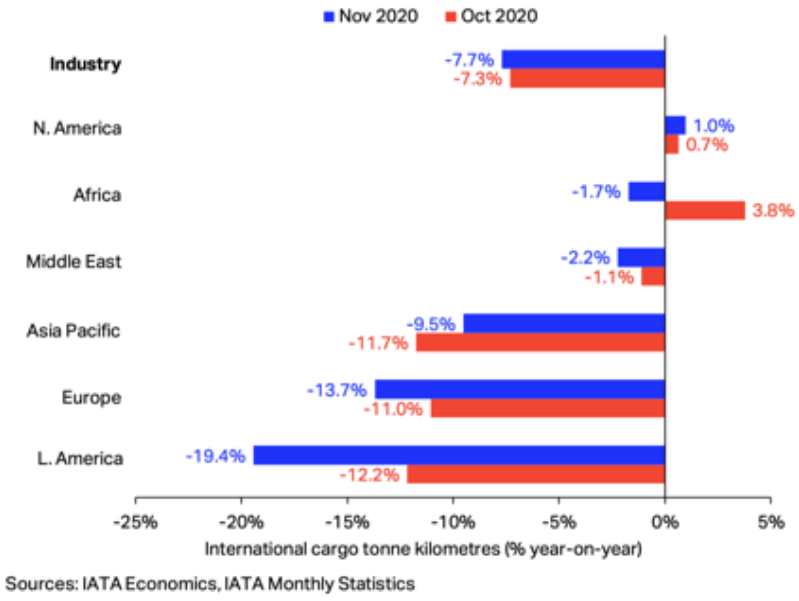
Table 96: Cargo tonne-kilometers per world region.

% change on a yr ago	2019	ago-20	set-20	ott-20
Region (registration basis)				
Middle East	-4,6	-6,5	-1,7	--2,0
Africa	7,4	1,9	10,6	2,2
World	-3,2	--12,0	-7,8	-6,2
Routes (segment basis)				
Middle East-Asia	-2,3	-5,7	0,2	3,4
Middle East - Europe	-5,2	-18,4	-12,7	-12,3
Africa - Europe	-1,9	-28,8	-23,5	-12,1
Middle East - Nth America	--7,0	2,3	-3,9	-2,2
Africa - Middle East	--6,0	-39,3	-26,7	-30,4
Africa - Asia	12,6	18,2	23,6	4,2

Source: Economics. Note: historical data may be subject to revision

The November 2020 figures, however, illustrate a picture of general global contraction for air cargo, with Africa losing 1.7% points over the same month of last year. This performance was primarily due to less traffic on the Asia-Africa route, with a decrease of 4.5% year-on-year. However, IATA forecasts that CTKs will return to 2019 monthly levels around spring 2021[54].

Figure 154: International CTK growth per world region.



The latest traffic data for the global aviation industry show that the growth trend of past years has been abruptly arrested by the crisis induced by Covid-19 pandemic outbreak. These unexpected developments must be taken into consideration when defining the aviation industry development

[54] IATA, Air Cargo Market Analysis, November 2020.

strategy for Ethiopia.

Although progresses have been made, and a new regulation has been promulgated in order to start liberalization in the domestic passenger aviation market, Ethiopian aviation, at beginning of 2021, is still in a de facto monopoly status.

Nevertheless, given the size of the country, and in consideration of the population growth trends, domestic aviation will be essential to allow fast travel across the nation's large territory for many reasons, both for Ethiopian residents and international visitors. According to UN forecasts, as shown in the next figures, the Ethiopian population in 2050 will reach 188 million people, almost double to that of 2015. And in particular in 2050 the most active part of the population, those in the age range 15-59 years old, will represent over 60% of the population.

Table 97: Total population by country, 1950, 2015, 2030, 2050 and 2100 (medium variant)[55].

	Population (thousands)				
Country	**1950**	**2015**	**2030**	**2050**	**2100**
Ethiopia	18.128	99.391	138.297	188.455	242.644

Table 98: Percentage distribution of the population in selected age groups in 2050[56].

	Population distribution 2050			
Age clusters	**0-14**	**15-59**	**60+**	**80+**
Ethiopia	25.9%	63.7%	10.4%	1.1%

9.4.2 Aviation infrastructure development strategy

Given the current status of the international and domestic aviation industry, it is our opinion that aviation should become a more widely used transportation mode for passengers and goods within the horizon of this transport masterplan. Aviation industry is also critical in terms of contribution to the national economy in many respects and the strong international positioning of EAG has to be supported in the future. At the same time there is the need of improving the status of the domestic aviation sector in terms of infrastructure and services offered. And an effort is needed to make domestic leisure travel demand to develop in the next decades in order to have more Ethiopian residents choose air services for their mobility. In our opinion the guidelines to support the aviation sector future development are as follows:

1. Implement liberalization with an action plan that will make it effective for all players at all levels in the domestic market;
2. Keep upgrading and expanding the network of domestic airports and airstrips in line with population growth to provide maximum coverage for passenger and cargo services;
3. Increase and update air navigation systems at domestic airports;
4. Establish technical training courses to create the future needed workforce for the aviation and travel industry.
5. Support the development of the Single African Air Transport Market within the context of AfCFTA

1. IMPLEMENT LIBERALIZATION IN THE DOMESTIC AVIATION MARKET

As above mentioned, the new investment proclamation and regulation have introduced a new framework for the aviation industry. Previous limitations that were in place and not helping the development of private operators have been lifted by the new rules. Under the new framework it is

[55] United Nations, Department of Economic and Social Affairs/Population Division 17 *World Population Prospects: The 2015 Revision, Key Findings and Advance Tables.* http://esa.un.org/unpd/wpp/publications/files/key_findings_wpp_2015.pdf

[56] See note 45.

also possible for foreign investor to partner with Ethiopian national investors in passenger air transport services. In air cargo it is not yet possible to make agreements among private investors only. However, practical implementation of the new rules for the domestic market should follow with a presumption in favour of the private sector. This means, for example, allowing private operators to use Addis Ababa International Bole Airport as base for both operations and for their maintenance warehouses since passenger demand is mostly originated from the capital city, and this will not change for a while. Also allow the development of private enterprises in the provision of different services to aviation industry at all airports including Addis Ababa. Facilitate the development of national private operators in the field of air services to provide response to environmental crises (such as locust control operations) together with the Ministry of Agriculture announced helicopter fleet, aviation rescue fire-fighting, land protection, etc.

Ethiopian Airlines Group (EAG) has emerged as one of the few successful carriers in 2020, and is the leading one in Africa. The main focus of the company is on international growth as the competition with other large carriers, especially those from the Middle East, is intensifying. EAG should be supported in its international expansion consistently with its Vision 2035 strategy. But the carrier should also devote more attention to the Ethiopian market. For what the domestic market is concerned, in our opinion, EAG should work on twofold strategy. First, the airline should improve the level of domestic services offered, expand the network of served airports over time accordingly with demand and population growth, and introduce a flexible dynamic pricing system. Second, EAG should act as an agent of change in order to make the domestic aviation industry more robust. In this perspective, the airline should join forces with local private operators and investors in order to help the creation of a new operator on the market through specific partnership agreements. It would be beneficial for the national air transport system to have at least one more Ethiopian organization that can act on the liberalized aviation market with its own resources. The alternative would be private operators partnering with foreign investors. However, in this scenario the private air operators would be in a weak position since they are too small. For the development of the aviation sector in the next decades, the development of a competitive domestic market is essential. This means an improved level of offering and to provide more choice in terms of timetable and fares among competing carriers. In turn, this will help attract more demand to air travel within Ethiopia in the long term.

Finally, Ethiopian Airports business unit should be spun-off into a separate company in order to create separation between the infrastructure manager and the service manager. The spun-off company may stay within EAG as a subsidiary separated from the rest of the organizational units, or it may be made entirely independent from EAG in order to operate as a fully privatized organization that guarantees fair treatment towards all market players. In our view the second option is the most adequate in the long term and this may include opening the share capital to private investors.

2. KEEP UPGRADING AND EXPANDING THE NETWORK OF DOMESTIC AIRPORTS AND AIRSTRIPS IN LINE WITH POPULATION GROWTH TO PROVIDE MAXIMUM COVERAGE FOR PASSENGER AND CARGO SERVICES;

The current airport network conditions represent an improvement when compared to the past. There has been an effort in recent years. And bringing the Ethiopian Airport Enterprise under the Ethiopian Airlines Group has possibly helped the process so far, although our idea is to change the current status of the airport business unit, as explained above.

The list of investments for the upgrading of the domestic aviation infrastructure on the Ten Years Plan shows the intention not to lose momentum and decrease speed in the process. Nevertheless, the Ten Years Plan document also recognises that some objectives have not been reached due to different reasons. In particular, the creation of cold storage facilities for export goods at regional airports has to be prioritized if Ethiopian export of flowers, and fresh goods is to grow in future. Currently only Addis Ababa, Bahir Dar and Mekele, have good cargo facilities. And the plan to create additional cargo infrastructure at regional airports has to be resumed and implemented at good pace. Possibly with participation of private investors within the new legal framework.

In recent years, the agriculture industry export has grown significantly[57]. And most of the export goods travel by airplane. Since the government is active through its agencies such as the Ethiopian Investment Commission (EIC) in increasing the number of foreign investors to the country also in the horticulture industry, it will be of highest importance to provide all facilities needed to facilitate export of goods at airports located close to the existing and future development production areas.

Looking at the next three decades developments and growth, more airports and more airstrips will be needed. In this context, the involvement of regional governments in the development of new airports will be essential. Given the fact that, at the same time, new roads and railway infrastructure are being planned to provide a better mobility for people and goods, it is of highest importance to adopt an integrated planning approach that maximises the end result for the nation and for society. In this context some developments are taking place in the horticulture industry. As mentioned above this economic sector is of critical importance for Ethiopian export. However, being air cargo expensive, the competitivity of Ethiopian export goods on certain markets can be sometimes reduced and other solutions are to be found. An example is the on going test phase use of referee containers transported by road and train to the port of Djibouti for shipment of horticulture products to Europe[58].

3. INCREASE AND UPDATE AIR NAVIGATION SYSTEMS AT DOMESTIC AIRPORTS;

The investments already included in the Ten Years Plan are directed towards building new control towers and upgrading of air navigation equipment and technologies. It is of high importance to keep a steady flow of investments to constantly improve the levels of safety and reliability of domestic airports.

State of the art air navigation systems are a key requirement now and will be even more in the next years. With market liberalization and the recovery of international tourism flows to Ethiopia, more traffic is expected and demand to use regional airports in the future is going to increase.

4. ESTABLISH TECHNICAL TRAINING COURSES TO CREATE THE FUTURE NEEDED WORKFORCE FOR THE AVIATION AND TRAVEL INDUSTRY.

The expansion of the aviation infrastructure will create the need for additional jobs across the industry at all levels. All organizations will have to face either the need to fill more positions, or the need to update existing resources skills and competences. This will be a need for central entities such as the MOT, ECAA, EAG, private air operators. The same is true for regional bodies that will be involved in the process of modernizing the national aviation industry.

In addition, private organizations active in the travel industry at large will experience the same need to grow their teams and to educate personnel to the effective use of new ITC systems that will be increasingly used across the industry.

Continuous capacity building will have to be a critical part of the future development plan. It is important to consolidate and retain strengths and to overcome weaknesses in order to create a skilled workforce for the near and long-term future.

5. SUPPORT THE DEVELOPMENT OF THE SINGLE AFRICAN AIR TRANSPORT MARKET WITHIN THE CONTEXT OF AFCFTA

Ethiopia should commit the best possible effort in the execution of the Single African Air Transport Market (SAATM) to accelerate the continental rate of industrialization and to stimulate and attract additional flows of investments to Africa. Ethiopia is well positioned in this context to gain significant economic benefits, for manufacturing, services and tourism industries. In addition,

[57] According to the Ministry of Trade and Industry, agriculture commodities have generated the highest export earning to the nation in the current budget year 2019/20, that is 73 percent revenue of the overall exported commodities. The Ministry indicated some 3 USD billion was generated from total export in fiscal year 2019/20. The bulk of the revenue was secured from the agriculture sector which is said to be 88 % of the total export target. Source: Capital Ethiopia, http://capitalethiopia.com/featured/export-revenue-slightly-increases/

[58] Capital Ethiopia, Avocado export goes via refrigerated container, http://capitalethiopia.com/capital/avocado-export-goes-via-refrigerated-container/

January 1st 2021 was the launch day of the African Continental Free Trade Area (AfCFTA). The new free trade area can significantly boost intra-African trade and a more sustainable economic development. Ethiopia has all the interest and strengths to seize the development opportunities for its aviation industry that the AfCFTA will bring in the future years.

9.5 LOGISTIC SECTOR

The ETMP50 actions in the logistic sector is focused on the need to conduct a detailed study on the different possible **international trade corridors**, also in relation with the development corridors identified at regional level (IRIMP Study may 2020), the distribution of new dry ports, new border posts and application of the logistic strategy for modernization of the present logistic system of the country.

9.5.1 Diversification of trade corridors

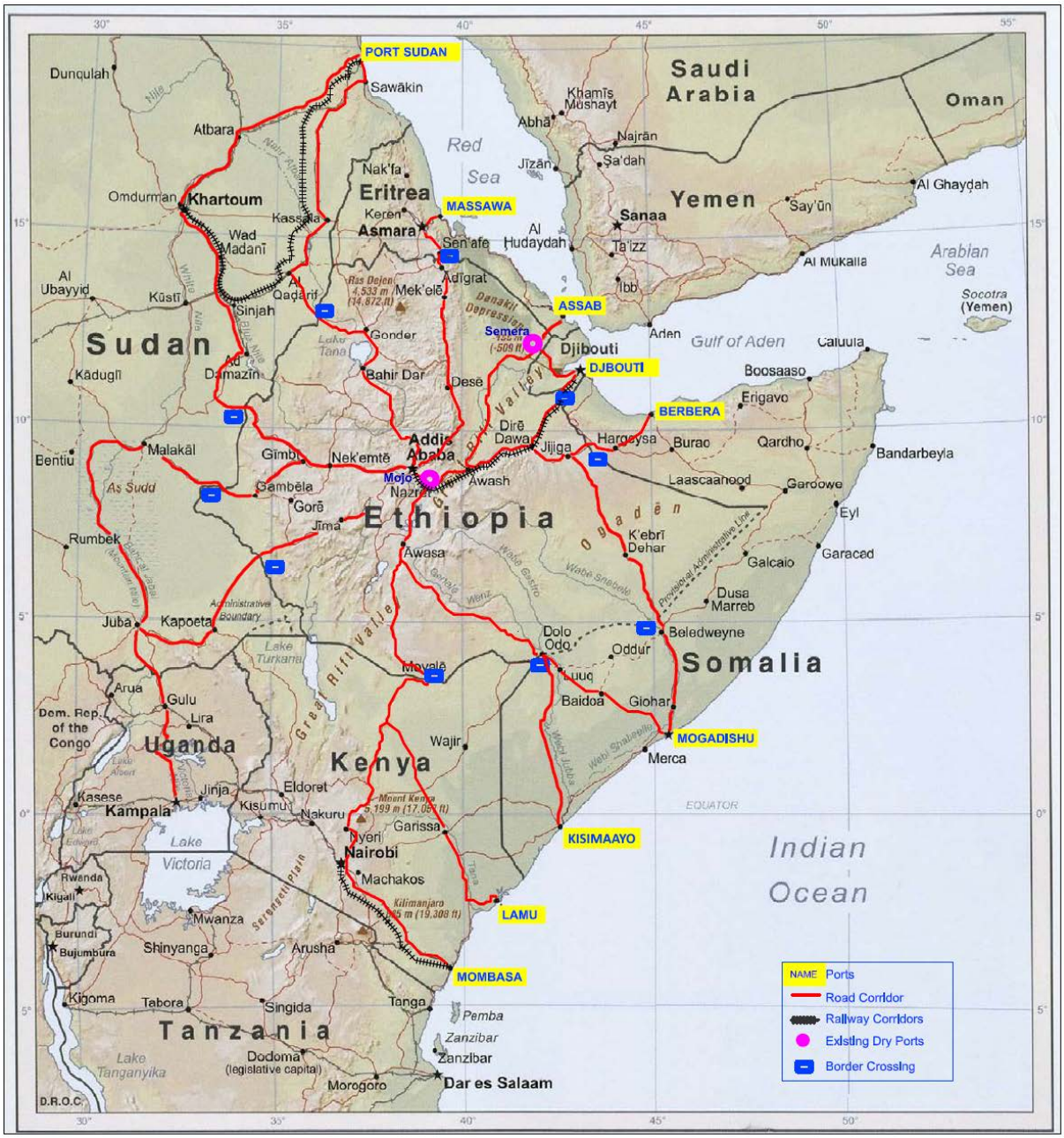
The study should define future demand of import/export tonnage, inland distribution needs in the next 30 years, evaluate costs for corridor improvement investment and operation and define the investment timing. The study should consider the proposed spatial Ethiopian development corridors with the parallel regional investments in terms of economic infrastructure development regarding EDCs (Economic Development Corridors), including transport, logistics, energy; ICT and water infrastructures. IGAD economic development corridors indicates the opportunity at long term (2050) to include, besides the main expressway or rail corridor, also possible crude oil or gas pipeline, Optic Fibre lines, power interconnecting lines, water projects.

List of IGAD corridors:

- **Port Sudan Corridor**, serving Sudan, Eritrea, Ethiopia and South Sudan
- **Massawa Corridor**, serving Eritrea, Ethiopia, Sudan
- **Assab Corridor**, serving Eritrea, Ethiopia
- **Djibouti Corridor**, serving Djibouti, Ethiopia, South Sudan, Uganda, Sudan and Somalia
- **Berbera Corridor**, serving Somaliland, Ethiopia
- **Mogadishu Corridor**, serving Somalia, Ethiopia, Kenya
- **Kismayu Corridor**, serving Somalia, Ethiopia, Kenya
- **LAPSSET Corridor**, serving Kenya, Ethiopia, South Sudan
- **Northern Corridor**, serving Kenya, Uganda, South Sudan

The following figure shows the different transit corridors and also the possibility for Ethiopia to become hub for transit traffic to Sudan, South Sudan and Uganda, using the Metema, Assosa, Gambela and Raad border posts.

Figure 155: Regional Trade Corridors

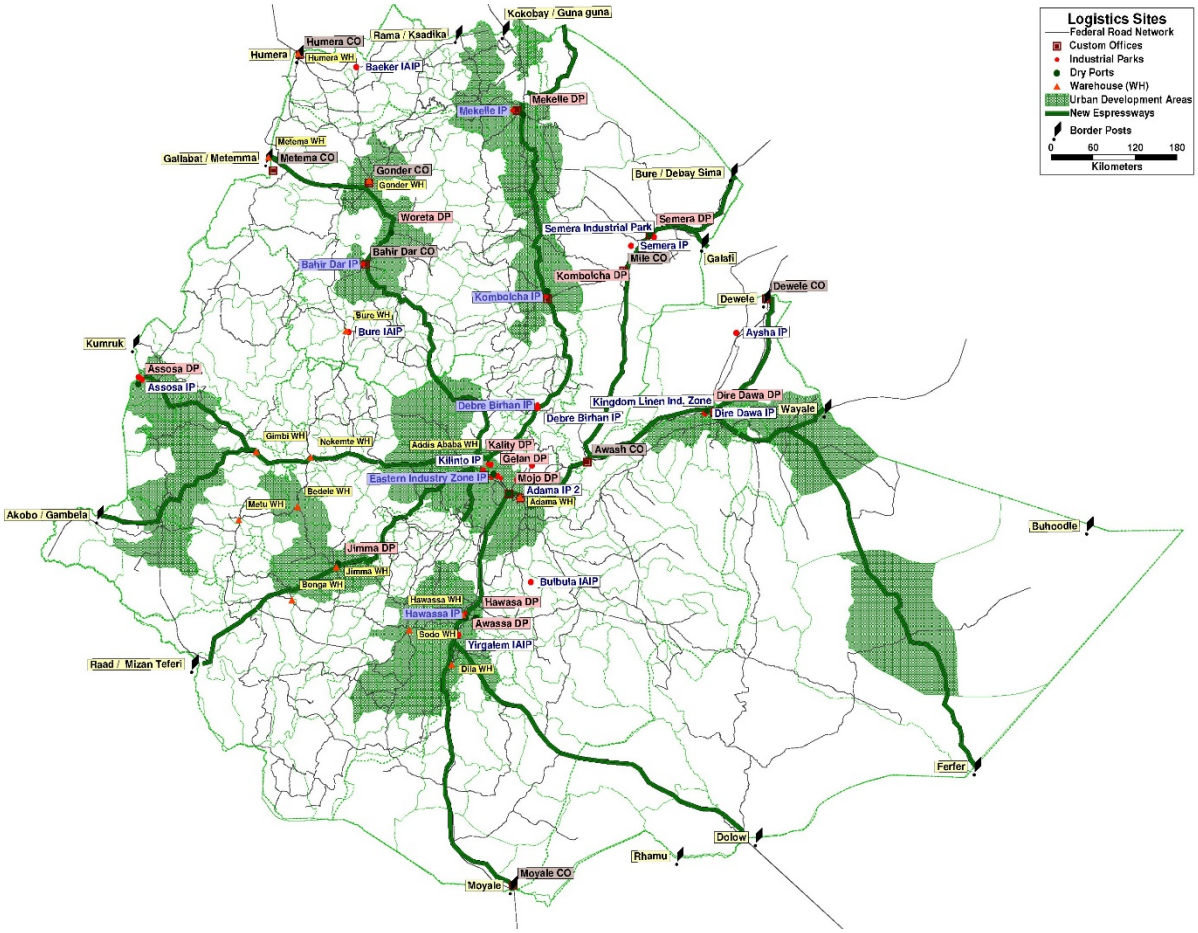


New Dry Ports location

The MoT FYP and TYP ask for the construction of 3 additional dry ports in Assosa, Jimma, Awassa and others to reach 20 dry ports. The new dry ports should be connected with the regional trade corridors, the Ethiopia spatial planning areas and the existing and future industrial and agro-industrial parks. A specific study should then be carried out analysing the main trade commodities production, collection and import/export and distribution, in order to identify the best location for complementary freight terminals, warehouses, cold stores.

In paragraph 2.2.3 are listed the present boarder post and custom offices. In paragraph 2.2.5 the location of the 8 existing dry ports already active and in in paragraph 4.5.1 and 4.5.2 the location of present industrial and agro-industrial parks.

Figure 156: Dry Ports and Border Posts



Future Logistic sites (Dry Port and Industrial parks)

Other Logistic poles (Dry Ports) and industrial, agricultural and manufacturing sites have been planned to support economic and social growth along the corridor development areas.

In particular, in the short term (2025) the realization of 3 Dry Port and 3 Industrial Park:

- Hawassa Dry Port
- Assosa Dry Port
- Jimma Dry Port
- Bole Lemi Industrial Park 2
- Kilinto Industrial Park
- Dire Dawa Industrial park.

In the medium and long term (2035/2050) the following Agro-Industrial and Industrial Parks are planned:

Year 2035:

- Baeker IAIP (Integrated Agro Industrial Park)
- Yirgalem IAIP (Integrated Agro Industrial Park)
- Bure IAIP (Integrated Agro Industrial Park)
- Bulbula IAIP (Integrated Agro Industrial Park)

Year 2050:

- Adama Industrial Park 2
- Semera Industrial Park

- Assosa Industrial Park
- Aysha Industrial park
- Kingdom Linen Industrial Zone.

Border Crossing and Custom Offices

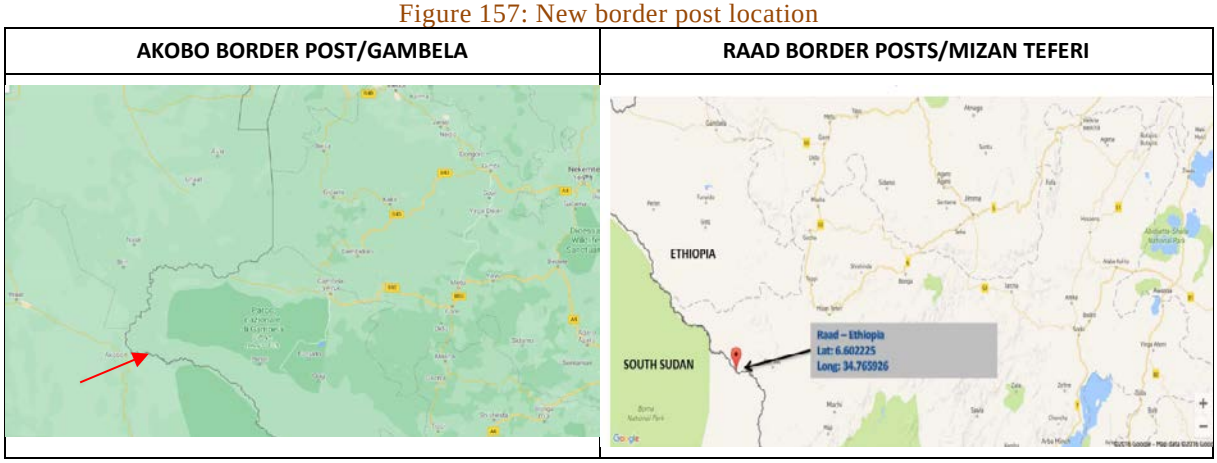
Customs offices where goods are declared for import, with their points of entry, are listed in paragraph 2.5.3, but other four additional Border Crossings points are to be added.

Table 99: Border Crossing & Transit Country

Border Crossing point	Transit Country
Buuhoodle	Somalia
Khatumo State	Somalia
Togo Wayaale	Somalia
Dewele	Djibouti
Galafi	Djibouti
Gallabat	Sudan
Metemma	Sudan
Humera	Eritrea
Qaysān, QēssanKormuk	Sudan
Moyale	Kenya
Doolow	Somalia
Ferfer	Somalia
Dolow	Somalia
Akobo/Gambela	**South Sudan**
Raad /Mizan Teferi	**South Sudan**

With reference to the new expressways proposed by the consultant, two additional Border posts should be established at the border with South Sudan.

Figure 157: New border post location



NEW border Post – South Sudan / Ethiopia according to the FINAL FEASIBILITY REPORT- RAAD ONE STOP BORDER POSTS (TRADE AND TRANSPORT FACILITATION STUDY OF THE KAMPALA-JUBAADDIS ABABA-DJIBOUTI CORRIDOR – 2015)

Besides the infrastructural and physical improvements also the **policy measures** have to be recalled.

The main concern of the logistics sector's policy is that of market liberalization in order to make private operators to inject their money and entrepreneurial skills in the sector's development. The most important issues to be faced under this topic are: i) an effective process of multimodal licenses issuing and, ii) a clear positioning about the dry ports development and management model. As pointed out earlier (8.4.3) this latter issue calls for a choose between an approach based on some vertical integrated operators and another based on different operators using the same network of freely accessible dry ports. Both points also require a review of the mission of the public company in the sector, ESLSE, in order to allow it to act with a clearer and conflict-free mandate in the various fields of action (land transport, maritime transport, intermodal transport).

9.5.2 Capacity building

The implementation of the Transport Logistic Strategy & Policy needs to be assisted by a technical assistance and capacity development to the relevant institution(s) of the Government of Ethiopia dealing with transport and logistics, with the aim of;

- ***Transfer of knowledge on logistics and transport best practices:*** provide technical assistance to the responsible government body/ies to implement the logistics strategy, to improve the existing logistics system to international standards and modernize the transport services to better facilitate logistics (including for instance mode share to rail, inter-modality, axle overloading control, vehicle standards, road safety, time, etc.).
- ***Technical Support on defining and implementing the logistics reforms:*** provide data evidence and contributing to bringing the reform of the logistics sector higher in the political agenda, ensuring the participation of CSOs in the policy making process and accelerate its pace

Support on defining and monitoring relevant corridors' performance indicators and standards: to improve the monitoring and data collection (including environmental/climate performances and road safety), contribute to improving environmental and safety standards.

9.6 MARITIME & INLAND WATER SECTOR

Inland waterway navigation needs a new framework of development. The unbalanced development and existence of bottlenecks on the inland waterways cause the main shortcomings far greater popularity of this mode of transport. The Ethiopia n network of inland waterways represents a significant, but at the same time, completely unexploited part of national values of Ethiopia. Therefore, it requires a thoroughly elaborated and rational approach regarding the future development and management of inland waterways. The overall policy on development of inland waterways should be directed towards the two basic directions: (a) achievement of a higher level of competitiveness and quality of the existing network of inland waterways; and (b) implementation of faster and more appropriate construction of inland waterways compliant with the international standards and best practices.

The studies and analyses carried out in the maritime and inland waters sector concerned:

- **demographic analysis of cities close to or falling within the 7 water bodies of Ethiopia;**
- **analysis of the national parks and reserves existing in the country,**

in addition to existing seaports linked to Ethiopia and sector plans such as Ten years perspective plan (2020-2030), discussed in the previous chapters.

Based on the studies conducted, **design solutions have been designed for new river ports to be realized in Ethiopia** in order to improve internal trade links and promote tourist transport in the country, and in particular in the national parks / reserves existing in Ethiopia.

9.6.1 Demographic Analysis of cities close to 7 water bodies

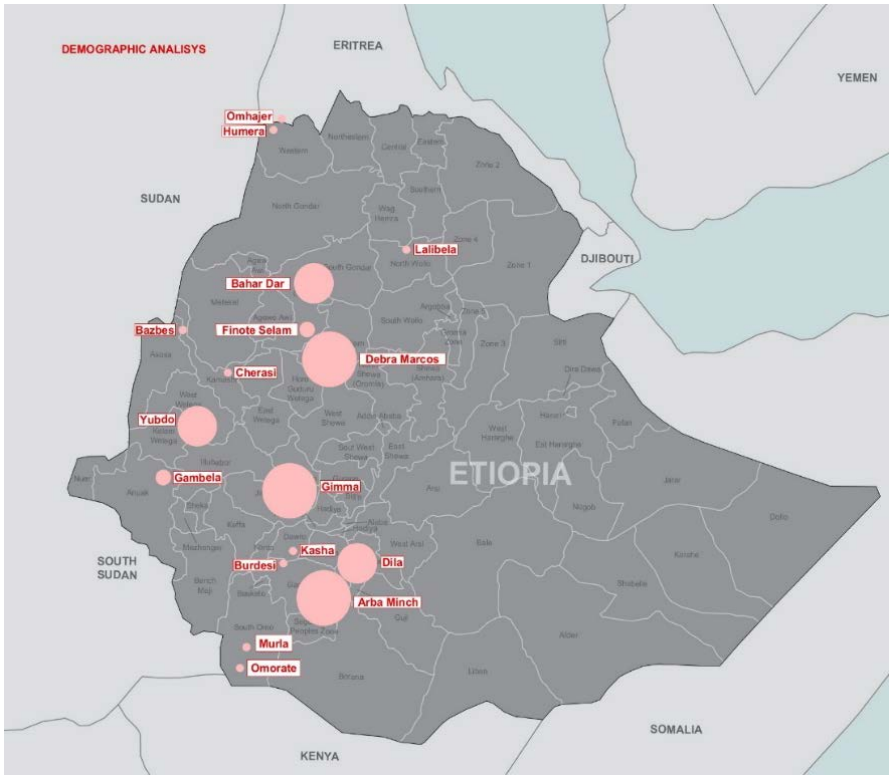
Among the studies and sector analyzes, **Demographic analysis of cities close to 7 water bodies** *(Tana, Baro, Abaya, Chamo, Tekeze, Renaissance Dam and Gibe River)* were carried out.

The cities with:

- population of less than 25.000 inhabitants are:
  - Omhajer
  - Humera
  - Lalibela
  - Bazbes
  - Cherasi
  - Kasha
  - Burdesi
  - Murla
  - Omorate

- population between 25.000 and 50.000 inhabitants are:
  - Finote Selam
  - Gambela
- population between 50.000 and 100.000 inhabitants are:
  - Yubdo
  - Dila
- population more than 100.000 inhabitants are:
  - Bahar Dar
  - Debra Marcos
  - Gimma
  - Arba Minch

Figure 158: Cities population



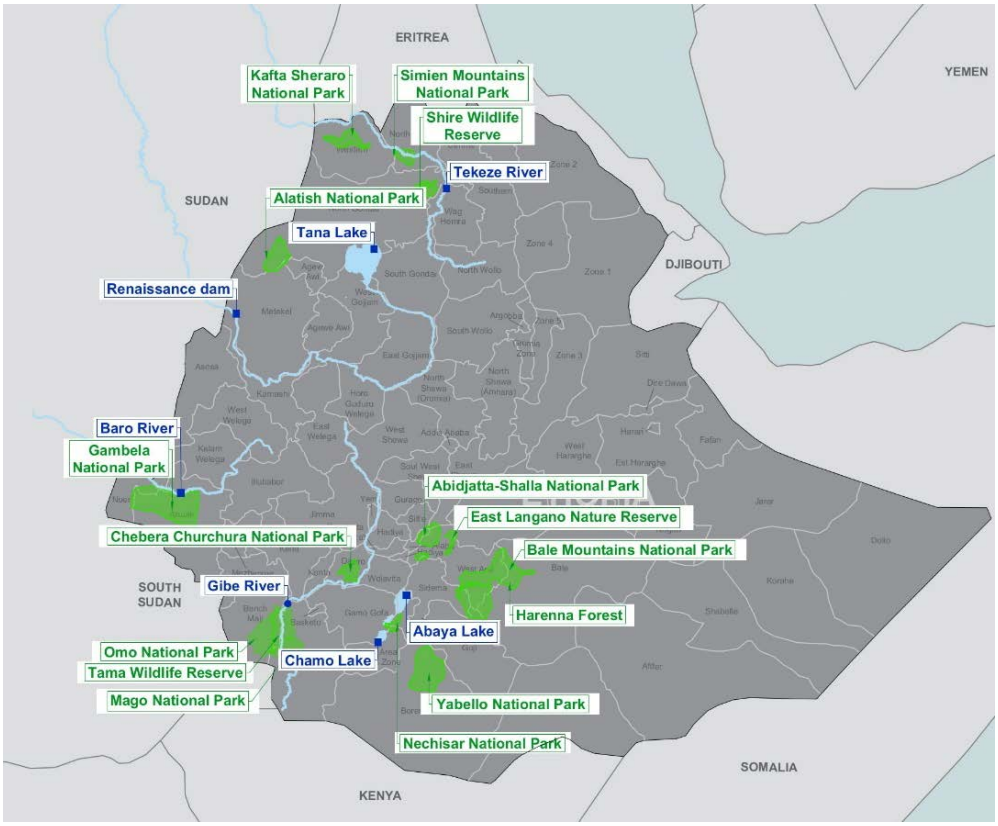
9.6.2 Analysis of existing national parks and reserves in Ethiopia close to 7 water bodies

The **Analysis of existing national parks and reserves in Ethiopia close to 7 water bodies** (Tana, Baro, Abaya, Chamo, Tekeze, Renaissance Dam and Gibe River) found that the national park and reserves present are total 15, listed below.

1. Kafta Sheraro National Park;
2. Similen Mountains National Park;
3. Shire Wildlife Reserve;
4. Alatish National Park;
5. Gambela National Park;
6. Chebera Churchura National Park;
7. Abidjatta-Shalla National Park;
8. East Langano Natural Reserve;
9. Bale Mountains National Park;
10. Omo National Park;

11. Tama Wildlife Reserve;
12. Mago National Park;
13. Harenna Forest;
14. Yabello National Park;
15. Nechisar National Park.

Figure 159: National parks



9.6.3 Design solutions for new river ports in Ethiopia

By the studies and sector analyzes carried out, the most strategically important cities in which to build **new port infrastructures** have been identified.

The design solution of new port are 2:

- the **Design solution 1** consists in the realization of a "full port" characterized by:
  - Commercial Port Area;
  - Fishing area and shipbuilding;
  - Passenger Area.
- the **Design solution 2** consists in the realization of a port characterized by **only Passenger Area.**

The main characteristics of ***Commercial Port Area*** *are* Operating Docks (APRON) with *Mobile cranes (10 and 30 t); Floating platform for RO-RO;* Terminal area (*Office and Service Buildings; Indoor and outdoor storage areas; Storage in transit; Equipment storage and workshop; Installations; Safety and Security)*

The main characteristics of ***Fishing and Shipbuilding*** are Operating Docks (APRON) *with Slipway;* Fishing and shipbuilding area *(Passenger station; Port Authority Offices Building; Equipment storage and workshop; Facilities; Safety and Security)*

The main characteristics of ***Passenger Area*** are Operating Docks (APRON) *with Floating platform for*

docking; Passenger Area (*Passenger terminal; Port Authority Offices Building; Safety and Security).*

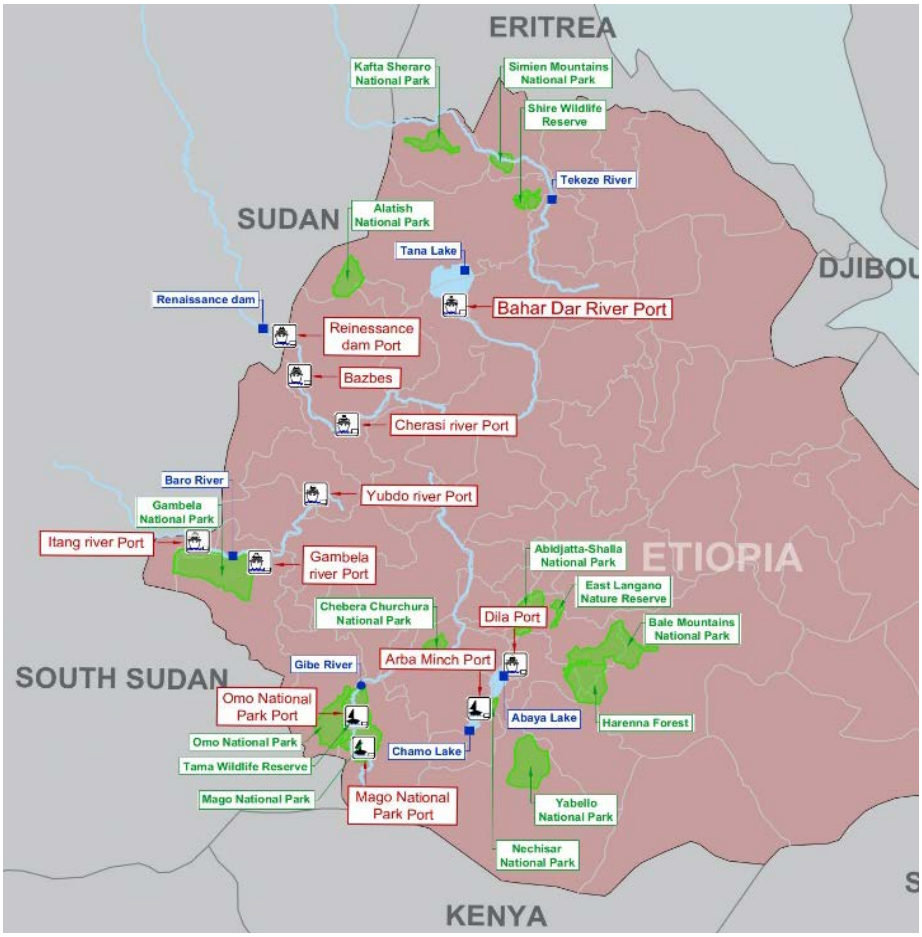
The **Design solution 1 planned in:**

- Tana Lake:
  - Bahar Dar
- Blue Nile:
  - Renaissance Dam
  - Bazbes
  - Cherasi
  - Baro River:
  - Gambela
  - Yubdo
- Abaya lake:
  - Dila

The **Design solution 2 planned in:**

- Chamo Lake:
  - Arba Minch
- Gibe River:
  - In the Tama Wildlife Reserve
  - In the Mago National Park

Figure 160: River ports



9.7 URBAN PLANNING & MOBILITY

9.7.1 Urban transport challenges

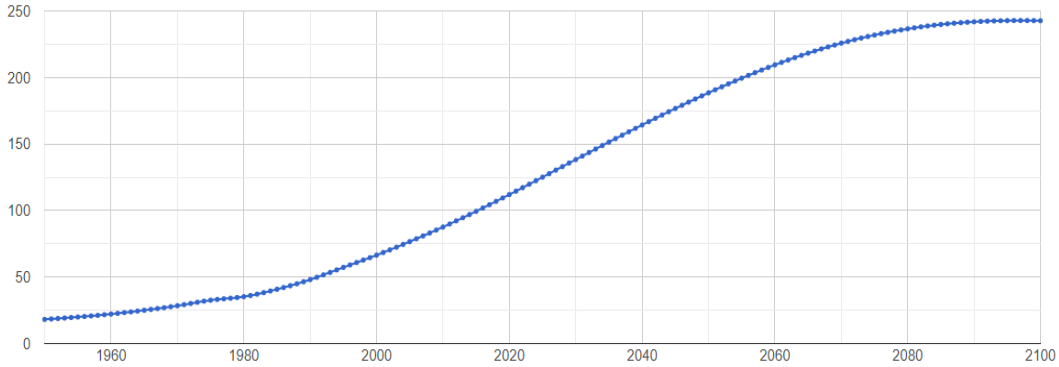
The last 20 years have strongly changed the economic, social and demographic structure of the entire country from all points of view, greatly influencing especially in the Capital, Addis Ababa, the mobility of people. Despite considerable resources dedicated to the construction of new road infrastructure, transportation, traffic management techniques and technologies, congestion seems to be a dominant constant for almost 4 million inhabitants who live in the Capital every day. Certainly, the regional and international role of Addis Ababa has changed: new jobs, new energies, new models of living have made their way.

Thousands of citizens have moved from the rural area looking for a better life and for a fixed salary or to self-employment, with profound changes to work and leisure schedules that have greatly affected mobility. And these changes took place in the rest of the urban main centers in a context of accelerated globalization that fortunately up to now has coincided with the entry of new cultural and professional forces now more than ever attentive to the environment, to the quality of life in the urban environment and which also demands quality in the suburbs, indeed it claims to live the whole city thus overcoming the rigid zoning that characterized the old ways of doing urban planning. All this leads to a greater propensity to mobility and to a greater demand for quality public spaces that can no longer be just spaces for parking cars, but spaces for socializing, shopping, meeting, walking, and cycling.

Due to increasing pace of the urbanization and the demographic growth the mobility in all the urban areas (and not only in the capital) will play a fundamental role for livability of the people. Nowadays it ‘s necessary to cope together urban planning and transport planning with a toolbox containing new technicality instrument and a new vision about the role of the mobility of people in an urban environment.

According to the Population Division of United Nation, in the next 30 years, the population in Ethiopia will growth from 112.942.875 (Jan 2020) millions to 188.455.080 (2050) millions that is an astonishing increase of 75.512.205 units that’s means a tremendous challenge in travel patterns especially in the urban context and not only in Addis Ababa but in all the regional capital and urban settlement as a whole.

Figure 161: Ethiopia: Demographic Evolution and Population Forecasts



Source: Population Division of United Nation

From a 25% of urban people in 2020 a cautionary estimation expects that almost the 40% of the population will be attracted to the urban centers in 2050, that means that more than 75 million people has to be accommodated in urban settlements exacerbating the present mobility challenges. This challenge can only be afforded with efficient and safe public transport as well more public spaces accessibility and providing transportation options that work for all people, the way to ensure a future that allows everyone to meet their daily needs and participate in public life in all the cities and large urban agglomeration.

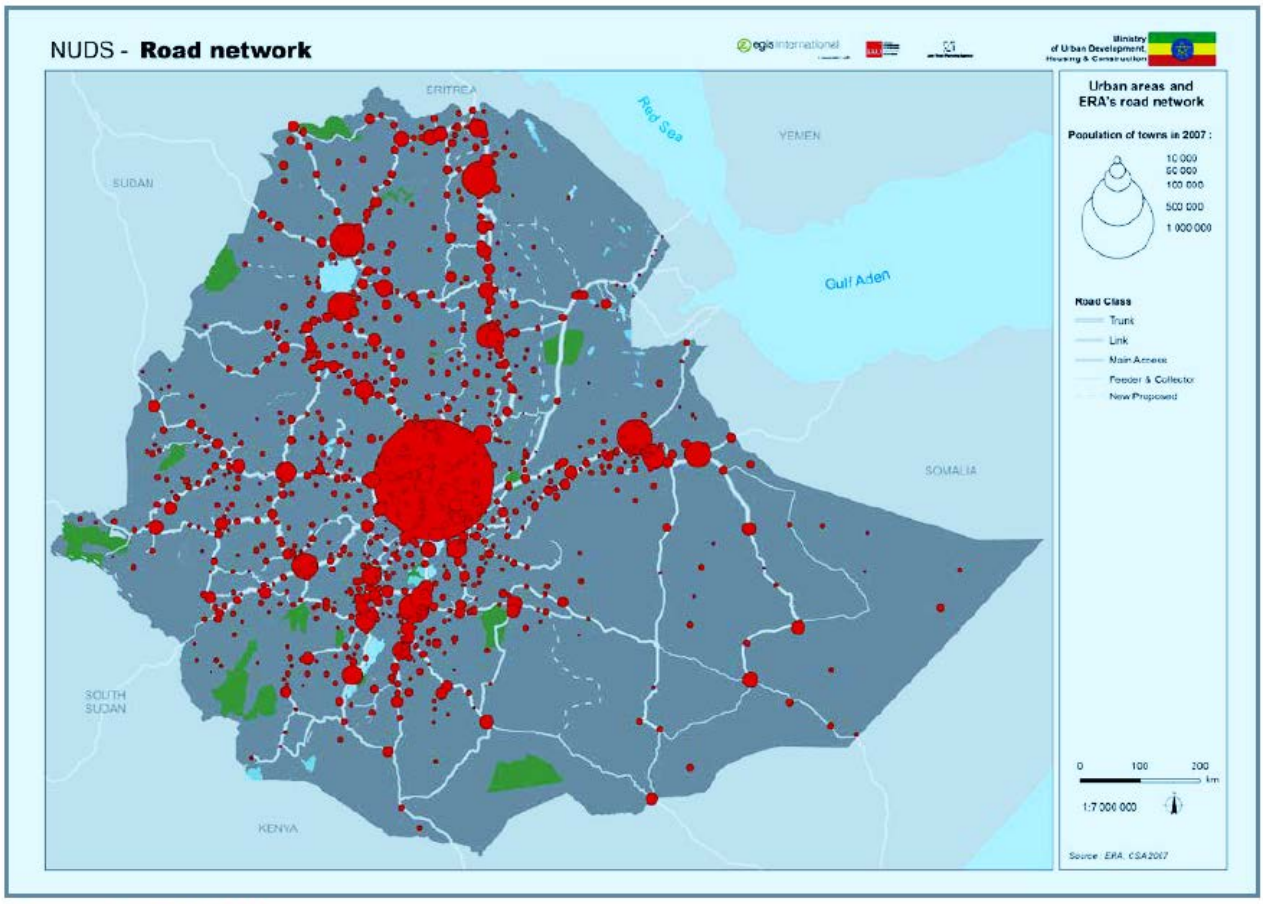
Table 100: Population projections for Ethiopia's major urban centres

City	Today	2025	2050
1. Addis Ababa	3,195,000	4,105,000	5,086,000
2. Adama	308,526	529,281	1,322,290
3. Gondar	306,246	532,674	1,252,837
4. Haw assa	285,785	485,845	1,001,600
5. Dire Dawa	268,000	378,000	606,604
6. Bahir Dar	266,667	463,832	1,090,921
7. Dessie	177,688	309,065	726,913
8. Jimma	169,446	290,687	726,217
9. Jigjiga	154,183	216,422	347,500
10. Shashemene Tow n	140,717	241,402	603,089
11. Bishoftu Tow n	140,039	240,239	600,183
12. Mek'ele	131,0201	224,372	470,895
13. Harar	125,000	171,000	259,485
14. Gambela	62,093	114,171	253,927
1 It is thought that the population of Me'kele is misrepresented here, at the time of the report it was closer to 250,000.			

Source: CSA 2016

The map below clearly reveals the network of the urban areas that stem along the main road, de facto with a structure that can be easily organized with the principles of development growth corridors.

Figure 162: NUDS Road network



Source: ERA & CSA

Growing down town: Addis Ababa and others urbans downtowns is home to more people, jobs, and activity than ever, and they play a critical role as a cultural and economic center for the cities

and their respective metropolitan area. An accessible, and walkable downtown or better historic center (that can be restored, adding value to identity of the cities) in all the cities makes an appealing destination for residents, employees, and visitors alike. By offering appealing public spaces on the streets, it's possible to enhance the downtown's role as a gathering place for the city and surrounding areas. By providing a range of mobility options on the very limited road space; the expectation of an increase of the ability to move people to, from, and within downtown, while at the same time increasing the livability of the peripheral areas is a fair question to which the metropolitan and urban areas area must answer.

New tool and best practice to afford the urban mobility.

The adoption by several cities in Europe to proceed with the drafting of the **SUMP's** (Sustainable Urban Mobility Plans) following the European Guidelines - Sustainable Mobility (LGE - ELTIS) of the European Commission was and still is the main tools to afford the urban mobility in Ethiopia in all the regional context can be a true political act of immense strategic value. The SUMP guidelines, in fact, are the result of a European-wide consultation that began in 2010 and was adopted by many cities since 2013 and is still being updated and improved until now having brought immense benefits to the cities in all Europe enough to become a point of reference for all cities that have adopted the tool.

The SUMP defines what is undoubtedly a strategic Plan aimed at satisfying the demand for mobility of people and businesses in urban and peri-urban areas to improve the quality of life. Consultant does not consider it as yet another plan for its own sake but rather as a plan for integration with existing instruments and plans, enhancing the principles of participation, evaluation and monitoring.

No longer a plan dedicated exclusively to identifying infrastructures but a strategic tool that adopts the principle of an integrated approach based on the search for greater balance in the use of the different transport modes, supporting and promoting efficient and sustainable travel. With the European Guidelines, adopted by the Municipal Administration with more than 50.000 inhabitants (and where necessary a voluntary consortium of interconnected municipalities) the consultant strongly suggests to adapt and adopt the SUMP experience as a point of reference to find out the solution or urban mobility for the near future. The consultant suggests and invites to share the objectives and experience of the hundreds of SUMPs developed in the last 10 years which can then be further codified as:

- the integration of transport methods in favor of more sustainable ones (i.e public transport, cycling and pedestrian)
- the feasibility of actions and proposals achievable in the short, medium and long term;
- the participation with the involvement of citizens and stakeholders for a shared vision of the current city's development and of the future vision
- the sustainability in social, environmental and economic action that has to be taken the measurement through the detection of changes induced by the actions/proposals,
- the monitoring of the interventions to be evaluated from qualitative and quantitative point of view of the actions taken and the hypothesized benefits.

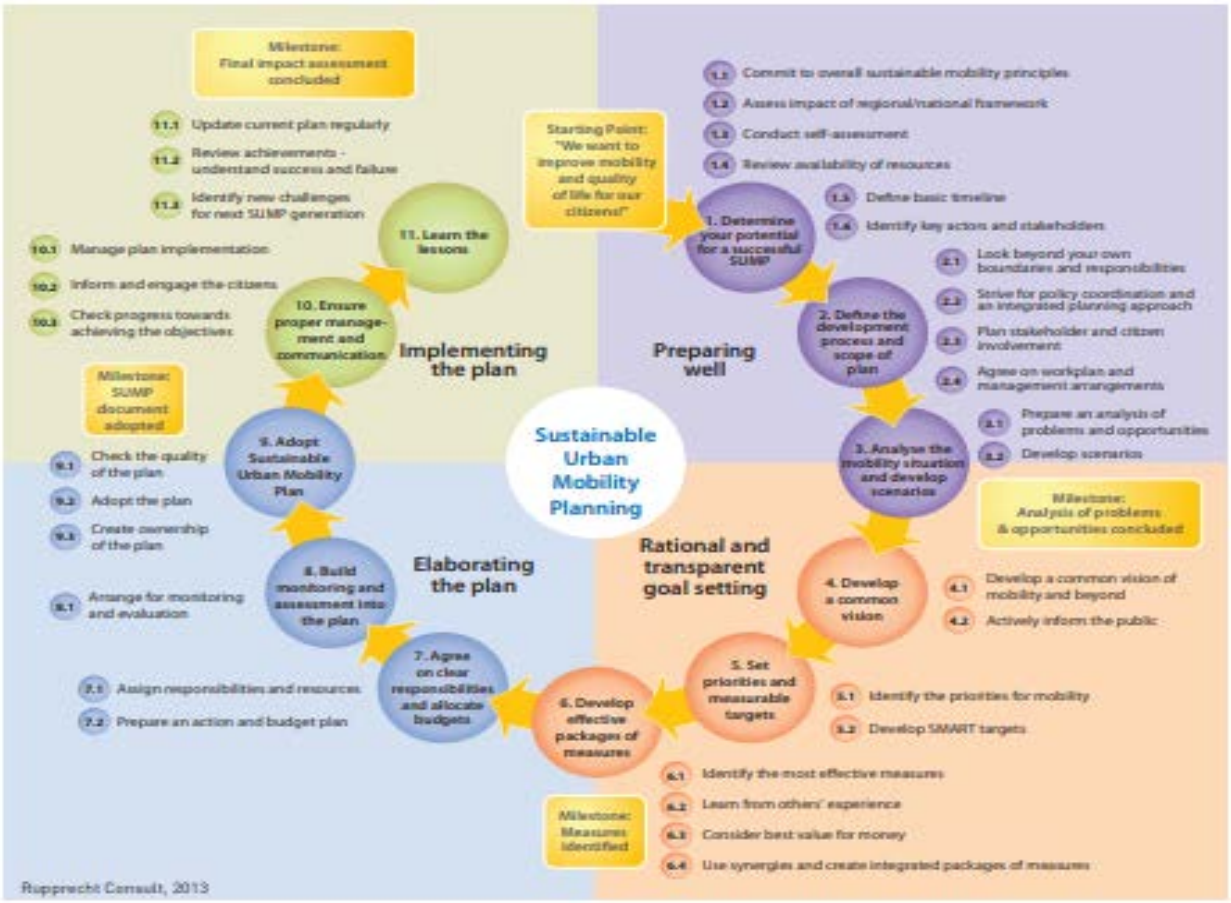
In procedural terms, the SUMP is based on a cycle of sustainable mobility planning configurable in 4 steps, divided into 11 phases, for 32 total activities. However, the timing of the various activities does not determine a sequential structure but the general address logic that could be represented as follows:

Table 101: The main steps of a SUMP

Preparatory Activities	Definition of rational and transparent objectives	Elaboration of the Sustainability mobility plan	Implementation Plan
1. Determine the SUMP's potential for success	4. Develop a shared strategic vision	7. Agree an allocation of funds and responsibilities	10. Ensure adequate communication and management in implementing the plan

Preparatory Activities	Definition of rational and transparent objectives	Elaboration of the Sustainability mobility plan	Implementation Plan
2. Define the plan development process	5. Establish measurable priorities and targets	8. Integrate monitoring and evaluation of the plan	11. An opportunity to learn and improve
3. Analyze the current state of mobility and create scenarios	6. Develop effective measures packages	9. Adopt an urban plan for sustainable mobility	

Figure 163: Planning cycle for a sustainable urban mobility plan



In other words, it seems to us that the SUMP guidelines can be easily integrated with current spatial and transport planning methodology already existing in the practice of the urban and transport planners: this can lead to pave the way to the seven fundamental strategies on which to organize the analysis and planning actions that are:

1. Integration between transport systems;
2. Maintenance and Development of collective mobility;
3. Consistent development of pedestrian and cycling mobility systems and consequent re-appropriation of public spaces dedicated to people and not just to cars;
4. Introduction of shared motorized mobility systems;
5. Renewal of the vehicle fleet with the introduction of low-impact vehicles
6. pollutant;
7. Rationalization of urban logistics;
8. Diffusion of the culture connected to sustainable mobility and the integration of urban planning processes with those of mobility.

The opportunity to integrate into the NMTS the principles of the SUMP to afford the challenges of

a strong population growth coupled with a huge urbanization process can allow all the Municipalities together with the Federal and Regional Administration to align in a due time the urban and mobility policy to that of the most developed countries of Northern Europe, thus improving urban quality, making the entire urban settlements attractive and competitive. In fact, despite an index of motorization that is still low, the road congestion, air pollution and accidents are conversely quite high and not only in the Capital City. The need is to tackle the issues of sustainable mobility in relation to urban development in time is in fact of extreme importance: first of all for the metropolitan area of Addis Ababa (also considering the infrastructural assets based on an already multimodal city where the methodology of the SUMP appear underway and likely to be ready for June 2021) other than for the growth urban corridor already identified and proposed by the consultant in the Inception Report (June 2020), in the Baseline Report (September 2020) and into the most important urban and transport studies.(1)

Of course, in the next phase the urban corridors where the adoption of the SUMP is recommended will be fully tailored according to the following rationale:

Aligning development corridor with social networks

The economy of the sustainable city of the future will not be based not only upon agriculture or industry but upon networks: networks of information, networks of people, networks of capital, people who have ambition, creativity and a choice of place to live will be drawn to locations that are richly networked. These creative individuals will drive the new economy. David Brooks described the situation well, “In a networked world the issue is no longer relative power but centrality in an increasingly dense global world.”

To encourage the development of networks

- Invest in technology so that geographically isolated towns can tap into the global flow of ideas.
- Foster spaces where people can meet talk and most importantly accomplish. As geographic proximity becomes less important to productivity social proximity rises in importance. Cities that support accomplishment will thrive. This means creating high-quality, convivial spaces and paying attention to critical details like good lighting.
- Invest in participatory experiences
- Good governance

Integrating transportation with Land-use

The best transportation plan is a good land use plan. With this in mind the following land use consideration should be applied to design of a street networks.

- Always create smaller blocks. By providing more paths of travel, traffic can be better distributed. Wide, pedestrian-hostile streets can be avoided and the number of destinations within walking distance can be increased.
- Mixed use neighbourhood centres should be within walking distance of all homes and businesses so that the basic needs of daily life are within walking distance. Small blocks help to ensure this.
- Primary schools should be located within walking distance of all residences. Secondary schools should be within bicycling distances of all residences and along transit corridors.
- Dense land uses (especially commercial nodes and corridors) and major activity centres (such as schools, universities, hospitals and civic institutions) should be served by frequent transits and connecting and adjacent streets should place a high priority on transit.
- To accommodate transit lines streets should generally be straight and streets suitable for transit service should be about a half mile apart.
- Except in the most urban and pedestrian oriented places, retailers should be visible from a major road.
- Successful retail demands a street that is busy with traffic yet is narrow enough that pedestrians on one side of the street can see store fronts on the other side. Retail streets work best when they are one travel lane in each direction so they can function as well as single retails space. At

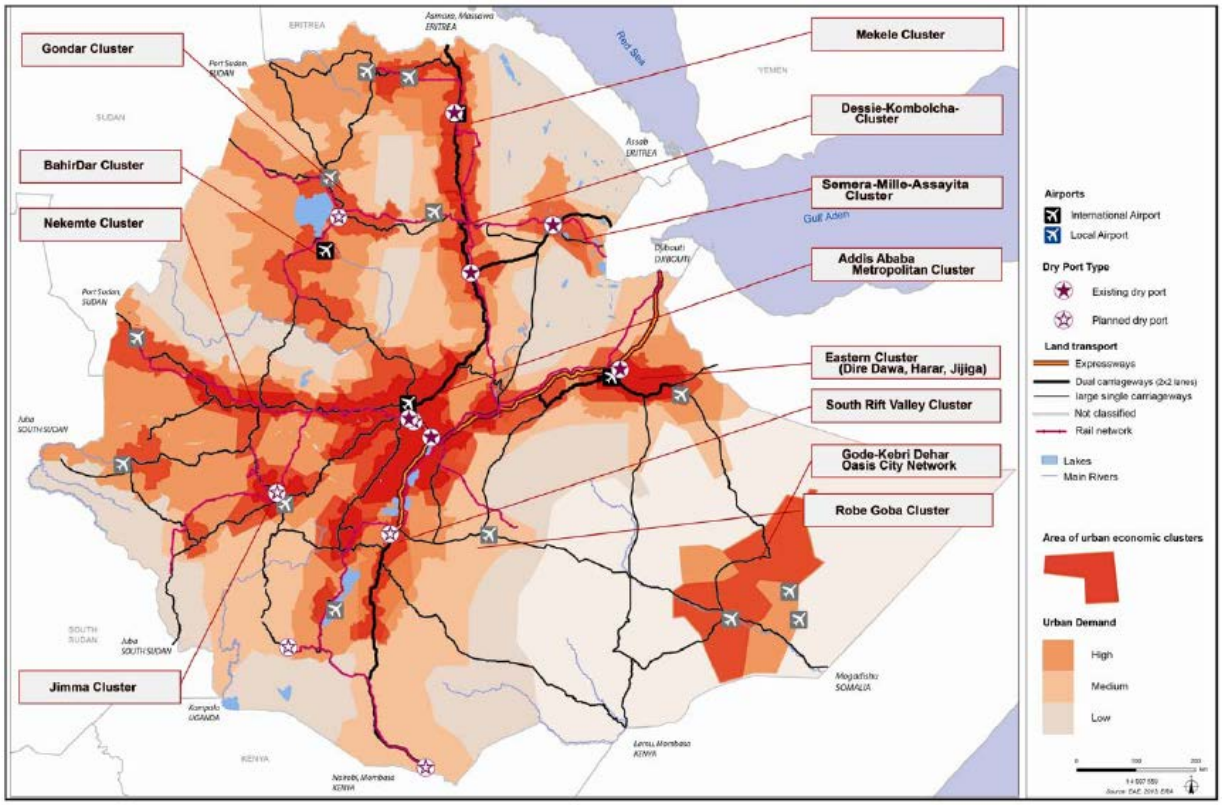
more than two lanes in each direction retail of each side of the street will tend to operate independently with less mutual support of retailers across the street.

- If a major road would create too much of a pedestrian barrier for successful retail. Retail streets should be located perpendicular to the road. Avoid locating retail centers on a street that will get little vehicle traffic.
- Unlike retail centers, parks and elementary schools are best located far from major streets. Key exceptions are high schools and major athletic facilities which are major destinations and should be placed along transit lines.
- When modelling motor vehicle traffic demand for new street network ensure the model is sensitive to land use density, mix of land uses, transit availability ,position in regional transportation networks ,transportation demand management programs and other factors. As density increases vehicle trip generations rates decline

The key principles able to better describe the rationale will be based following these key issues:

1. A network of buses and minibuses between urban settlements inside and outside the urban growth corridors together where the cooperation of the paratransit sector will be strategic to fulfill the growing demand of mobility in all the country giving the private sector the opportunity to invest on the fleet renovation and modernize the payment systems, throughout the adoption of smart technologies and ICT;

Figure 164: The preferred urban growth corridors scenario



Source WB & MoUDH- 2016

2. A substantial fleet of taxis, with relatively low costs, capable of satisfying a new, increasingly unpredictable mobility, with lifestyles and consumption patterns typical of urban community that has habits and schedules that will no longer conventional and based only with the dominance of the industrial needs (made up of fixed timetables) but taking in consideration also the needs of the advanced and independent tertiary sector;

3. The introduction in dedicated and special tourist area of unconventional means of transport such as cable cars which, although used mainly for tourism purposes, have allowed urban mobility in several capital city of the world (La Paz, Caracas, Rio de Janeiro, Bogotà..) on specific areas of the built city;
4. Facilitate pedestrian traffic which will still remain consistent, covering urban routes interspersed with bus stops at least every 400 -500 meters.
5. Provide in all urban settlements a network of protected cycle paths interconnected with each other towards the main routes and points of attraction. It is very likely that with the introduction of electric bicycles this transport modality can quickly reach percentages of soft mobility which is not very widespread until now that can be suitable both for the altimetric characteristics of Addis Ababa than for the generality of urban areas. To this end, some changes to the road code will be identified to rebalance the road space between the different modes of transport and avoid any danger on intersections.
6. Intervene with substantial updated design together with the adoption of road safety and calming measures at intersections in order to increase pedestrian especially for disable people;
7. Introduce a drastic reduction in speed in all residential areas or in any case in those with higher traffic, considering the establishment of 30 km zones and or Limited Traffic Zones in which the speed does not exceed 30 km/hour;
8. A careful review of the many roads with a one-way direction that inevitably leads to a predisposition to increase speed even in residential contexts.
9. Adopt strong road safety measures along the most important “home - to work” and “home to school” routes which see an excessive crowding of cars during opening and closing times with very high accident risks;
10. Facilitate and coordinate a complete revision of the parking policies together with the introduction of building standards, rules and regulations aimed at the need to rebalance public spaces, as well as the obligation to include the introduction of protected bicycle stalls both for new buildings and for urban renovations in order to avoid that they are stolen;
11. Provide rules and norms to equip bicycle stalls nearby all shopping centers and public services, bus, terminals and railway station;

Urban Logistic

Even in the field of freight logistics and urban areas, the development of e-commerce is leading to a fragmentation of deliveries that will inevitably require new regulation in both the means of transport and delivery methods up to the localization of urban logistics areas (including the need for cold chain). For those activities the reuse of the several brownfield areas as well new ones can be a fundamental instrument for the reorganization of the deliveries in urban areas.

That means for local goods and services movement must be provided:

- an efficient and maintained network of designated truck routes
- an efficient loading and unloading spaces reconsidering loading requirement along all the main important areas and routes;
- a support for the low impact goods and services movement and delivery.

For all the cities, Addis Ababa and the urban growth corridors this measure can represent a tremendous opportunity to increase the overall efficiency delivery of good and services in a less-polluting ways.

Governance

From a governance point of view, it is urgent to redefine the roles of the various agencies that have a n impact on metropolitan mobility.

Pending the results of the ongoing project “Consultancy services for the implementation of institutional policy reforms in the provision of public transport services”; the Consultant

suggests to establish a specific authorities or Agencies to be responsible with clear responsibility to develop a sustainable mobility framework both in the metropolitan area of Addis Ababa than in the growth development corridors already identified and suggested (see Baseline Report by optimizing the urban and suburban public transport service. This agency would have the following responsibilities:

- plan mobility strategies;
- design the public transport network (with the routes and the related stops);
- plan public services development;
- define the times and frequency of the services;
- manage infrastructures for metropolitan public transport: bus stations, terminals and stops;
- check vehicles and control technologies;
- define quantity and quality of the services to be provided;
- manage resources coming from federal and/or regional funds dedicated to the public transport;
- pending future calls for tenders for the various public transport services, define the standards and operating parameters;
- supervise the management of the transport services (currently served by Anbessa, Sheger, Psetse, LRT in Addis Ababa) and all lines entrusted to the private sector (code 3), to meter taxis, (code 1), to Bajaj in all the proposed urban corridors;
- manage the tariff system in agreement with the stakeholders;
- manage contributions from Associated Local Authorities, governments institutions as well as subsidies for the mass transport services.
- define, bid and approve concession contract with transport companies in charge of mobility services in and along the urban growth corridors; and
- liaise with, communicate to and inform the citizens, users, stakeholders and NGO's on mobility issues.

The establishment of a structured Mobility Agency for each of the urban growth corridors can better manage and accompany the development of the urban and interurban public transport together with future spatial development plans.

Of course, several hundred of professionals will be necessary to afford the future urban development corridors, and the Consultant will propose the main skills and characteristics that can be tailored around such architect, engineers, urban planners as well socio-economic expert.

The above considerations have been derived from the following documents:

- Unlocking the power of Ethiopia cities–by EDRI and Global Green Initiative- Addis Ababa Feb 2015
- Ethiopia Regional Cities by Arup & City alliance Addis Ababa 2016
- National Urban development Spatial Plan – Existing situation and diagnostics/land use by WB/IDA & Egis International and Urban Lyon Planning Agency, Insititute d'Amanagement et urbanisme Addis Ababa April 2016
- National Urban development Spatial Plan – National Urban System Study-Final Report by WB/IDA & Egis International and Urban Lyon Planning Agency , Insititute d'Amanagement et urbanisme
- Addis AbabaMarch 2016
- National Urban development Spatial Plan – Ethiopia urban development scenarios, Final Report -Final Report by WB/IDA & Egis International and Urban Lyon Planning Agency, Insititute d'Amanagement et urbanisme Addis Ababa April 2016
- Sustainable Transport Planning (2012), Tools for Creating Vibrant, Healthy, and Resilient Communities, Jeffrey Tumlin

9.7.2 Inter-urban passenger transport in development corridors

Public transport is one of the social facilities which are provided with the aim of improving the transport system. However, providing equitable and efficient public transport for the ever-increasing demand with the limited resource available is a challenge in the Ethiopia. This gaps in transport efficiency are created due to weak coordination mechanisms have hindered the formation of an effective and efficient transport

corridor that might eventually evolve into a successful trade and economic corridor supplemented with improved conventional public bus transport. Thus, the need to evaluate current public transport efficiency to identify opportunities and deficiencies as the cost of maintaining, expanding and extending public transport service is very high in Ethiopia. In public transport, efficiency measures can be used to monitor resource and service distributions, identify deficiencies and opportunities. In Ethiopia there are mainly privately owned bus transport companies.

Establishing an efficient public bus transport system in the planned economic corridor calls for a comprehensive strategy that aims at improving and enhancing future investments in transport in the region. This improvement made by introducing transport corridors promotes further economic growth and development, thus helping Ethiopia address the challenges of ineffective transport system. The spatial structure of cities, in Ethiopia particularly, is highly dependent on the sparsely located settlements. In some areas services and facilities are adequately provided while there are inadequate or no services provided in others. Therefore, bridging the gaps and enhancing the efficiency of the transport and economic corridor is critical to improve the capacity of these urban centers to effectively function as future growing cities. Similarly, there is variation in socio-economic characteristics of the dwellers from place to place. Moreover, the urban vulnerable groups are located mostly either at the city center, economic heart, or at the fringes, where no one else wants to live.

Theses variations show the challenge of getting equal and efficient urban services for the disadvantaged and vulnerable groups. As a consequence, this study proposes the quality of life in Ethiopian regions can be improved by introducing transport corridors. Pacione (1989) notes that quality of life is closely related to people accessibility to alternative employment, educational and medical facilities, essential public services, and nature or extensive recreational open space. Selective policy measures such as developing a joint long-term regional corridor development plan, harmonizing towns and settlements with regulatory frameworks and undertaking major reforms in establishing a joint corridor management entity should be the focus of this inclusive strategy.

The urban transport sector, however, has many problems in Ethiopia. Inadequate and poor-quality infrastructures, mismatch between demand and supply, and increased rate of accidents are some of the problems. These problems are triggered by interrelated trends such as urban population growth and (rapid, unplanned, and uncoordinated) growth of cities (TranSafety 1998). Transport planners must consider influences of these trends and trip purpose, temporal and spatial distributions of trips, modal splits of travel, and costs on mobility which leads into a broad-spectrum interpretation of corridors that attain sustainability dimensions that includes social, economic and environmental factors.

The dominant mode of public transport in developing countries in road-based transport is the ‘conventional’ bus. It has wider social and environmental benefits. It is the only one affordable to the urban poor (Armstrong-Wright et al. 1987). It is the most flexible as it satisfies high short distance mobility demands. It needs less investment on infrastructure. It is feasible economically to all groups and environment friendly system. Vikash (2003) reckons how people can tradeoff between owning a vehicle and good quality public transport as: “Most people in a city are better off if they access vehicles rather than own them.”

Ethiopia’s economy is highly reliant on public transport system. However, in line with the idea of transport corridor, the demand of this service (particularly during peak hours) is beyond its capacity and the quality of service is poor. Moreover, the general prevailing traffic congestion and inadequate street networks constrain the level of service. To illustrate how severe the problem of traffic congestions is in some cities the traffic speed in most urban areas has been dramatically similar to what existed at the times when horse and carriage was the fastest means of travel (Vikash 2003). From this we can infer that the transport corridor needs a reliable and sustainable strategy to maintain the momentum of economic growth, breed a conducive environment for the public bus transport system in addition to the existing transport system. This must come forward with greater urgency and commitment to developing the corridor for long-term use of public bus transport. Public bus transport service in Ethiopia is provided both by the government and the private sector.

The public transport system needs to first adjust the notion of service coverage to reflect the spatial, socioeconomic and demographic characteristics of towns and cities rather than attempting to set public transport goals for the entire region to assess the cost of recovery and give priority to developing a planned corridor that strategizes based on the momentum of economic growth of towns and cities. Second strengthen and extend the coverage of the transport system to other regions.

There are eight planned corridors in this proposed strategy. This includes addition of separate bus lanes, providing new public transport corridor, improving the efficiency of transport stops and travel routes in terms of redundancy and suitability. These solutions focus on improving ease of access and efficiency to overcome resistance to travel by public transport and ensure the system will get people from where they are to where they need to go in a reasonable amount of time and comfort with improved connectivity.

Uncontrolled and rapid horizontal expansion, increasing population and poor road infrastructure of the city (narrow road, limited network extent, no pedestrian facility and lack of adequate traffic signs, etc.) dictate the level of service and need to be controlled with the introduction of planned corridors strategy. Transport is the back bone of urban life and the corridors. It is one of the factors which determines the form and socio- economic development of a city. Mobility and accessibility provided by the transport system have been playing a major role in shaping towns and cities, influencing the location of social and economic activity, the form and size of cities, and the style and pace of life by facilitating trade, permitting access to people and resources, and enabling greater economies.

Public transport in the planned corridors is envisaged as a collection of modes of transport which are available to the public irrespective of ownership. It includes road-based modes like conventional buses, transit vehicles, human and animal powered vehicles, cycles and walking; rail-based models like heavy rail system, light rail transit, street tramway; and rapid transit systems (Iles 2005). Among these modes, the conventional bus is the most common public transport mode in Ethiopia. The public transport system mainly due to its low running and initial cost routes flexibly with permeability into town and city centers (Davison et al. 2006).

Some people believe public transport is the ‘solution’ for some of urban transport problems (Black 1995). And its importance has been widely acknowledged. It helps to overcome some of the social and environmental impacts of transport system which includes mobility problem for the disadvantaged groups (e.g. poor, handicapped and elderly), congestion, accident, environmental impact, land consumption, urban sprawl and energy consumptions. The planned corridor provides improved mobility for those who cannot drive their own cars; helps in creating and maintaining livable communities; relieves highway congestion; assures long-term sustainability in terms of resource consumption and the environment.

In Ethiopia the primary importance of public transport is to move large numbers of people with considerable flexibility within the planned corridor in order to meet mobility demand, particularly access for employment throughout the city. The existing public transport capacities does not satisfy the demand for a number of reasons: the quality of travel on public transport is poor; roads are badly maintained and managed; and costs of travel are high for the citizens to make regular use of the public transport system.

The planned corridor vison embraces social services, efficiency and performance measures in public transport that are necessary to monitor progress toward a result or goal of creating efficient transport corridor. The planned corridor is important in terms of identifying and measuring sources of successful transport performance and therefore can be used in policy planning and allocation of resource. The boundaries of the corridors can be used as means of evaluating proposed extensive changes towards increased regulation, reorganization and privatization of public bus transport.

Furthermore, In Ethiopia the public transport system is managed by the federal office. This office reports how many passengers have been transported per annum. There are regular buses and special busses in each region. There is a spread and distribution of buses in the regions. Each region has its mandate to manage its own public bus transport.

10 ENHANCING TRANSPORT SECTOR CAPACITY

10.1 INTRODUCTION

The interviews session has clearly shown how the planning process is important and practiced at Government level and in all the public administration sector.

In the transport sector a good planning process is particularly relevant, as the full process of creation of a new infrastructure, from the conception to the full exercise, can easily take ten years. In a fast-growing economy, as Ethiopia has proved to be in the recent years, it is more and more important to be able to provide on time the right sizing of transport offer, as the transport demand can grow at a double-digit pace. The alternative is a systematic excess of demand, with serious consequences on the economic competitiveness and growth of the whole Nation.

The importance of the transport planning, however, is not backed by a consistent level of professional capacity in all areas of the public administration. To be more specific, it is observed a quite good planning capacity inside the Authorities and Companies under the MOT supervision, even with a high level of variability, that somehow reflects the relative managerial strength of the institution. At the level of the Ministry of Transport, it is observed a proactive and remarkable activity in the policies definition, while the capacity to supervise and challenge the plans coming from the Authorities and Companies appears quite weak. The planning supervising and endorsing function doesn't seem to be systematic, but approached when it urges to issue a new national plan, so the working team is often not the one that is supposed to make that job inside the Ministry. As a consequence, the process results to be mainly politics-driven rather than evidence-driven.

The issue of the capacity building in the transport sector is reflected in the Terms of reference at Task 6, which asks for: letter b) an assessment of the institutional structure, financing and technical capacity of transport departments/agencies; letter k) an analysis of the modalities and the assistance required to implement the investment and policy reform program.

In the present Report, thanks to the interviews conducted and the documents examined, it is possible to come to a strategic approach to the capacity building issue.

The approach to the Task 6 letter b) and k) will be illustrated in the following paragraph 10.2 for what is about a broader strategy definition for an effective implementation of the capacity building programs for the transport departments/agencies.

In the following paragraph 10.3 it will be covered the training specifically connected to the best understanding of the National Transport Master Plan and the modeling behind it., including the Task 7: Consultations & Awareness Workshops

10.2 CAPACITY BUILDING STRATEGY DEFINITION

10.2.1 Governance administration and capacity building

Ministry of Transport

The analysis of the transport sector's governance is grounded on Ministry of Transport as the primary center of political decision. Within the duties of the MoT, one of the most important activities is the planning process. Essentially this concerns the amount and the scheduling of investments within the planning period for each sub sector.

The official planning documents for the transport sector are the Ten Years Plan 2020-2030 and its detailed implementation document, the Five Years Plan[59]. Both the documents are, in turn, the

[59] The entire planning process is currently ongoing. The draft version of the documents is, respectively: Federal Democratic Republic of Ethiopia, Transportation sector. Ten-year development plan (2013 - 2022 EC). Addis Ababa, Draft November 2012 EC, from now on TYP and, Ministry of Transport's Five-year development plan (2013-2017 EC). Addis Ababa, Draft February 2013 EC, from now on FYP.

sectoral part of the whole planning document of the country.

Given the general split of planning processes between 'top - down' and 'bottom-up' typologies, the process adopted by the government seems to belong to the second one. In fact, MoT collects from the sectoral authorities the investment proposals which, in turn, come almost totally by the public sectoral enterprises. As the axle 'Ministry - Authorities - Public Enterprises' is under the umbrella of the public ownership, the coherence of the market investments with the public strategy is given by definition through the top management's loyalty to the political guidelines.

The analysis of TYP and FYP, together with the interviews with both MoT's top directors and advisors, enlightened the adequacy of the planning process to design the transport's investment program for each sub sector. A detailed description of the investment's amount and its time schedule is reported in Chapter 7

As policy measures are concerned, the analysis of the aforementioned documents shows a similar structure of the process.

The sub-sectoral authorities/agencies, according to their functions, present programs and strategies to the Ministry of Transport. It is interesting to note that the development of programs or strategies is often linked to the numerous technical assistance programs financed both by the government and by leading international financial institutions. In general, these programs carry out an assessment of the situation to the involved stakeholders and institutions, providing policy suggestions, strategic guidelines, intervention plans.

The official planning documents analysed (included in TYP and FYP documents) present specific areas devoted to "Program and Strategies" and "Institutional Capacity, Policies and Strategies to be Implement(ed)". The documents quoted are as follows[60]:

"(7.1) Programs and Strategies
- Integrated Transport Master Plan
- National Logistics Strategy
- Blue Economy Strategy
- Non-motor strategy
- Multinational Transport Expansion Strategy
- Automotive Strategy
- Road Sector Master Plan
- Road Classification
- Woreda Transformation Initiative Program

(7.2) Institutional Capacity, Policies and Strategies to Implement
- Transportation Policy
- Aviation Sector Policy
- Road Sector Policy
- Rail Sector Policy
- Road Transport Policy
- Logistics Sector Policy
- Road Resource Management Policy
- Road Payment Policy
- Railway Safety Act
- Public Transport Act
- A Guide to the Coordination of Railway Stakeholders
- Multi-modal transport regulation
- Improvements in the organization of the sector
- Establishing a Corridor Management Board"

[60] TYP Chapters 7.1 and 7.2.

It is easy to see that the number of specific policy documents or strategies to be implemented is very large. Furthermore, as each of the implementation plans will require not only a budget, but also time, staff and organizational efforts, it is easy to understand that this very broad set of tasks that must be coordinated and verified by the Ministry can likely lead to difficulties in carrying out these activities.

This leads the reasoning on the aforementioned governance model (see figure 1) based on the control chain 'Ministry → Authority → Public Enterprise'. Looking at this axle and given the resources managed by the concerned bodies, it is rather clear that the ability of the MoT to design policies and check its implementation is not fully effective. On the contrary, the bigger part of work is centered on the couple Authority → Public enterprise, which, depending on the sub-sector, can be focused on one or another actor.

The transport minister has of course the role to direct and coordinate these bodies but does not has an adequate organization to do it practically. For this key role, the Minister has as a governance tools essentially the power to nominate the top managers of the Authorities (and in some cases of the public-owned enterprises) and the powers coming from usually being personally Chairman of the Board. The MoT structure, in itself, is not directly involved in the discussion about the strategic decisions of each Authority, and the offices does not have the key knowledge to engage a dialectic relationship with a specific Authority or Public Enterprise.

The weak technical and economic capacity of the ministerial structures to make independent review or investigations about the choices to be done, makes this decisional center depending from the Authorities and the Public Enterprises. Moreover, out of the three main transport public enterprises, ERC, EAL Group and ESLSE the two latter are not under the MoT supervision but under the PEHAA (the former Ministry for Public Enterprises).

In terms of ability and skills of the work force, a recent assessment conducted within a World Bank technical assistance program, identified some critical gaps to be filled related to fast turnover of the employees, low level of wages (absolute and compared to the authorities' salary level) and training possibility[61].

Coming back to the several policies and strategies included in the official planning documents, as the number and qualification of MoT employees is currently low, the risk of lack in both coordination and monitoring of all these sectoral/horizontal policies is real. In addition to this risk, the current situation of the MoT has certainly influenced the absence of a priority ranking in the list of declared policies, so that the leading role of the Ministry is less effective than required.

Main Authorities accountable to the Ministry of Transport

Among the transport institutions under the supervision of MoT, ERA has a prominent role given the fact that road transport is by far the most important provider of mobility services of the country. The authority has been the pivotal institution of the road development of the last decades and evolved during times. Also, the scope of work evolved, in particular it is interesting to remember that, with the establishment of the Ethiopian Construction Works Corporation in 2015, the mission of ERA focused on the development, design, procurement and technical support activities. A similar process occurred in the case of toll roads which have been given to a focused corporation (ETRE) in charge of the role of contracting authority with the private financial partner under the PPP rule.

Being the national focal point of the main projects of roads development, the Authority benefited of numerous technical assistance programs embedded in the projects financed by international institutions, capitalizing skills, knowledge, training and field assistance. Currently one of its main tasks is to transfer knowledge and methodologies acquired to the sectoral institutions at local level, also managing technical assistance programs to regional or local level.

[61] Expressway Development Support Project (P148850). COMPONENT 3: Road Safety and Institutional Development Support to the Transport Sector.

At the same time ERA continues to enhance and review its performances, trying to improve its knowledge or its organizational structure, in order to cope with the increasing length of the national road network and with the variety of issues connected with its management and maintenance. The Authority, in fact, has recently undertaken a reorganization of its Directorate in charge of the Road Asset Management System issues.

During this process of focusing and fine tuning of its mission, the institution appears to have strengthened its technical knowledge and skills which appears adequate to cover its role and carry out its mission.

The mission of the Federal Transport Authority is to provide the administration and regulation of road services at federal level. The Authority is responsible for issuing regulations in the fields of safety of motor vehicles, drivers and commercial transport operators and for propose road safety rules to the political level. Given the federal structure of the country, FTA, which has central directorates in charge of vehicle inspection and road safety, is present at Regional States level with its regional transport offices in charge to issue driver licensing, vehicle registration and inspection functions.

This regulatory and administrative mission assume the existence and proper functioning of monitoring systems on the application of regulations, given the significant impact that driving behaviors and the condition of vehicles have on the safety of road traffic. Since these methodologies and systems have not yet been implemented, the FTA activity only partially governs the phenomenon of road mobility.

Coming to the issues of the right to mobility as described in the introductory part of this chapter, the aspects of quantity and quality of transport services provided by economic operators appear to be little supervised. FTA did not issue any guidelines or instructions able to set the framework of the economic and technical requirements to meet the mobility needs of citizens. Accordingly, at local level, the activity of license issuing to economic operators (public or privates) to provide transport services is strictly limited to general requirements and does not have to meet minimum standards.

The Logistics and Maritime sector are of primary importance for the country's economic activity. Furthermore, it is known that Ethiopia's sector positioning indicator (Logistics Performance Index) is rather low and in any case unsatisfactory for the size and ambitions of the country. As stated in 2.5, the ability of the sector authority, EMAA, to work towards a substantial improvement in the efficiency and effectiveness of Ethiopian logistics is hampered by numerous factors, many of which highlighted in the official assessment of the Government issued by the National Logistics Strategy.

First of all, there is a lack in the regulatory framework that has so far prevented the start of competition for the supply of multimodal services and for the development of dry ports and related services.

Furthermore, a lack of clarity in the definition of the mission of the public sector company, ESLSE, contributes to this deficiency. We have seen, in fact, that the assignment of multiple and sometimes conflicting objectives to the public enterprise has generated, or contributed in encouraging, behavior to preserve and protect its monopoly position. On this aspect, what should be better defined, or even revised, is the commitment of the public enterprise; this revision can only take place at the level of the governing political body, namely the MoT.

Thirdly, there is a lack of adequate professional and qualified figures, as well as for the whole sector, which make the application of government policies much more difficult.

In this scenario, the policy of promoting the entry of private operators in investments and in the supply of logistic services risks producing only partial results.

A different landscape is that of the air sector, which, being international by its nature, has an administrative and regulatory framework to be referenced to if the country wishes to access the network of international connections. The growth and success of Ethiopian Airlines go in parallel

with the fact that the country has, over time, developed technical and regulatory bodies (ECAA, the Aircraft Accident and Incident Investigation office at MoT) able to build positive relationships with the international institutions of the sector.

On the other hand, also in this case the role of the public enterprise is so central that it seems difficult to be able to separate, even on one aspect only, the interest of the enterprise from that of the country. This is the case of the merger of the airport management company into Ethiopian Airlines. Although the motivations for this merge are rational and justified, if considered from the company's side, the long-term implications on the development of domestic connections do not seem to have been sufficiently considered.

In a long-term planning term this powerful asset of the country could, on the contrary, play an adverse role, looking mainly at the international scenario and neglecting the opportunities on the domestic side.

The case of the railway is still different. Here the country has a long experience, from which it has decided to move away to undertake a new development in a more modern direction, adopting a standard gauge and power supply.

From an administrative and regulatory point of view, this implied the need for a complete re-foundation of the railway system of the country whose essential basis allowed the debut of the first services but whose completion is in progress and will probably take several more years.

The process currently underway is that of design and implementation of the sector Authority, which will first of all have to oversee the safety aspects of the operation and design of the railway systems. Similarly, to the aviation sector, also in this case the person in charge of carrying out the investigations on railway accidents must be a third party.

As stated in 2.3 there is still a lack in the railway regulatory framework, but also the scarcity in specialised professional figures affects the administration of this sector. Apart from the absence of specialised university training programs, also the company's potential basin of recruitment is not an easy source for new public officials.

However, these aspects, albeit fundamental, will not be sufficient to make the Ethiopian railway system, in which the country has invested a lot and shows that it still wants to invest, an effective support for logistics and transport. In fact, the existence of three different public companies (ERC, EDR, CDE, two of which bi-national - and partially managed by a non-domestic private entity), and the desire to involve private capital in the development and management of the sector, highlight the need for strong coordination. which, up to now, the MoT has not been able to perform.

Local level

The local level essentially concerns the governance of the road sector at the regional states' level and within them. The main issues raised in this field can be summarized by dividing them into infrastructure provision and service provision, so as to include the regional offices belonging to the respective federal institutions, ERA and FTA.

As regards the regional transport authorities (RTAs), it should be remembered that the functions relating to vehicle registration, vehicle status, driving license and operator registration (public service vehicles, private freight transport and passenger transport) have been devolved to the Regional States and to the two City Administrations. In accordance with the federal form of the Ethiopian State, each Regional State was able to define the competences of its own Authorities. At present, therefore, there is no common system used by all the (eleven) authorities to which the above powers have been delegated and in Ethiopia there is no central database of registers of all motor vehicles, drivers and operators. As stated in the sectoral chapter, this deficiency seems to be crucial for a heterogeneous application of the legislation in force.

In this case, the problem seems to be twofold: on the one hand, an uneven design of the tasks of the RTAs, on the other hand, the absence of a national monitoring system that highlights and allows to prevent/correct non-conforming applications of the legislation in force.

In the case of the Regional Roads authorities (RRAs), what emerges from the assessments conducted in the case of specific international projects or from overall evaluation processes is that the local level of the road sector has numerous shortcomings.

Regarding the institutional and administrative aspects in many RRAs there is a lack of clear understanding on which is the boundary between the regulatory and operational aspects. Many distinct functions are instead confused under the same responsibility thanks to a poorly defined or misinterpreted organizational autonomy.

In terms of planning process is interesting to observe that the practical situations in many of the RRAs is that of absence of system or practice of information tracking and documentation. This has caused problems in getting data for planning, budgeting, as well as designing strategic plans and policies.

In terms of managerial and technical capacity, there is a lack of technical and managerial skills at the top management level. This is due to the qualification of the assigned person (unrelated field of study, little experience; shortage of staff) which causes poor management of professionals/technical staff and high turnover. Moreover, a low level of managerial and technical capacity of the strategic team of RRAs seems to be the major factor for poor level of understanding and skill to set issues and prioritize projects widely observed in many of the authorities.

To sum up the main issues arising at local level are as follows:

- Merging multiple and incompatible functions a unique authority;
- Lacks and vagueness connected to the legal/regulatory framework governing the horizontal coordination and internal relations concerning the regulation of road safety, road use, right-of-way, environmental protections, social protections; and other regulatory responsibilities;
- Lack of qualified personnel, particularly at top level.

The main conclusion is that what has been achieved (or is going to be achieved) at national level, in terms of ability to guide and manage by public organizations, it is currently far to be achieved at local level. This means a real risk of fracture between the two levels of governance regarding the ability to implement the sectoral objectives.

10.2.2 The ongoing initiatives

According to the **MOT Ten Years Development Plan 2020-2029** recently officialised by the MOT, significant successes have been characterized the previous years in the capacity building of the sector, and a number of lacks have been detected as persisting gaps.

Various capacity building and organizational improvements have been made to increase the capacity of the workforce:

- short-term training and long-term training and education opportunities have been created for more than 6,000 employees (about 60% of the workforce employed by the Ministry of Transport and its affiliated institutions);
- there have been long-term educational and training activities provided by establishing working relationships with higher education institutions and preparing various educational packages. Among the long-term training and higher education applications are various road related engineering courses, train driver training, maritime law, transport planning management, master's degree in railway engineering, and road and railway construction and maintenance technicians;
- many organizational reforms and efforts to create a conducive work environment have been implemented by various institutions in the sector;
- the development of new proclamations, regulations, policies, strategies and transformation initiatives are expected to enhance the capacity of the sector to achieve its goals; among them can be mentioned the Civil Aviation Proclamation, Amendment, Civil Aviation Workers' Regulation, Air Transport Expansion and Access Regulation, National Logistics Council Establishment Regulation, Maritime Administration Proclamation, a road policy, a national

logistics strategy, the woreda transformation initiatives program, and toll road service using modern technology.

The following persisting gaps have been declared:

- Failures in increasing the human resource capacity of the sector;
- lack of funding for transport infrastructure construction (and consequent limitations for funding the capacity building connected to the investments);
- limited capacity for project management;
- limited capacity of contractors (contractors, consulting firms and transport service providers);
- lack of management system;
- lack of coordination among stakeholders in the sector;
- gaps in law and practice.

Even though quite generic in the formulation, the contents of the gaps seem to indicate that the capacity building in the transport sector is a war far to be won.

In general, the increasing of technical and professional competencies is something that never can be stopped, as the competencies are subject to obsolescence and need to be continuously updated. The point is if the different actors of the sector are able to provide autonomously to the competence building or if it is necessary a strong intervention from above/outside to force the inertial trajectory of the phenomenon.

It is strong belief of MOT that an active intervention is steel needed, and this is reflected on their programs. The Consultant totally shares this belief.

In terms of investments, some of the projects included in the budget of the ten years plan are specifically referable to the capacity building. They totalize an amount of 967 million ETB, (about 26 million USD), and are the following:

Table 102: Projects related to Capacity Building - Railway Transport Sector - S*ource: 10 Years Plan)*

Ongoing project	The owner of the project	The location of the project	Start Time	End date (s)	The allocated capital
Construction of the Kaliti Transport Management Traffic Safety Training Institute	n.a.	Addis Ababa	2011	2013	380,000,000 ETB
Projects in Research and Design/New project to be implemented					
Logistics Sector Capacity Building Project	Maritime Affairs Authority	Addis Ababa	2020	2027	77,113,692.08 ETB
Carry out construction of aviation training academy centre on campus	Ethiopian Civil Aviation Authority	Addis Ababa	1-Jan-25	1-Jan-29	500.00 Million ETB
Conducting Aviation Training Academy, Headquarters Museum, Simulate Fire Exercise Centre, Additional Buildings, Recreation Centre Design	Ethiopian Civil Aviation Authority	Addis Ababa	1-Jan-22	1-Jan-23	10.00 Million ETB

The **Five years investment Plan** declares the same investments in capacity building above mentioned, but is more detailed in terms of goal to be achieved in this domain. In particular, the goals declared, that are in connection with the capacity building concept, are the following:

Goal 30: Create capacity to cover 75% of maintenance, redevelopment and upgrade costs by extending the existing 2nd Generation Road Fund to the 3rd Generation Road Fund. A capacity building activity is envisaged in favor of the Fund Office and the Fund beneficiaries;

Goal 33: To increase the capacity of the rail sector by providing trainings to 2,971 trainees in various train operations and maintenance sectors; The main activities are:

- Complete 100% of Rail Academy Construction;
- Complete 100% completion of the ESTRIP project, which provides train academy training, tractor training and other software screws;

- Provide short and medium-term training to 850 trainees in the academy;
- Providing training to 123 trainees for automation of Awash-Kombolcha Hamburg Railway operation;
- provide full-time training to 1,998 trainees on various aspects of operation and maintenance in the management and management of the New-Djibouti Railway from the management contractor;
- Complete and implement 100% simulator installation for train drivers on the New-Djibouti Railway

Goal 34: Provide capacity building education (Diploma to PhD) and trainings to enhance capacity in the road transport sector. The main activities are:

- Providing educational opportunities to 370 professionals in the road transport sector;
- Evaluate 50% of the COC in Road Transportation Professionals
- Providing 170 different training courses on a pay scale, making it available to 4,020 employees;
- Spending 5% of the annual budget on capacity building in the form of payment;

Goal 36: Improve the transportation sector's service delivery and increase foreign exchange annual income from US $ 27.5 million to 47.2 million. Some related activities are:

- Collect US $ 40 million a year from Marine Services (training of overseas pilots, training ship registration and shipping)
- Expanding the Baccalaureate Training Academy at local universities;
- Develop and implement a ship registration system;
- Increasing the capacity of TVET institutions and working in partnership with higher education institutions

Goal 39 - Ensure the participation and benefit of women, youth and special needs communities and increase job creation in the sector. Some related activities are:

- Create job opportunities for 411,018 citizens in the transport sector;
- implement incentives and capacity building activities to increase the leadership role of women in the transport sector by 50%;

As it can be seen, the goals imply a number of actions and a magnitude of interventions (with additional costs of dozens of Million Dollars) that will require appropriate and professional setting and organization. The programs in the sectors of railways and of maritime appear particularly challenging.

Other facts and elements of analysis are provided by the **National Logistic Strategy of EMAA**.

In it can be read: "***Poor Quality and Low Competence of Logistics Service Providers*** *- One of the main challenges for different government organizations engaged in regulating the logistics sector is lack of institutional capacity to lead the sector based on knowledge and skills. In addition, the private logistics service providing companies including port and terminal operators have also challenges of shortage of appropriate qualified professionals. In this regard, integrated operations are required between customs clearing agents, freight forwarders, ship agents, transitors and ship agents in Djibouti. Though different institutions are providing training and qualification programs, these programs are disintegrated and incompatible with the required trade logistics performance of the country".*

In the same document, other elements of diagnosis are provided: ***"Logistics Service Providers & Regulators gaps on Institutionalization & Capacity****- Logistics service providers and various government organizations engaged in regulation and controlling have institutional organization and capacity shortcomings in leading the sector with the relevant knowledge and skills. There is no also legal basis for horizontal coordination and effective integration among logistics institutions."*

Also, URRAP program assessments, on local connections, has enlightened important shortcomings in capacity at local level and, accordingly, huge needs of capacity building activities.

Other ongoing capacity building initiatives have been detected (and probably many others are floating around):

- a tender for technical assistance is undergoing. It is the Technical *Assistance to Ethiopia's Transport and Logistics Sectors Project*, funded by the EU. It contains many elements of capacity building.
- two TOR have been drawn for the capacity building, the first for the MOT internal structure (Terms of Reference for the Procurement of Consultancy Services For Technical Assistance, Capacity Building and Training activities for Strengthening the Policy, Planning and Monitoring Functions of MOT) " and the second for the relationship between MOT and the Universities (Terms of Reference for the Procurement of Consultancy Services For technical assistance to develop a long-term program to improve MoT capacity through engaging with local Universities to develop corresponding curriculum, and supporting students in those programs on a pilot basis) and will be floated with the World Bank financial support;
- An additional intervention in capacity building is under study for the new Railway Safety Regulatory Body, also here with the involvement of the World Bank.

10.2.3 Diagnosis and Intervention lines

All the elements above reported compose a landscape that requires to be interpreted and addressed strategically. The relevant elements to be taken into considerations for a diagnosis are, on the consultant opinion, the following:

- the capacity building is considered a **key strategic tool** in all the compartments of the Transport sector;
- **considerable amount of resources has been devoted** during the last years for many capacity building, training and technical assistance initiatives in the sector. In particular, any physical investment effort has a component in it devoted to the capacity building.
- overall, the **transport sector has significantly benefited** of the interventions and has grown in quality and number of professionals;
- **The relevant effort not always has brought corresponding results**. The progresses are more evident in aviation, road administration and railways. In other sectors, where the role of private operators is dominant (freight transport, urban transport.) the gap is huge and the expectations are growing faster than the results;
- the capacity building programs that the MOT is launching in the short run are even **more challenging and relevant in terms of resources;**
- it is evident that most of the initiatives **come out bottom-up**, and there is a clear gap in terms of unitary and organic program **formulation** as well as of **coordination** among the different initiatives;
- the lack of coordination implies **loss of opportunities** in term of synergies and with risk of overlapping and mutual erosion;
- a further **gap is in terms of effectiveness of the intervention**, for reasons either of intervention design or for poor implementation;
- there is no evidence of evaluation of the capacity building programs and there is no presence of an homogeneous measurement methodology.

The diagnosis brings immediately on the next step of the Consultant work in the field of the capacity building. On the Consultant opinion what is needed is a **meta-intervention**, in the sense that the massive doses of capacity building, training for professionals and technical assistance that will be injected in the system must be accompanied by a strategy and a governance system of this type of intervention.

The contribution of the Consultant will be to study and propose actions able to create a management system and the best organization inside the MOT, to put the Ministry and H.E. the Minister in better condition to:

- exert an effective control and coordination of the many initiatives of capacity building ongoing;
- to define a strategy and a methodology to plan and perform future effective capacity building and training projects.

In particular, the Consultant will study the following issues:

a) the **Organization redesign** of the capacity building/human resources development unit in MOT, including the functions and responsibility definition, the number of resources required, their job description, skills and background of the required resources;
b) a **Management System**, including project management tools and coordination procedures between MOT and the Authorities/Companies under it.
c) an **Evaluation Methodology** for the measurement of the effectiveness of each capacity building/training intervention on a homogeneous base.
d) an **Implementation Strategy** that will focus on early wins, intermediate objectives and final achievements through a definition of phases of intervention.

In the due deliverable "National Transport Sector Strategy Document and Policy Note" the capacity building issue will have a specific focus.

10.3 TRAINING DURING THE MASTER PLAN ACTIVITIES

The training associated to a National Transport Plan has typically two main goals:

- to allow the contracting structure and the beneficiaries to have a full understanding of the proposed Plan, and to extract the maximum of the information contained in it;
- to support the contracting structure in the proper and professional use of the system of models built to define and check the national Transport Plan, in order to use directly and update overtime the models for future planning activities or for monitoring the National Transport Plan implementation.

The proposed training has the objective to match these two goals.

As stated in the technical offer, sstructured On-the-Job Training (OJT) with an overall intention of implementation of NITMP, on the job training to not more than 2 graduate civil engineers at a time (furnished by the Employer) shall be conducted to assist the MoT/ERA engineers in the process of reviewing designs, commenting on technical and contractual reports and in the preparation of the projects plan, and Implementation. It will be conducted by members of the Consultants' team in their respective professional field.

However, after the Covid 19 outbreak, and the consequent Emergency governance Plan proposed during the kick off meeting and approved, there is the risk that the training activity must be reconsidered in terms of modality. If the on-the-job training will not offer guarantees to be fruitful in presence of a scenario of mobility limitation, it will be opportune to switch to a distance training modality, that is more resilient in case of limiting situations.

In parallel with the installation on the ERA work station the TRANSCAD model, containing all the results of the National Master Plan, included monitoring indicators and selection criteria for the prioritized investment program, the two graduated civil engineers will be selected by the Managing Team of the Contract. Their names and references will have to be communicated, together with their CV's, at least two months before the start of the training, in order to allow the trainers to fine tune the teaching materials and the teaching methods to the trainee background.

The training will pertain all the planning tools that are in use to build the National Transport Master Plan and specifically:

- **TransCad - Transport Model on GIS Platform:** Geo-referenced network traffic calibration (present) and assignment in future horizons (2025, 2030, 2035, 2040), road network connectivity and accessibility analysis;
- QGIS for RAI calculation;
- **MCA Model**: Sustainability Eco/Financial/Social/Environmental Multicriteria Matrix.
- **HDM-4 & RED**: Vehicle Operating Costs, Road maintenance program, Economic Pre-Feasibility, Road Management Tool;

10.3.1 Training on-the-job

The elaboration of the Detailed National Transport Master Plan, will be facilitated by the use of different simulation and evaluation models. These same models will be object of the Consultant training activities to the stakeholder's experts:

- **TransCad - Transport Model on GIS Platform:** This model will be used for all the possible simulations of the transport system, under different sets of actions in different time horizons. This model is the core of planning and can evaluate the master plan effects on the general mobility of the nation. The model will be used in an iterative process, to represent at the best the present conditions and to forecast transport situations with and without master plan actions;
- **QGIS for RAI calculation**: this model elaborated by the Consultant and presented in Chapter 5, will be used to identify present rural accessibility problems and identify the appropriate interventions in the rural road network, in order to better satisfy rural people needs of mobility to access social services, market, job opportunities, etc.
- **MCA Model**: This model will be applied to compare different scenarios or strategy alternatives, on the base of their contribution to attain the national, transport or sub-sectoral objectives. This model is particularly appropriate where is not possible to quantify all the objective parameters and some of them need a more complex and qualitative evaluation. The MCA model needs the use of political weights and has to be conducted together with the Client and stakeholders to reach agreement on the relative importance of the different objectives (criteria).
- **CBA Model:** The Cost/Benefit Analysis will be used to evaluate major investments of the master plan under a financial and economic analysis. In particular, for road investments, the Consultant will use the World bank model **HDM-4,** which is able to minimize life-cycle total cost and optimize the road interventions. For rural roads the **RED model** will be used.
- For the actions that need major investments outlays, a **Risk & Sensitive Analysis** will be conducted. The risk analysis will use the Montecarlo simulation model for construction cost and traffic volumes.
- **EBM:** This Expenditure Budgeting Model will be used to optimize the master plan expenditures under annual budget constraints