Rwanda Transport Sector Review and Action Plan

AFRICAN DEVELOPMENT BANK GROUP

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Transport Sector Review and Action Plan - RWANDA

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Foreword

The transport sector is one of the key engines of growth in an economy. Improving the quality and reliability of transport infrastructure and services is a major building block for reducing transport costs, attracting domestic and foreign investment, and expanding access to economic opportunities. The Government of Rwanda recognizes that more needs to be done to address existing constraints in the transport sector and to offset the geographical bottlenecks which continue to drive the high transportation costs in Rwanda relative to the region. Indeed, an efficient transport sector is central to achieving the objectives of Rwanda's Vision 2020 whose overarching goal is to transform the country from a low-income agrarian economy to a medium income export-oriented and knowledge-based economy.

Realising the country's Vision will require addressing at least three key constraints. First, low investment in the development and maintenance of the physical infrastructure, and second, limited participation of the private sector in the development and financing of transport infrastructure. Third, insufficient public sector capacity to deliver the required transport services. Addressing these constraints will catalyse the development of modern transport infrastructure and services, contributing to a reduction in the cost of doing business and thus increasing the country's competitiveness.

Several policies and other interventions have been implemented by the Government to address the sector's challenges. All these interventions prioritize improving the quality and reliability of transport infrastructure and services which is critical for reducing transport costs, attracting investments, and contributing to the broader goals of inclusive growth by connecting rural communities to economic activities.

This study aims to complement these efforts by making three key contributions. First, it identifies the core transport infrastructure bottlenecks facing the country and options for mitigating these challenges. Second, it presents an action plan covering both the expansion of physical infrastructure and the development of sector structure, regulation, and institutional capacity; distinguishing between the short-and longer-term measures. Third, it identifies options for attracting private sector investment and financing including through public-private partnerships and concession arrangements are also identified. The action plan is expected to guide the preparation of the second Economic Development and Poverty Reduction Strategy and for informing dialogue on required reform measures. The study's recommendations are also expected to support growth that is more inclusive and also ensure that inclusive growth is sustainable through a gradual shift towards green growth, in line with the African Development Bank's Ten Year Strategy (2013-2022).

We hope that the study's findings will be used to inform the design and implementation of the required transport sector reforms and look forward to sustaining dialogue and collaboration with various stakeholders as we join hands to support Rwanda's economic transformation.

Vice President,
Country and Regional Operations and Policy
African Development Bank

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Abbreviations and Acronyms

AADT	Average Annual Daily Traffic
ADT	Average Daily Traffic
AfDB	African Development Bank
AMO	Aircraft Maintenance Organization
BOT	Build Operate and Transfer
CAAs	Civil Aviation Authorities
CAP	Corrective Action Plan
CASSOA	Civil Aviation Safety and Security Agency
CDS	Corridor Diagnostic Study
COMESA	Common Market for Eastern and Southern Africa
CPCS	CPCS Transcom Limited
CSP	Country Strategy Paper
DRC	Democratic Republic of Congo
EAC	East African Community
EDPRS	Economic Development and Poverty Reduction Strategy
ESIA	Environmental and Social Impact Assessment
EU	European Union
FAA ITS	Federal Aviation Administration Investigative Tracking System
GDP	Gross Domestic Product
GoR	Government of Rwanda
GVW	Gross Vehicle Weight
HDM-4	Highway Development & Management Model
HIMO	Haute Intensité de Main-d'œuvre (Labour-intensive public Works)
HIV/AIDS	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICD	Inland Container Depots
IFC	International Finance Corporation
IMT	Intermediate Means of Transport
IOSA	IATA Oversight Safety Audit
JKIA	Jomo Kenyatta International Airport
KIA	Kigali International Airport
KIST	Kigali Institute of Technology
KPC	Kenya Pipeline Company
KTC	Kisii Training Centre
LIPW	National Labour Intensive Public Works
MINAGRI	Ministry of Agriculture and Animal Resources
MINALOC	Ministry of Local Government
MINEAC	Ministry of East African Community
MINECOFIN	Ministry of Finance and Economic Planning

MINICOM	Ministry of Commerce, Trade, Industry, Tourism and Cooperatives
MININFRA	Ministry of Infrastructure
MININTER	Ministry of Internal Security
MINIRENA	Ministry of Natural Resources
MSCBP	Multi-Sector Capacity Building Programme
NIS	National Investment Strategy
NISR	National Institute for Statistics Rwanda
NTBs	Non-tariff Barriers
NTB	National Transport Board
NTP	National Transport Policy
OECD	Organisation for Economic Co-operation and Development
ONATRACOM	Office National De Transport En Commun
OTF	On the Frontier Group
PPP	Public-Private Partnership
RRA	Rwanda Revenue Authority
RCAA	Rwanda Civil Aviation Authority
REMA	Rwanda Environmental Management Authority
RMA	Rwanda Maritime Authority
RMCs	Regional Member Countries
RMF	Road Maintenance Fund
RMMS	Road Maintenance Management Systems
RTDA	Roads Transport Development Agency
RURA	Rwanda Utilities Regulatory Agency
SADC	Southern African Development Community
SMEs	Small & Medium Enterprises
SMS	Safety Management Systems
SSATP	Sub-Saharan Africa Transport Policy
SSC	ICAO Significant Safety Concern
STMP	Strategic Transport Master Plan
TCB	ICAO Technical Cooperation Bureau
USAID	United States Agency for International Development
VLC	Vehicle Load Control
VPD	Vehicles Per Day

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Executive Summary

The Government of Rwanda recognises the transport sector as one of the key drivers of growth. Improving the quality and reliability of transport is critical to reducing transport costs and attracting domestic and foreign investment in Rwanda. Due to existing constraints in the transport sector and geographical constraints, however, Rwanda has the highest transport costs in the region, estimated at 40% of the value of her imports or exports against 12% and 36% for Kenya and Uganda respectively.

Despite the implementation of several policies designed to improve performance, Rwanda's transport sector is still confronted with challenges including inadequate air transport infrastructure, lack of rail, water and pipeline transport, low capital and maintenance investments in unpaved roads, and delays along the two transport corridors to the ports of Mombasa and Dar es Salaam. It is against this background that the Government of Rwanda and the African Development Bank commissioned this study to undertake a comprehensive review of the transport sector to identify the opportunities, challenges, and threats and subsequently develop a prioritised action plan to guide investment in the sector for the period 2013-2030.

The study's primary objective is to complement the Government of Rwanda's efforts to address the country's transport challenges and also inform future African Development Bank's transport sector interventions in Rwanda. In particular, the study aims to develop a comprehensive and prioritised action plan to guide transport sector investments in Rwanda during the period 2013-2030.The study is expected to contribute to Rwanda's infrastructural development by providing a holistic solution to the existing deficiencies in the transport infrastructure and to the reduction of transport costs. In particular, the study maps the core national and regional transport infrastructure and service needs, identifies the required investments, and provides a prioritised investment action plan and possible financing options.

The study involved a review of current national and regional transport sector policies and strategy documents so as to identify relevant policy, legal, and institutional frameworks whose adoption can enhance the delivery of transport sector objectives. The study reviewed the Rwanda Vision 2020, the Transport Sector Policy, and the Strategic Transport Master Plan for Rwanda (STMP), Rwanda's Country Strategy Paper (CSP) prepared by the African Development Bank Group, Eastern Africa Regional Integration Strategic Paper (RISP), Economic Development and Poverty Reduction Strategy (EDRPS) II, Public Transport Policy and Strategy of Rwanda among other documents. The study also analysed the existing demand and supply in road, air, rail, water, and pipeline transport both at the domestic and regional levels. The existing opportunities and challenges were assessed and key action areas for improvement of the transport sector were identified.

The key action areas identified by the study include: (i) construction, rehabilitation and maintenance of national and regional transport infrastructure and services in all subsectors; (ii) building human capacity for the transport sector, especially in air, rail, and water transport; (iii) institutional strengthening through the development of various policy and regulatory instruments such as a long-term transport sector policy, like the recently approved public transport policy and strategy, allocation of new responsibilities to the existing authorities, (iv) enhancing private sector participation in Rwanda; and (v) developing a comprehensive monitoring and evaluation framework for the planned investment programme. Subsequently, projects and measures are proposed to address the identified transport challenges and priced sub-sector investment programmes have been prepared.

Recommendations on the Institutional and Regulatory Frameworks

1. **Rwanda Civil Aviation Authority (RCAA):** The dual functions of RCAA as the aviation regulator and manager of airports should be separated in the future so that RCAA can concentrate on regulation of airport opera-

tions, aviation safety and security oversight, economic regulation of air services and development of civil aviation. The management of airports should be the function of a separate authority, with the responsibility for development and maintenance of airport infrastructure, provision of rescue and fire-fighting equipment and services, and the provision of amenities and facilities for passengers and freight. Such division of responsibilities will open up opportunities for the private sector to participate in the development and operation of airports. At the moment this is not a mandatory ICAO requirement, but international best practice is heading toward that direction. This proposal is under consideration by the Government of Rwanda.

2. **Rwanda Transport Development Agency (RTDA):** Expansion of the mandate of RTDA to include urban transport development and participation in urban land use and transport planning is currently under consideration. In the short term, the mandate of the existing Road Safety and Environment Unit in RTDA should be expanded to cover the entire sector, and in the medium to long term this unit can be converted to become a national agency to enhance its effectiveness as transport safety matters cut across many national institutions. The responsibilities of the transport safety unit should include coordinating transport safety, overseeing security and incident management, working together with the other agencies responsible for transport, driver training and licensing, vehicle inspection, enforcement of traffic laws and security, health, and emergencies. The transport safety unit should have the capability to undertake road safety audits and accident investigation, as well as design mitigating measures. RTDA should also put in place an effective axle load control mechanism in line with the harmonization of the permissible load limits applied in the EAC. Axle load control laws and regulations, installation and operation of weigh-bridges at all the major border posts and on the national road network should also be implemented.
3. **Road Maintenance Fund (RMF):** The RMF has the right building blocks to become an effective "second-generation" road fund. Further transformation can be achieved by expanding the RMF's objectives to make them flexible enough to include undertaking Public-Private Partnerships in the long term for maintenance of roads. The RMF should also have a clear resource allocation formula for the various roads in the network and criteria for prioritising road funding.
4. **Rwanda Utilities Regulatory Agency (RURA):** RURA should participate more in the on-going harmonisation of Rwandan regulations with those of the EAC countries and lobby for the removal of non-tariff barriers along the Central and Northern Corridors. RURA's capacity should be enhanced for effective regulation of the railway, water, and pipeline transport sub-sectors. In order to increase passenger and freight service levels, improve reliability and reduce transport costs, RURA should have the capacity to put in place regulations that require transport providers to operate through registered associations/companies, as proposed in the recently approved public transport policy and strategy. Individual operators should only be allowed on roads with low passenger volumes. It should also be a requirement for the associations/companies to operate scheduled high-occupancy buses on licensed routes. Moreover, putting in place regulatory structures will further promote the development of the water transport sub-sector in the short term. The establishment of a maritime authority will become necessary as the water transport sub-sector develops.
5. **Rwanda National Police (RNP):** The capacity of the Rwanda Police should be enhanced to effectively enforce traffic laws and regulations so as to reduce accidents. In particular, RNP's capacity should be strengthened with additional modern equipment for road transport speed control, alcohol detectors and well-equipped emergency vehicles with rescue and communications equipment. In addition, RNP police should have the capacity to accurately collect, store and undertake accident investigations, and share accident statistics with other transport agencies to enable appropriate investment in measures that will contribute to transportation safety.
6. **The Ministry of Health.** Rwanda implements an Emergency Medical Assistance Service (SAMU) and hospitals are equipped with emergency facilities. However, improvements could achieved by ensuring that hospitals have better-equipped and better-trained paramedic

staff and trauma care centres capable of treating accident victims along the heavily-trafficked national highways and major towns.

7. Regulation of professional practice, registration and development through legislation is also recommended for the sound growth of both the public and private sector. The Government of Rwanda is already in the process of putting this in place.
8. The GoR should also consider creating a National Construction Authority to oversee the construction industry and coordinate its development. The key responsibilities of this authority would include undertaking research, prescribing the qualifications and other attributes required for registration as a contractor, encouraging standardisation and improvement of construction techniques and materials and encouraging continuing education. Work in this area is currently in progress.

Transport Investment Programme

The capacity building investment programme includes costs for: (i) training graduates, undergraduates, and technicians and even local communities (cooperatives/associations) in local and international academic institutions (ii) empowering women/disadvantaged to play an active role in the transport sector; (iii) developing strategies for integrated transport services (iv) developing technical standards, specifications, and strategies; institutional strengthening by the creation of new units and provision of equipment for effective service delivery (iv) facilitation of regional trade; and (v) setting up transport safety standards amongst others. The investment programme for improving the institutional and regulatory frameworks is estimated to cost about US$200 million and is proposed for short-term and medium term implementation (2013–2024).

The proposed investment in air transport covers the costs of: (i) expansion and rehabilitation of the Kigali International Airport and those at Rubavu and Kamembe (ii) establishment of an aviation training school and other human capital development (iii) provision of navigation services; (iv) design studies and cost of construction for the proposed Bugesera International Airport; and (v) purchase and hire of aircraft for national carrier RwandAir amongst others. Addressing the bottlenecks in the aviation sector is estimated to cost US$1,040.46 million with US$214.3 million required in the short term (2013 – 2018), US$491.4 million in the medium term (2019 – 2024), and US$294.75 million in the long term (2025 – 2030).

The water transport investment programme involves the development of Lake Kivu for local and international transport, detailed studies and development of Akagera River for regional transport. The investment is estimated to cost US$4.95 million in 2013 – 2018 and US$254.9 million for the development of the transport systems in 2019 – 2024.

Investment for the rehabilitation and construction of the new railway line from Dar es Salaam to Rwanda and Burundi is estimated at US$4.7 billion, consisting of about US$2.7 billion for construction of the new line from Isaka to Kigali in Rwanda and Musongati in Burundi and US$2 billion for the rehabilitation of the Dar es Salaam-Isaka line. Construction of the new railway line in Rwanda is estimated at US$650 million and provision of the rolling stock at US$475 million, bringing the total to US$1.125 billion. The investment is proposed for implementation in 2019 – 2024 and could be financed through a split-concession model consisting of (i) train operating concessions (TOCs) limited to financing of rolling stock for passengers or freight to certain sections of the new lines issued by respective national railway regulators; and (ii) infrastructure manager concessions (IMCs) to finance, build and maintain the rail infrastructure in each country through the respective governments of Tanzania, Rwanda, and Burundi. A study for the development of a new line from Kigali to Rubavu to Goma to Kampala should be undertaken in the short term.

In the short term, the Government of Rwanda should carry out feasibility studies and detailed designs of the Kampala

– Kigali – Bujumbura Pipeline and the Kigali – Muhanga – Rubavu and Huye – Rusizi pipelines. This is estimated to cost US$1.15 million. The development of the Kampala – Kigali-Bujumbura products line should be undertaken at an estimated cost of US$635.77 million in the medium term. In the long term, additional linkages to the Lake Kivu region from the Kigali – Bujumbura line can be undertaken at an estimated cost of US$500 million.

The investment programme for roads involves: (i) detailed studies for capacity and safety improvement of the international roads that link Rwanda with other neighbouring countries; (ii) construction of a ring road around Kigali City and other bypasses (iii) construction of high-capacity urban roads in Kigali City (iv) rehabilitation and upgrading of National and District roads class 1(v) improvement of District roads class 2.

The Public Transport investment programme includes: (i) construction of various facilities and infrastructure for city and inter-city transport such as: quality bus corridors, bus terminals and stops and integration with Non-Motorised Transport (ii) Construction of Dedicated Bus Lanes and Bus Rapid Transit facilities in Kigali City (iii) Construction of new bus terminals, stations and stops in Kigali City and upgrades to the existing ones.

A consolidated investment programme (Table 1) covering all sub-sectors have been identified and costs for its implementation in the short, medium and long term estimated.

Private Sector Participation

The private sector is expected to participate in the following potential projects:

1. ***Road Transport:*** Financing, design, operation and maintenance of weighbridge stations (traffic control centres); roadside amenities such as truck stops, passenger and freight transport services; and construction of public transport terminals.
2. ***Air Transport:*** Financing, design, operation, and maintenance of the proposed new airport at Bugesera, management of aerodromes in the provinces, and provision of domestic air transport services.
3. ***Rail Transport:*** Operation and maintenance of the proposed railway lines.
4. ***Pipeline Transport:*** Financing, design, operation and maintenance of the proposed Uganda-Rwanda pipeline.
5. ***Water Transport:*** Financing, operation and maintenance of ships and boats in Lake Kivu and possibly in the Akagera River.
6. ***Development of Multi-Modal Facilities*** in the vicinity of the City of Kigali.

Table 1: Consolidated Road Transport Infrastructure Investment Programme

Sub-sector/ Project	2013 - 2018	2019 - 2024	2025 - 2030	Total (US$ million)	Public Sector (US$ million)	Private Sector (US$ million)
Institutional/Capacity Building	174.05	27.0		201.05	201.5	0.00
Roads	1,729.0	2,322.6	2,961.0	7,012.64	7,012.64	0.00
Aviation	254.29	494.4	294.75	1,043.44	260.86	782.58
Pipeline	1.15	635.77	500	1,136.92	284.23	852.96
Rail	1.97	1,126.00	0	1127.97	281.99	845.98
Water	4.95	254.9	0	259.85	64.96	194.89
Border Posts and Weighbridges	134.6	0	0	134.6	134.6	-
Urban Transport and Multi-Modal Facilities	146.7	302.4	22.8	471.9		-
Total (US$)million	**2,446.71**	**5,136.07**	**3,483.80**	**11,388.37**	**8,240.78**	**2,676.41**

Preparation of identified projects, including economic and social analysis and justification, should be completed well ahead of implementation to minimise financial and technical risks, especially for those already identified for private sector participation

Funding

It is expected that the sources of funds for the investment programme will be the public sector, development partners and the private sector. Some of the strategies that should be considered for bridging the expected financing gap in the future include (i) improving efficiency so as to increase the funding available from existing budgets (ii) mobilising additional resources from domestic taxes and user charges (iii) lobbying development partners for additional support (iv) raising funds from the local stock markets and through infrastructure bonds (v) encouraging Public-Private Partnerships and (vi) adjusting the implementation plan to fit within the available funds. In order to succeed in raising private sector financing in the transport sector, the government will have to implement the following three-step approach more effectively: (i) laying the foundation by defining and measuring the depth and breadth of private sector opportunities (ii) developing the market for private sector finance and (iii) sustaining the private sector finance market.

Monitoring and Evaluation

A monitoring and evaluation framework has been developed for the implementation of the investment programme. Table 2 contains 2013 – 2018 indicative targets.

Cross-Cutting Issues

Overall, integration of environment, gender, poverty and other cross-cutting themes like youth employment can be effectively achieved if they are built into transport sector programmes and projects. Generally, measurement of progress toward these objectives in programmes and project reports is necessary to create a base for appropriate monitoring and evaluation. Strengthening these practices in Rwanda will facilitate funding by international partners, who are expected to report on cross-cutting themes in their national and regional programmes.

Inclusive Growth and Green Growth

Rwanda is considered a promising candidate for implementation of inclusive growth strategies and transition to green growth. Rwanda has in place a National Transport Policy (NTP) that envisions that infrastructure should be developed in a sustainable manner so as to reduce constraints to transport and promote sustainable economic growth and contribute to accelerated poverty reduction. The NTP's strategies that are consistent with the Bank's inclusive growth agenda as articulated in its 2013-2022 strategy include: (i) encouraging the private sector to play a greater role in the development of infrastructure and provision of transport services and (ii) involving and supporting local communities in the maintenance of rural access transport infrastructure. The Government of Rwanda has also developed a Green Growth and Climate Resilience Strategy (Vision 2050) that advocates for the implementation of climate-resilient transport systems.

Rwanda plans to reduce the heavy dependence on imported petroleum products in the transport sector through the use of locally produced bio-fuels, ethanol from solid wastes and methane from Lake Kivu. However, until cleaner and cheaper alternative fuels become readily available, the transport sector should focus on efficiency and travel demand management. In this respect, Rwanda will need to: (i) improve vehicle efficiency through vehicle and fuel quality regulations and taxation policies, especially in urban areas;(ii) provide incentives for mass transit and transport servicesand (ii) promote new technologies to reduce emissions, such as encouraging the use of hybrid vehicles.

The main interventions recommended in this Transport Sector Review and Action Plan is expected to contribute to inclusive growth and a gradual move towards green growth. Investments in road transport will be crucial as it is the dominant mode of transportation supporting all sectors

of the economy. The Action Plan also makes recommendations on how the government can continuously promote private sector participation in transport projects and has identified specific projects in which the private sector can effectively participate.

Rwanda's steep and hilly topography leaves it particularly susceptible to landslides and flooding, and makes it financially and technically challenging to provide adequate transport infrastructure and services. High population density coupled with dispersed human settlements further complicate the efficient provision of transport infrastructure and services. The government has embarked on the development of a land use planning strategy to guide human settlements and the efficient provision of transport infrastructure and services.

Moreover, ensuring sustainability will require ensuring that roads, railways and bridges are designed to be resilient to climatic conditions, especially flooding and storms. To the extent that resources will remain scarce in the short to medium term, investments will have to be prioritised to ensure value for money. Timely and systematic maintenance of transport infrastructure will also be essential in sustaining the expected benefits and ensuring access to transport services.

Transport Indicators

Outcome and impact indicators are required for the measurement of transport sector trends and also to allow for benchmarking against the regional, sub-regional and country levels. In the absence of dependable indicators, it is difficult for policy makers to determine transport priorities, track progress on infrastructure and services development, benchmark performance against peers and evaluate the impact of past investments.

For Rwanda, the proposed indicators at the national and sector level are contained in Tables 3 and 4 respectively.

Way Forward

Implementation of the proposed action plan will require the involvement of the Government of Rwanda, the private sector, and development partners. The government will be required to sustain its leadership including by continuing to initiate actions in all transport sub-sectors including roads, air, rail, water, and pipeline. Policy reviews, capacity building and setting the right investment climate and legal framework will also be a preserve of the government. Implementation of the action plan is expected to be a joint effort between the government, the development partners and the private sector.

Table 2: Indicative Monitoring Framework for Sub-Sector Short-Term Targets (2013-2018)

I.1 Air Transport (Total Investment = US$ 254.3 million)	
1	Establishment of Aviation Training Organization
2	Route expansion by RwandAir
3	Fleet expansion by RwandAir
4	Enhanced Safety and Security to Air Service: ACC & Automation Set up
5	Mateo Automation upgrade: SADIS
6	Improved Airspace Safety
7	Acquisition of CNS equipment: (Comms, Nav, Surv & data broadcasting)
8	ICAO Compliance
9	Infrastructure Upgrade: Resurfacing Kamembe Airport, Rwanda
10	Apron and Taxiway expansion of KIA
11	KIA Terminal Building expansion

12	Expropriation of Kamembe and Rubavu
13	Rubavu and Kamembe runway extension
14	Development of a Fuel Hydrant KIA
15	Installation of Navaids and Airfield Lights at Kamembe and Rubavu
16	Construction of a terminal at Rubavu and Kamembe
17	Development of a fuel firm at Kamembe and Rubavu
18	Land Acquisition for the Construction of the New Bugesera International Airport
19	Construction of Air Cargo Centre (ACC) and Commercial Mall
20	New Air transport regulatory authority created separating from airport operation
21	Capacity Building for Air transport sector
22	Development of Business Plan for all airports
I.2 Road Infrastructure (Total Investment = US$1,729.0 million)	
1	National strategic roads (RN1 – RN10): Economic analyses and prioritisation for capacity and safety improvements complete
2	680 km of selected national unpaved roads upgraded to bitumen standards
3	Acquisition of 5,200 km of road reserve for all classified roads
4	Feasibility Study on the Development of low-cost Toll Roads: RN4 from Musanze to Rubavu (Rubavu)
5	150 km of selected District Class 1 roads upgraded to bitumen standards
6	150 km of selected District roads upgraded to gravel standards
7	Upgrading 2,550km of District Class 2 roads to gravel standards
I.3 Urban Transport and Multi-Modal Facilities (Total Investment = US$146.7 million)	
1	Development of a business model for bus operation under route franchising approach for rural bus service
2	A new public limited company is fully operational to provide improved bus services in 98 rural routes
3	Consolidated public limited companies or operators' cooperatives working in the Public Transport Sector for Bus Services
4	Full tax rebate for importation large standard bus for public transport (approximately 292)
5	Development of a public transport fare policy
6	Review of Public Transport Regulations
7	Designing and bundling routes
8	Publication of route operators
9	Study on Parking Management Strategies for Kigali City
10	Implementation of Recommended Parking Strategies for Kigali City
11	Feasibility study and preliminary design on the construction of 3 town bypass roads in Huye, Muhanga and Musanze
12	Feasibility study and preliminary design on the construction of Kigali City Ring road cum Expressway

13	Development of standard bus routes and schedules for Kigali City
14	Development of a Business model for bus operation under route franchising approach for Kigali City
15	Pilot project of standard scheduled bus service and integrated ticketing system under a route franchising approach in Kigali City
16	30 km of Dedicated Bus Lanes (DBLs) for exclusive use by Dedicated Right-of-Way Buses in bus routes with expropriation;
17	Detail Design Study for a BRT system for Kigali City
18	Improvement of 650 bus shelters in Kigali City
19	100 Automated smart fare collection system in bus shelter
20	Integrated Smart ticketing system with micro processing ability (1000,000 cards)
21	Intersection upgrade (Queue jumps at 6 numbers of signalized interactions)
22	Intersection upgrade (Queue jumps at 7 numbers of Intersections)
23	Establishment of a Public Transport Operation control centre
24	Development of a Central Intercity Bus Terminal;
25	Development of Bus Sleeping Ground by upgrading existing taxi park
26	Establishing a new sleeping ground for bus
27	100 km of High Quality footpath on both side of roads with shade tree at 10 m interval including wheel chair access facilities for disables
28	Improvements to pedestrian access ways/tracks (100 km)
29	100 number of pedestrian crosswalks with signal
30	Development of 3 Park-and-ride facility (open lot parking) peripheral area
31	Development of Bicycle parking at 25 sites
32	82 km of City of Kigali unpaved roads upgraded to paved road for bus routes
33	Construction of a Grade Separated Intersection at Nyabugogo
34	Development of a Business Model and Detailed Design of Quality Bus Corridor Service for Intercity bus service
35	Quality Bus Corridor Service Pilot Project
36	Implementation of Quality Bus Corridor Service in 11 routes
37	140 km of all main roads in major urban centres have basic facilities for NMT and pedestrians
38	Feasibility Study and Detailed Design for a four lane divided highway from Kigali to New Bugesera International Airport
39	Acquisition of land for a six lane divided highway from Kigali to New Bugesera International Airport
40	Construction of 4 lane Divided Highway from Kigali to New Bugesera International Airport
1.4 Border Posts and Weighbridges Action Plan and targets (Total Investment = US$ 134.6 million)	
1	Feasibility Study, detailed design and development of 5 One-Stop Border Posts, i.e. 3 at primary border posts of Kagitumba, Rusumo and Akanyaru Haut and 2 at secondary border posts of Rusizi/Cyangugu and Cyanika Border Posts
2	Feasibility study, detailed design and construction of 4 Truck Stops/Roadside Stations
3	Approval of axle load control policy and strategy

4	Installation of weigh bridges at Akanyaru, Cyangugu, Gatuna, Rubavu and Rusumo Border Posts
1.5 Pipeline, Rail and Water Transport Action Plan and Targets (Total Investment = US$ 8.07 million)	
1	Kampala-Kigali-Bujumbura products pipeline feasibility studies and design completed
2	Kigali-Muhanga-Rubavu and Huye-Rusizi Pipelines feasibility studies completed
3	Kigali-Rubavu railway line feasibility study and detailed design completed
4	Development and Implementation of Lake Kivu Inland Waterway Transport System and Service
5	Akagera River Project feasibility studies and design completed

Table 3: National Level Transport Indicators

Indicator	Unit of measure	Frequency	Source
Passenger and freight transport costs along the Northern and Central Corridors, and within Rwanda	US$/km	Annually	Trade and Transport Coordination Authorities of the Northern and Central Corridors and RTDA
Density for paved and unpaved roads by District	km/km^2	Annually	RTDA
Number of persons employed in transport projects by category	No.	Monthly for every project	RTDA
Rural population living 5-10 km from all-weather roads (District roads)	No.	Annually	RTDA
Traffic volumes by category of traffic	No.	Biannually	RTDA, RCAA, RURA
Volume of passengers and freight	Available air/water/rail/ road passenger seats; Tonnes of freight	Biannually	RTDA, RCAA, RURA
Travel times on international and national roads including delays at ports, weighbridges, police checks and border posts	Hour	Biannually	Trade and Transport Coordination Authorities of the Northern and Central Corridors and RTDA
User charges (fares, licences, fuel levy charges)	US$/unit	Biannually	RRA, RMF, RURA
Urban population living within 0.5 – 1 km to a serviced public transport stage	No.	Biannually	RURA
Condition of infrastructure (Good, Fair, Poor)	% of total length/area	Annually	RTDA, RCAA

Table 4: Sector Level M&E Indicators

Indicator	Unit of measurement	Frequency	Data source
Unit rates for works, goods and services	US$/km; US$/unit	Annually	RTDA, RCAA, RURA
Length of airstrips, roads, ports, rehabilitated/ upgraded by category	Km/No.	Annually	RTDA, RCAA, RURA
Traffic accidents by category	No.	Annually	RTDA, RCAA, RURA, Rwanda Police
Congestion levels in urban areas (Queue lengths at major intersections)	m	Biannually	RTDA
Congestion levels in urban areas (congestion index from travel times)	%	Biannually	RTDA

CHAPTER 1: CONTEXT AND OBJECTIVES OF THE STUDY

1.1 Economic and Political Context

The government's long-term vision is to transform Rwanda from a low-income agrarian economy to a medium-income, export-oriented economy operating as a knowledge-based service hub by 2020. Moving from the current agricultural production and services sector economy, supported by heavy public investment and large aid flows, to the desired status captured in the country's vision will require the enhanced investment in public infrastructure including roads, rail, water and air transport.

An analysis of Rwanda's economic situation reveals some challenges to the realisation of the country's vision. These obstacles include low investment in the development and maintenance of the physical infrastructure; slow uptake of the private sector and insufficient capacity of the public sector to deliver the required services. Inadequate physical infrastructure is a major constraint to economic growth, human capital development and growth of export goods and services. In view of these factors, the Economic Development and Poverty Reduction Strategy (EDPRS) has identified as one of its flagship programmes economic transformation for employment creation and generation of exports.

The EDPRS, however, recognises that the private sector has made only limited contribution to the country's economic growth despite the fact that Rwanda has consistently received top-reformer ratings in the last five years. In 2011, the World Bank's Doing Business Survey rated Rwanda as the second-best reformer among 183 countries, having jumped progressively from the ranks of 143 to 67 to 45 in the last three years. The survey further indicates that it is easier, faster, and less expensive to do business in Rwanda. The Government of Rwanda (GoR) is committed to supporting private sector investment and has adopted, as an additional economic policy instrument, the use of Special Economic Zones (SEZ) to promote private investment. These zones require heavy investment in physical infrastructure.

Vision 2020, EDPRS and the Rwanda 2012-2016 Country Strategy Paper of the African Development Bank (AfDB) have all emphasised the importance of infrastructure development as a key driver toward achievement of the country's development aspirations. Indeed, Vision 2020 recognises physical infrastructure as one of the six interlinked pillars for achieving the national development goal. The Vision 2020 and the EDPRS, also view the rehabilitation and development of infrastructure (energy, transport, and ICT) as a catalyst for domestic and foreign investment. Adequate and modern transport infrastructure and services can contribute to lower transport costs in addition to reducing the high cost of doing business in Rwanda and with other countries. Improvement of the road transport infrastructure is particularly critical for Rwanda as a landlocked country that is still heavily dependent on the road transport infrastructure of neighbouring countries to access the ports for her imports and exports.

1.2 Transport Infrastructure and National Development

Improving the quality and reliability of transport infrastructure and services is critical to reducing transport costs and attracting domestic and foreign investment in Rwanda. An efficient transport system will also contribute to poverty reduction by facilitating access by rural communities to economic activities such as markets and social and other support services. Compared to her neighbours, Rwanda has the highest transport costs estimated at 40% of value of imports or exports; these costs are about 12% and 36% in Kenya and Uganda respectively. It is estimated that the transport cost between Mombasa and Uganda (and Rwanda) would reduce to about 25% if railway transport were used as an alternative to road transport (Kenya Economic Update – June 2012, Edition No. 6, and The World Bank).

The Government of Rwanda has put in place a number of policies and other interventions for improvement of the transport sector by addressing challenges related to infra-

structure development and maintenance and service provision. The main policies/frameworks for improvement of the transport sector are the National Transport Policy 2008 (i) the National Transport Sector Investment Strategy 2002 (NTSIS) (ii) the Integrated National Transport Strategy 2011–2015 and (iii) the Strategic Investment Programme (SIP).

The transport sector policy was developed with the aim of promoting the achievement of the national transport sector goals. The policy is aligned to the national development goals contained in Vision 2020, EDPRS and the National Investment Strategy (NIS). The transport sector policy also captures other development reference points such as the Millennium Development Goals (MDGs) and the action plan of the sub-Saharan Africa Transport Policy (SSATP) Programme.

The SIP in particular has given priority to six main interventions aimed at addressing the country's infrastructural bottlenecks. The specific interventions recommended for the transport sector are (i) construction and rehabilitation of a regional railway linking Rwanda to Burundi and Tanzania (ii) capitalisation of RwandAir and (iii) construction of the Bugesera International Airport.

1.3 Rationale and Objectives of the Study

In line with efforts by the Government of Rwanda to address the country's transport challenges alongside the African Development Bank's Rwanda 2012-2016 Country Strategy Paper (CSP), this study is aimed at developing a comprehensive and prioritised action plan to guide transport sector investments in Rwanda from 2013-2027.The study is expected to contribute to Rwanda's infrastructural development by providing a holistic solution to the existing challenges in the transport infrastructure and to the reduction of transport costs during the EDPRS-2 period (2013-2018) and beyond. In particular, the study maps the core national and regional transport infrastructure and service needs, identifies the required investments, and provides a prioritised investment action plan and possible financing options. It also identifies the resource limitations of institutions in the transport sector that need to be addressed to effectively implement the proposed action plan. The action plan developed by this study outlines the investment needs for air, road, water, pipeline and railway transport; public and private financing options for each sub-sector; and a phased implementation programme.

A monitoring and evaluation framework is provided to enable the tracking of implementation progress.

Several studies have been undertaken in the past, but none has been as comprehensive as the current one, which covers all of the following issues:

1. Development, rehabilitation and maintenance of the entire road transport network (national, district class 1 and 2 roads)
2. Identification of the sources and options for mobilising the funding required for the development and maintenance of transport infrastructure and services
3. Development of an investment action plan based on prioritisation criteria, complementary roles of the various transport modes and resource requirements
4. Development of a monitoring and evaluation framework with indicators and targets for tracking the performance of transport sector development

The specific objectives of the study were as follows:

1. Identify the core transport infrastructure bottlenecks in Rwanda and options for mitigating those challenges
2. Quantify current and projected passenger and freight demand,the size and condition of existing transport infrastructure and transport services in both rural and urban areas and ongoing interventions by GoR and partners
3. Quantify the financial requirements for addressing these bottlenecks and advise on the options for mobilising these resources including direct private sector investment and Public-Private Partnerships among others

4. Assess the adequacy of transport sector policies and strategies and the role, structure and capacity of the institutions and agencies involved in the implementation of investment and development programmes in the sector
5. Prioritise transport sector investments an clearly identify the short-, medium-, and long-term needs
6. Identify the complementary investments in transport (for instance, import and trade facilitation) required in Regional Member Countries (RMCs) bordering Rwanda, and in particular Rwanda's trading partners and RMCs which provide the country with access to the sea, and make recommendations on how these investments can be effectively coordinated and integrated to maximise benefits, economies of scale and synergies.

1.4 Approach and Methodology

The study involved a comprehensive review of current national and regional transport sector policy and strategic documents to identify the relevant policy, legal, and institutional frameworks for the delivery of transport sector objectives. The documents reviewed included, but were not limited to, Vision 2020, Strategic Transport Master Plan for Rwanda (STMP), the African Development Bank Group's Rwanda CSP and Eastern Africa Regional Integration Strategic Paper (RISP).

The study also undertook analyses of the strengths, weaknesses, opportunities, and constraints/threats related to the entire transport sector and to the various sub-sectors and made recommendations on how existing strengths and opportunities in the sector could be mobilised to minimise or eliminate the challenges. An investment programme for the whole sector was then compiled and the required financing estimated for each sub-sector. Probable sources of funding were investigated and recommendations made on what activities can be funded from the public and private sectors.

An action plan of interventions was then developed and prioritised using criteria such as (i) expected economic and social benefits (ii) level of project preparation and (iii) financial constraints. A list of performance indicators for the sector to help in monitoring the main objective of reducing transport costs in Rwanda was developed.

1.5 Structure of the Report

The report is organised into eight chapters as follows:

Chapter 1 provides an overview of the economic and political context of Rwanda, rationale and objectives of the study, and the approach and methodology used in the study.

Chapter 2 examines the policies guiding the transport sector and current strategies for improvement, legislations and regulations and institutions in the sector and their responsibilities. It also includes a section on sector financing framework.

Chapter 3 analyses the status of the transport sector in terms of demand and supply, on-going and planned projects and the key issues that need to be addressed by examining the strengths, weaknesses, opportunities and threats (SWOT) for each sub-sector. The chapter also provides an action plan for the broad areas of intervention.

Chapter 4 provides an investment framework for the transport sector which includes development of an integrated transport policy; human and institutional capacity building; enhancing private sector participation; and developing a monitoring and evaluation framework.

Chapter 5 discusses transport impacts to environment, gender and poverty, and how they should be taken into account in transport projects and programmes.

Chapter 6 discusses the financing options available for the proposed transport sector investment programme.

Chapter 7 summarises the Monitoring and Evaluation framework for the transport sector.

Chapter 8 reviews some implementation arrangements and the way forward.

The report ends with a list of information sources to which users may refer for more details.

CHAPTER 2: OVERVIEW OF THE TRANSPORT SECTOR

2.1 Introduction

This chapter examines policies and strategies guiding the transport sector, legislation and regulations, institutions in the sector and their responsibilities, and sector financing mechanisms.

2.2 Policy Framework

Transport sector policies and strategies are elaborated in the National Transport Policy (NTP) of 2008, which was the basis of the on-going sectoral reforms. The main objective of the NTP is to strengthen institutional and legal frameworks to support the creation of a favourable environment for the development of the transportation sector. The transport policy is also meant to consolidate the achievements of the National Investment Strategy (NIS) adopted in 2002.

The vision of the NTP is "to gain under Vision 2020 modern infrastructure and cost-effective and quality services with due regard to safety and environmental concerns," and to ensure "that the infrastructure should be developed in a sustainable manner to support economic growth of the country, mobility of the population and serve as a "pivot" for exchange of goods and services at national and regional level. The mission is "to reduce constraints to transport in order to promote sustainable economic growth and contribute to poverty reduction".

The strategies for implementation of the NTP include (i) encouraging the private sector to play a greater role in the development of infrastructure and provision of transport services (ii) supporting the provincial and district administrations in the implementation of the decentralisation policy (iii) supporting the local communities in the maintenance of rural access transport infrastructure (iv) developing the sector to benefit from and contribute to the regional integration initiatives and (v) developing institutional and human resource capacities for a vibrant transport sector in future.

The policy outlines the desired institutional framework for the transport sector with the Ministry of Infrastructure (MININFRA) being responsible for sector policies and strategies. The implementation of programmes for the entire sector was assigned to the National Transport Board (NTB), created by an Act of Parliament. The NTB, which is now known as the Rwanda Transport Development Agency, is expected to operate as a semi-autonomous body under MININFRA, to which it will be bound by a performance contract. The policy also recommends establishment of semi-autonomous agencies responsible for transport services, sector regulations and maintenance of the national road network. The management of district class 1 and 2 roads is the responsibility of the local administration in conformity with the decentralisation policy that empowers people at the local level to manage their own development programmes. All these provisions are at various stages of implementation.

The NTP recognises the importance of human resource capacity and provides for the establishment of a capacity building programme to equip the sector with qualitative and quantitative human resources as well as a sufficiently strong institutional background to enhance the achievement of the government's development objectives as outlined in the EDPRS and Vision 2020.The policy also allows for coordination and consultation with development partners during planning and preparation of sector policies, strategies and programmes to enable development partners to align their support with the sector priorities. The responsibility for planning and management of the sector are to be undertaken according to a Sector Wide Approach (SWAP).

The NTP in its current state, however, does not address the development of multi-modal facilities necessary for integration of the various transport modes. In addition, the existing urban land use planning and transport development policies are not clearly articulated to ensure that urban development takes place in an orderly manner. Also excluded are policies to encourage private sector participation in the transport sector, especially in provision of passenger and freight services. The transport policy is not clear on strategies for the development of district class 1 and 2 roads.

For instance, it does not explicitly provide for the use of local resources such as domestic labour, materials, equipment and finance. This study attempted to address some of these shortcomings.

In addition to the National Transport Policy, the Road Maintenance Strategy serves the following functions: (i) provides a policy framework to guide the Road Transport Board/ District staff in maintenance planning, programming and execution of road maintenance (ii) ensures that the investments made in the development of road infrastructure are safeguarded and allowed to deliver their maximum benefit and (iii) enables stakeholders to understand the investment decisions taken by MININFRA. The strategy envisages that road maintenance will be undertaken in a planned and organised manner on the basis of road condition, traffic data and an established priority system.

2.3 Legal Framework

The Roads Act (2012)[1] provides for road network reserves, classification and management. It allows for the acquisition and protection of the necessary land for road developments. The Act specifies a wider carriageway and road reserve to enable the application of uniform national standards for all roads of the same classification; accommodation of other utilities like water, communication and electricity lines, as well as future expansion as demand grows.

Implementing the Roads Act will require additional funds to cater for acquisition of land for road reserves; widening of existing narrow roads; construction of new, wider roads and the subsequent maintenance costs; and relocation of communities living within the areas specified as road reserves. These costs will need to be included as part of future road infrastructure development and maintenance. Phased implementation of the Roads Act could provide the option of reducing the potential increase in road investment costs in the short-term. Road reserves, for instance, could be acquired as and when the candidate road is rehabilitated or upgraded as traffic levels increase.

2.4 Institutional Framework

The National Transport Policy gives MININFRA the responsibility for overall supervision of the transport sector agencies; development of transport policy and strategic planning; creation of an enabling transport environment; and the setting of transport rules, regulations and standards. The implementing agencies under the MININFRA are the Rwanda Civil Aviation Authority (RCAA) for air transport and the Rwanda Transport Development Agency (RTDA) for road, water, rail and pipeline transport.

The RCAA is responsible for the management of civil aviation operations in conformity with the International Civil Aviation Organisation (ICAO) and other international standards. The Authority sets regulations for all civil aviation services and constructs and maintains airport infrastructure. The dual roles of RCAA of developing and operating airports and regulation are inconsistent with best practices as it may compromise safety oversight and service delivery roles.

The mandate of RTDA includes implementation of transport sector policies and project management. The Agency is responsible for transport sector planning, project design including environmental and social impact assessments, and quality control and assurance. The RTDA is, however, not responsible for urban transport and also lacks the capacity to handle the anticipated expansion into water and rail transport.

The Rwanda Utilities Regulatory Agency (RURA) has the mandate of regulation of public utilities including transportation of goods and persons by all modes of transport. It is the responsibility of RURA to ensure that there is fair competition in the market, enhance quality of services provided to the consumers and ensure that operators comply with

1 Roads will be in two classes: class 1 roads are the national, district and urban roads; and class 2 are other roads in districts and urban centres. Class 1 roads shall have 3.5m wide lanes and 44m road reserves, while class 2 roads shall have 3m wide lanes and 24m road reserves.

national transport service laws and regulations. The Ministry of Local Government (MINALOC) is responsible for the planning, development, and maintenance of transport infrastructure and services within local authorities. The Ministry of East African Community (MINEAC), in collaboration with MININFRA, coordinates the planning and development of regional policies and transport infrastructure.

The Ministry of Internal Security (MININTER), through the Rwanda Police, has the responsibilities of enforcing traffic laws and regulations, and collecting road traffic accident data. The Ministry of Natural Resources (MINIRENA) reviews and approves Environmental and Social Impact Assessments (ESIA) and monitors implementation of ESIA mitigation measures in transport infrastructure projects.

2.5 Financing Framework

While transport sector financing is generally allocated through the national budget, the road sector has a specific Road Maintenance Fund (RMF) under MININFRA, which is responsible for the actual management and distribution of funds for maintenance of public roads. The RMF is still in its formative years, but it appears to have the right building blocks for a successful "second-generation" road fund.

The Fund derives revenue mainly from a fuel levy (about 69.4%), transit road tolls (about 28.6%) and fines for contravention of traffic laws and regulations. These funds are collected by the Rwanda Revenue Authority (RRA) and regularly transferred to the RMF for allocation to the RTDA and City of Kigali. However, the RMF needs to put in place a clear resource allocation formula and prioritisation criteria for various classes of roads.

2.6 Conclusion and Recommendations

The foregoing analysis indicates that the existing transport policy and legal framework requires harmonisation for effective implementation, especially with the emerging railway and water transport sub-sectors. This study, therefore, makes the following recommendations:

1. **Rwanda Civil Aviation Authority (RCAA):** The dual functions of RCAA as the aviation regulator and management of airports should be separated in the future so that RCAA can concentrate on regulation of airport operations, aviation safety and security oversight, economic regulation of air services, and development of civil aviation. The management of airports should be the function of a separate authority, with the responsibility for development and maintenance of airport infrastructure, provision of rescue and fire fighting equipment and services, and, provision of amenities and facilities for passengers and freight. Such division of responsibilities will open up opportunities for the private sector to participate in the development and operation of airports. At the moment, this is not an ICAO requirement, but international good practice is heading that direction.

2. The mandate of RTDA should be expanded to include urban transport development and participation in urban land use and transport planning. The capacity of RTDA should also be enhanced so that it can effectively undertake its responsibilities in railway and water transport.

3. There should be a clear resource allocation formula for the various roads in the network in addition to a road funding prioritisation criteria consisting of (i) maintenance; (ii) cost of RMF administration; (iii) road safety; and (iv) counterpart funding to donor-financed road rehabilitation, improvement, and minor road upgrading projects.

4. RURA should closely engage in cross-border (regional) transport along the Northern and Central corridors. This will ensure that RURA actively participates in the on-going harmonisation of Rwandan regulations with those of the EAC countries and lobbies for the removal of non-tariff barriers. RURA should also have the responsibility of regulating railway, water and pipeline transport.

CHAPTER 3: STATUS OF TRANSPORT SECTOR

3.1 Introduction

This chapter analyses the status of the transport sector in terms of the current demand and supply, the on-going and planned projects, and the key issues that need to be addressed from the analysis of strengths, weaknesses, opportunities, and threats (SWOT) for each sub-sector.

3.2 Air Transport

3.2.1 Current Demand and Supply

International air transportation in Rwanda is currently limited to the Kigali International Airport (KIA), which has experienced appreciable growth in traffic over the years. Between 2007 and 2010, aircraft movements at the KIA increased by 38% while passenger volumes increased by 34%. A higher increase in aircraft movements compared to passenger volumes was perhaps because RwandAir continued to operate smaller aircraft at higher frequencies since mid-2005[2]. This resulted in a reduction in average seats and passengers per aircraft and an increase in aircraft movements.

In 2010, KIA handled 14,766 aircraft movements including 11,174 passenger and combination aircraft, which transported 314,230 passengers and 6,352 metric tonnes of international cargo. The passenger traffic growth rate was about 15% between 2009 and 2010, increasing from the 13.5% rate of 2007 and 2008.The passenger growth rates at KIA were substantially higher than those realised at the Jomo Kenyatta International Airport (JKIA) in Nairobi, Kenya, of 2.9% between 2007-8 and 2008-9 and 6.7% between 2008-9 and 2009-10. However, the load of 21 passengers per aircraft was only 30% of the value experienced at JKIA and 40% of that at the Moi International Airport in Mombasa, Kenya. The annual freight transport volume of 6,352 tonnes was also much lower than JKIA's 245, 275 tonnes.

The high traffic growth rates being experienced in Rwanda may be attributed to the general growth of the economy, but more so to the decision by the government to establish RwandAir in 2002. Rwanda Airways established as a national carrier with the main aim of improving performance of the KIA through increased competition, connections and seat availability. RwandAir currently owns and operates four Boeing 737 aircraft, two CRJs and one Dash8-200. It flies the East African Community (EAC) region, Johannesburg, Lagos, Libreville, Brazzaville and Dubai routes. The airline also has code-share agreements with SN Brussels on the Kigali-Brussels sector and with Ethiopian Airlines on the Kigali-Addis Ababa sector.

Despite the high growth experienced in international traffic, domestic traffic accounted for only 3.4% of the total passenger volume and no domestic freight traffic was recorded in 2010. The bad state of infrastructure at the Kamembe, Rubavu, Musanze, Huye, and Nemba airports is a major constraint to the development of domestic air transport in Rwanda. However, RwandAir recently started operating the only scheduled domestic services linking Kigali with Cyangugu/Kamembe and Rubavu. This is in line with international aviation practice that domestic air service remains reserved for carriers owned and registered in a country. This could change in the future as the EAC states continue with their integration.

Despite the impressive growth in international air traffic in Rwanda, it is still insufficient to attract or require substantial private sector participation. Akagera Aviation, a private company, currently provides various aviation services including helicopter charters for tourism and emergency medical services, helicopter maintenance, pilot training, and aerial support solutions for mining and geographical surveys and wild life and park management. The continued participation of the public-owned agencies (RCAA and RwandAir) in the provision of air transport infrastructure and services is still the most viable option as it enables these organisations to grow and build the required capacity to handle the expected vibrant aviation industry in Rwanda. The expected growth of passenger and cargo volumes is likely to attract private sector participation in some aspects of aviation.

2 New Kigali Airport – Master Plan, 2006.

3.2.2 Future Demand and Supply

The high air traffic growth rates are expected to continue in Rwanda with some projections indicating that the capacity of the KIA is likely to be achieved in 2015. The predicted medium-term growth of traffic volumes in Rwanda are estimated at about 1.3 million passengers, 15,500 tonnes of cargo and 17,712 aircraft movements per year by 2025[3]. In principle, the single runway at KIA can handle 18 aircraft per hour if the spacing is greater than 5 nautical miles. This can only be possible if the runway has two right angle exit/entrance taxiways[4].

Although some extra capacity can be realised at the KIA through extension of the terminal building and apron, the hilly terrain and airport's proximity to the City of Kigali are major physical constraints. In the short term, Rwanda has embarked on the rehabilitation and upgrading of existing infrastructure at the KIA, improving services and increasing the aircraft fleet operated by RwandaAir to boost passenger loads and cargo volumes. Other opportunities exist for Rwanda to increase passenger and freight volumes through promotion and investment in tourism and agricultural produce[5] consisting of perishable goods like horticultural produce, seafood and animal products.

In the medium and long term, Rwanda has embarked on a project involving the construction of a world-class international airport at Bugesera through Public Private Partnership (PPP). Feasibility studies have projected positive outcomes but detailed studies are currently in progress. It is expected that the new airport will eventually become the central African air transport hub in addition to providing international links for Rwanda's exports, imports and tourism. The airport is expected to exploit the country's strategic central location between eastern and western African countries for regional trade in addition to offering employment opportunities for.

The New Kigali Master Plan of 2006 proposes that the airport should be developed in three phases. The first phase will involve construction of passenger and cargo terminal buildings, a 4.2km long runway, an airfield and other buildings and the facilities meant to support the operation of an international airport including an air traffic control tower and airport rescue and fire-fighting facilities. The current estimated cost for the first phase is about US$630 million[6], which is expected to be financed through a 25-year PPP concession contract. This phase of airport development is predicated on passenger forecasts of approximately 1.3 million per year and 18 aircraft movements at peak hours by 2025. The second and third phases are provisionally provided for further expansion as growth materialises (basically, additional taxiways and exits) with the ultimate phase involving the construction of a second runway and additional passenger and cargo terminals to facilitate the processing of an additional 82 aircraft movements at peak hours and annual passenger throughput of 50–60 million.

3.2.3 Critical Issues in Air Transport

Commendable progress has been made since 2008 in addressing these bottlenecks. The government, for instance, has enacted a law governing civil aviation and introduced a Presidential Order relating to Rwanda civil aviation regulations. The other measures undertaken include (i) RCAA recruitment of qualified staff to carry out safety oversight functions in flight operations, airworthiness, air navigation services, aerodromes and aviation security (ii) development of a training policy and programme (based on FAA ITS programme) (iii) development of technical guidance material in the form of orders (for RCAA Inspectors) and advisory circulars (for industry) and (iv) the establishment and implementation of a surveillance programme.

The RCAA is also working closely with other regional civil aviation authorities (CAAs) under the East African Community's Civil Aviation Safety and Security Agency (CASSOA) in order to share available resources in areas where there

3 New Kigali Airport – Master Plan, 2006.
4 The Master Plan for the new Kigali International Airport, 2006.
5 Ministry of Trade and Industry in collaboration with the National Agriculture Export Board is already investing in tourism and agricultural export promotion.
6 Estimates provided by the RCAA in 2012.

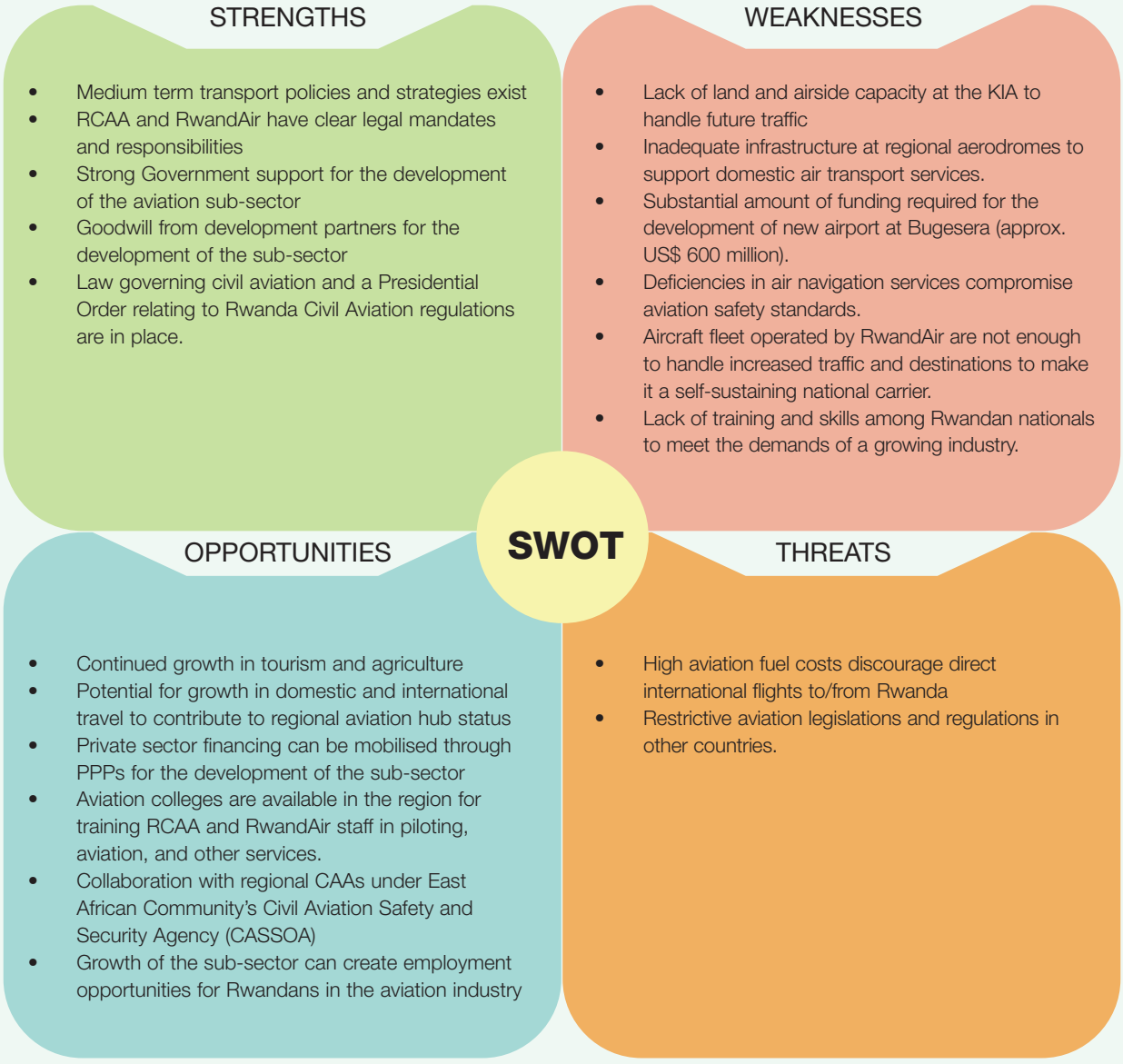
are shortfalls. Further, the RCAA engaged ICAO Cooperation Bureau (ICB) for six months (December 2011-May 2012) to address deficiencies in air navigation services. The agency also conducts regular safety inspections and audits to ensure that safety is not compromised in addition to organising regular safety awareness workshops for all stakeholders on their regulatory roles.

Preliminary conclusions from the ICAO audit report of 2012 indicate that RCAA has successfully passed the audit as all safety concerns have been addressed. However, a number of challenges, typical of many countries in the region, remain. These include: inadequacies in human capacity, as well as infrastructure and service provision. The current human capacity gap in the aviation industry is a major constraint that should be addressed urgently. Lack of adequate numbers of qualified technical personnel to conduct surveillance and resolve safety concerns, as well as certified air operators, were some of the issues identified during the 2007 audit by the ICAO, which still need attention.

3.2.4 Strengths, Challenges, Opportunities and Threats

The key strengths and challenges and opportunities and threats in the air transport sub-sector are summarised in Figure 3.1.

Figure 3.1: SWOT of the Air Transport Sub-sector



The high fuel costs can be mitigated by developing an oil pipeline, while challenges related to restrictive legislation can be addressed in collaboration with the regional economic communities, and lobbying countries to fully implement the Yamoussoukro Declaration on liberalisation of access to air transport markets in Africa. As outlined in (v) below, some of the on-going projects will address the existing challenges while additional interventions are proposed by this study.

3.2.5 On-going and Planned Projects

The on-going and planned projects are expected to address the identified challenges and spur further growth of the aviation industry in Rwanda. On-going and planned projects for 2013–2017 include: (i) enhancing the safety and security of air services (ii) airport infrastructure expansion and upgrading and maintaining facilities to international standards (iii) strengthening legal and institutional capacity and improving the service delivery system (iv) building the capacity of RwandAir by increasing aircraft fleet and staff, obtaining and maintaining IATA Oversight Safety Audit (IOSA) certification, and obtaining full Aircraft Maintenance Organization (AMO) certification (iv) capacity building through partnerships with aviation educational institutions and facilitating the establishment of aviation training organisations such as flying schools, maintenance training organisations and (v) promoting and implementing the Yamoussoukro Declaration. The detailed design of the new Bugesera Airport is also planned for completion, and construction should be at an advanced stage by 2017.

Additional interventions in air transport include increasing cargo handling facilities, building an aircraft maintenance hangar and rehabilitating regional aerodromes that have the potential for promoting tourism and export of perishable agricultural products. Also to be considered is the rehabilitation of the runways and aprons of aerodromes like Kamembe airport in Cyangugu, Rubavu and other airstrips based on their potential to serve domestic traffic and support growth of international traffic. In addition, the possibility of constructing at least two turn-off ramps at the KIA so that aircraft do not necessarily have to use a turning bay at the end of the runway should also be explored. This development will help maximise the use of the runway during peak hours.

3.3 Road Transport Infrastructure

3.3.1 Current and Future Demand

Road transport is the dominant mode of travel in Rwanda, catering for the bulk of domestic passenger travel and freight traffic demands. The main freight on Rwandan roads consists of agricultural products, construction materials, household goods, foodstuffs and minerals. Estimates of the 2010 passenger traffic volumes contained in the STMP of Rwanda indicate that many roads have low levels of traffic (Figure 3.2).

The roads with the highest passenger volumes of 2,000 to 4,000 per day are RN1 between Kigali, Muhanga and Ruhango and RN3 between Kigali and Rwamagana. Many roads have passenger traffic volumes of 1,000-2,000 per day including those between Kigali, Gicumbi and Rubavu; Rwamagana and Kibungo; Ruhango, Huye and Karongi; and Kayonza and Ryabega.

The high-volume roads are the cross-border highways, which provide links to the country's major production and economically active regions. The remaining road links have passenger volumes of less than1,000 per day. Freight traffic routes are similar to those of passengers with the main routes being those between Kigali and the towns of Muhanga, Rwamagana and Base.

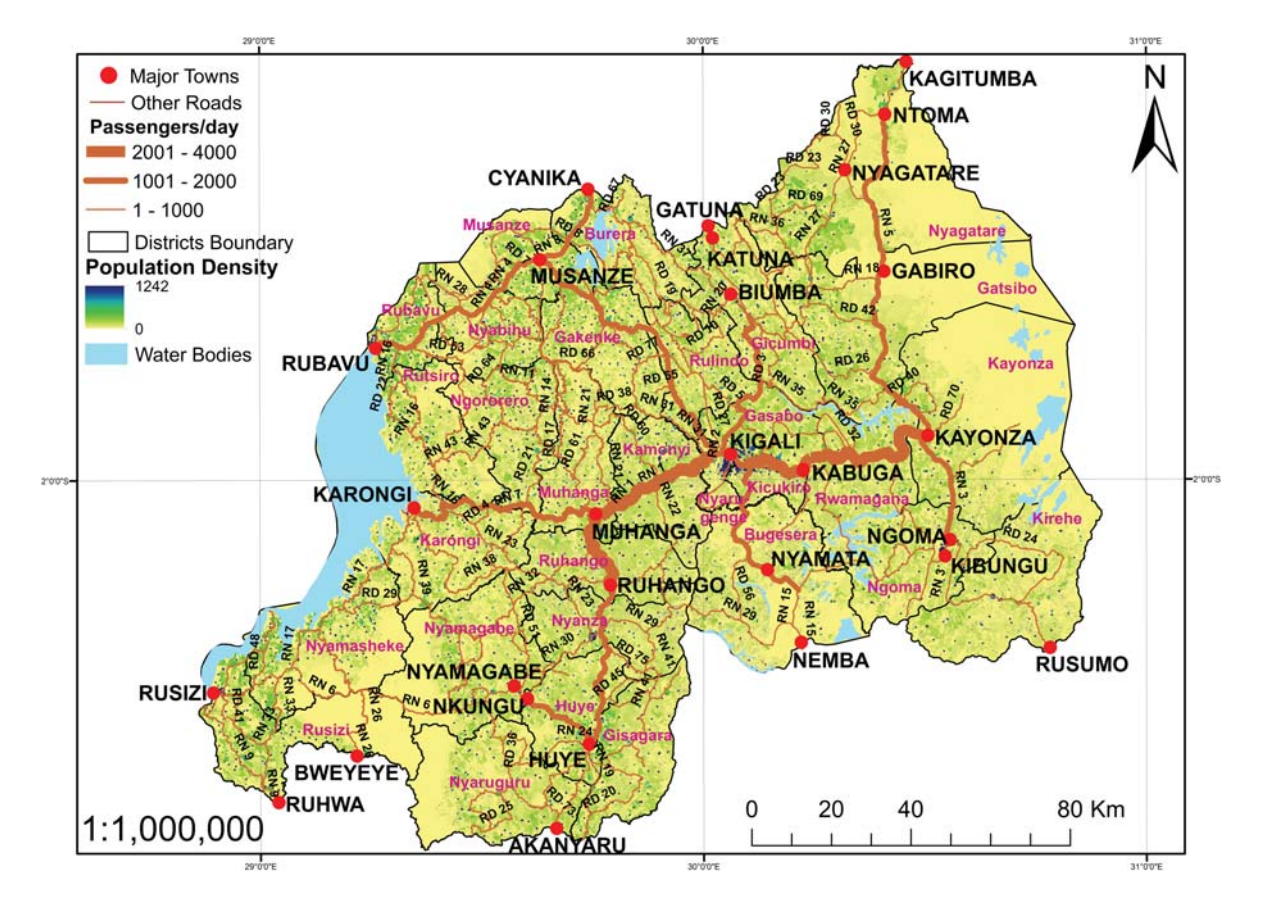
Passenger volumes are expected to increase at the projected population growth rates of 2.3% or slightly higher, while freight volumes will depend on economic growth rates and expansion of the range and volume of the main goods being transported. Such growth is expected to average about 10%. The 2010 traffic volumes across the main borders of Rwanda and the neighbouring countries and projections for 2020 at an expected growth rate of 7.5% are given in Table 3.1.

Table 3.1: Cross-border Road Traffic Volumes between Rwanda and Neighbouring Countries

Country	Vehicles per day		Freight (tonnes/day)			
	2010	2020	2010		2020	
			In	Out	In	Out
Kenya	55	85	240	30	495	60
Uganda	375	585	2,490	495	5,130	1,020
DRC	260	358	1,020	375	2,010	770
Burundi	140	220	555	90	1,140	185
Tanzania	58	87	555	60	1,140	125

Source: Strategic Transport Master Plan for Rwanda, Final Report, 2012 (submitted for approval by GoR)

Figure 3.2: Road Transport Passenger Traffic Volumes in 2010



Source: Population densities from www.afripop.org and roads from www.diva-gis.org

The STMP revealed that the paved national road network was operating at an undesirable level of service of between E and F, the lowest grades according to the Highway Capacity Manual (HCM)[7]. The level of service is a quantitative stratification of a performance measure or measures that represent quality of service. Level "A" represents the best level of service from the user's perspective, while "F" is the worst.

It should be noted that the HCM criteria assigns a LOS E and F to a traffic stream with speeds of less than 64 km/h. The apparent low levels of service calculated in the

7 Published by the Transport Research Board, Washington DC, 2010.

STMP study may therefore have been due to low speeds (less than 64 km/hour) but not because of lack of passing lanes. In addition, the current law restricts speeds to 80 km/h. Low speeds on Rwandan roads are due to mountainous terrain that makes it expensive to provide wider, more level roads that would meet higher levels of service.

3.3.2 Current and Future Supply

Rwanda has a high road density of 0.53 km/km^2, which almost matches the weighted average for Africa of 0.57km/km^2. However, this high road density may be a consequence of the mountainous terrain, which requires long, meandering roads. Another factor is the dispersed human settlement pattern on the ridges. The lengths of the various classes of roads in Rwanda are contained in Table 3.2 below.

Rural Transport Infrastructure

According to a survey by RTDA in 2011, 1,201 km of roads were paved and about 98% were in good condition. Another 32% of the unpaved national and 15% of the district road networks were in good condition.

Table 3.2: Total Length of Roads in Rwanda

Type of Roads		Length (km)
Classified	Paved National Roads	1,075
	Unpaved National Roads	1,785
	Unpaved District Roads	1,838
Total Length of Classified Roads		**4,698**
City of Kigali Roads	Paved Roads	153
	Unpaved Roads[8]	864
Total Length of Roads in Kigali		**1,017**
Unpaved Roads		8,285
Grand Total Road Length in Rwanda		**14,000**

Source: Transport Sector Strategic Plan for EDPRS II, Draft Report, MININFRA, November 2012

These results indicate that the unpaved classified road network is in an unacceptable condition of service and is therefore a major constraint to effective connectivity.

The condition of district roads Class 2 was unknown but is expected to be below acceptable levels because little or no periodic maintenance was being undertaken. In addition, the "Farm to Market" studies commissioned by USAID and undertaken by OTF Group consultants in 2009 revealed that an inventory of district roads Class 2 was not available. However, the district roads Class 2 network is estimated to cover 8,285 km. It is therefore clear that more should be invested to improve the condition of unpaved and district road networks.

The on-going and planned road projects are summarised in Tables 3.3, 3.4 and 3.5. Most of the projects fall in the categories of international and national trunk roads classified as RN 1 to RN 17.

The other projects are for the national unpaved, district, and unclassified roads. Most of the work includes rehabilitation, routine maintenance, installation of traffic signs and upgrading. There is also a number of emergency work in progress, mainly involving slope stabilisation, road embankment repairs and filling of potholes through direct government funding and the RMF.

Table 3.6 is a summary of on-going and completed road projects supported by the development partners.

3.3.3 Critical Issues in Road Infrastructure

Apart from the low quality of unpaved national and districts roads, other critical issues include lack of an appropriate road classification system, a lack of national standards and manuals, axle load control and planning data necessary for proper management of the network. Some of these are discussed below.

8 Estimate

Table 3.3: On-going Work on Paved National Roads

Road No.	Work
RN1	Installation of traffic signs
RN2	Rehabilitation
RN3	Multi-year maintenance on Kayonza-Rusumo section
RN4	Rehabilitation of Kigali-Musanze section
RN5	Multi-year maintenance on Kayonza-Kagitumba, installation of traffic signs planned
RN7	Multi-year periodic maintenance
RN9	Routine maintenance
RN10	Rehabilitation
RN11	Routine maintenance
RN15	Routine maintenance
RN17	Upgrading to paved road

Source: RTDA, November 2012

Table 3.4: On-going Work on Unpaved National Roads

Road No.	Works
RN 14	Procurement for periodic maintenance under process (Nyakinama-Vunga-Satinsyi)
RN 21	Periodic maintenance
RN 23	Recurrent maintenance
RN 24	Final acceptance of periodic maintenance works
RN 25	Recurrent maintenance
RN 26	Periodic maintenance
RN 28	Periodic maintenance and rehabilitation
RN 29	Periodic maintenance and rehabilitation (Ruhuha-Gasoro)
RN 31	Recurrent maintenance
RN 32	Recurrent maintenance on Byimana-Kaduha and rehabilitation of Kaduha-Kitabi
RN 34	Recurrent maintenance (Kibungo Ramiro)
RN 35	Recurrent maintenance
RN 36	Recurrent maintenance (Maya-Rushaki-Muhambo)
RN 37	Recurrent maintenance
RN 39	Recurrent maintenance on Mudasomwa- Gisovu, rehabilitation and periodic maintenance of Gishyita-Gisovu
RN 40	Rehabilitation and periodic maintenance
RN 42	Periodic maintenance and rehabilitation
RN 43	Periodic maintenance
RN 6	Procurement for Rehabilitation Lot2: Kitabi Crete Congo/Nil (30 km)
RN 16	Procurement for Lot6 and for Lot7 on-going
RN 17a	Procurement for Lot4 and for Lot5 on-going

Source: RTDA, November 2012

Table 3.5: On-going Work on District and Unclassified Roads

Road ID.	Work
Access road to Karongi Tea Factory(15 km)	Rehabilitation/ construction
Road Kivu Muganza tea Factory(18 km)	Rehabilitation/construction
Road to Gatare Tea Factory (22 km)	Rehabilitation/construction
Gisovu -Kivugiza (25km)	Rehabilitation/construction
Road to Nshili Tea Factory (17km)	Rehabilitation/construction
Road to Sorwathe (46km)	Rehabilitation/construction
Ngororero(21 Km)	Recurrent maintenance
Kavumu-Rubaya-Kabaya	Recurrent maintenance
Taba Urban Roads	Construction
Rwamagana Gasabo(District road RD 32)	Rehabilitation/construction
Nyankora Milindi-Nasho	Recurrent maintenance
Brasserie- Nkora	Recurrent maintenance

Source: RTDA, November 2012

Table 3.6: On-going and Recently Completed Road Work Supported by Development Partners

Project name	Financier	Status
Improvement work for Kibugabuga-Ruhuha Road project	African Development Bank	78%
Kigali-Musanze Road Rehabilitation Project	World Bank	97%
Multinational Burundi-Rwanda Cyangugu (Rusizi)-Ntendezi-Mwityazo (50 km)	African Development Bank	48%
Rehabilitation of Rusizi urban roads and heavy truck bridge at Rusizi II River, Lots 1, 2 and 3	European Union	Lot 1 - 25% Lot 2 – 69% Lot 3 – 80%
Rehabilitation of Bugarama - Ruhwa road	African Development Bank	100%
Slope rehabilitation and pavement reinstatement at PK 28 of Bugarama-Ruhwa road	African Development Bank	100%
Kigali Urban Roads Upgrading Project (36 km)	China Exim Bank	100%
Rehabilitation of Ngororero-Mukamira	BADEA	100%
Crete Congo/Nil-Ntendezi	African Development Bank	100%
Construction of the road to Tumba College of Technology	JICA	0%
Rehabilitation of Kigali-Gatuna road	European Union	10%

Source: RTDA, November 2012

Road Classification System

A road classification is necessary for prioritisation of investment. Making decisions about the specific roads to be paved, the standard required and where most investment is required helps policy makers allocate the limited resources in a manner that will help achieve optimal results. Rwanda currently applies a simple classification system which categorises roads as trunk, district and rural. Rwanda should, however, develop and implement a function-based road classification system which also includes strategies for development and maintenance. Such a classification system should form the basis for prioritisation of investment and maintenance. For example, the strategy for prioritisation of national roads for upgrading, rehabilitation and maintenance should be based on the importance of these roads for the following functions:

1. Providing travel between Kigali and the main international borders and provincial towns
2. Enhancing national connectivity by linking the main production and consumption areas in the country
3. Enhancing multi-modal transport systems that are important for national and international modal integration
4. Addressing inequity in resource distribution that has left certain areas in abject poverty
5. Serving high traffic levels and their importance to international and national trade

Design Standards and Manuals

This kind of classification will also help to establish design standards and the levels of service that should be provided by a given road class. Adopting this approach may require a review of the Roads Act 2012 to provide for a more function-based classification system.

Along with the anticipated classification scheme, there is also need to develop technical manuals, guidelines and standards for planning and design and operation/maintenance of road infrastructure. These are necessary for ensuring application of uniform standards based on road class, as well as project quality control and assurance. The standards should include those for feasibility studies; preliminary and detailed designs; construction material testing; work specifications and maintenance procedures and manuals.

Vehicle Axle Load Control

Overloading of vehicles along the road network contributes to premature failure of the pavement structure and increases the costs of maintenance. A 2010 study undertaken by the MININFRA on the national paved roads revealed that heavy goods vehicles with three axles had the highest percentages of overloading. The study established that 5% (from Kigali) and 25% (to Kigali) of axles weighed had between 12 and 14 metric tonnes, exceeding the permissible load limit of 10 metric tonnes.

The East African Community (EAC) Partner States had long recognised this problem and put into place independent rules and regulations to control vehicle loads as a way of reducing road maintenance costs. Unfortunately, a balance between trade facilitation and the protection of road infrastructure has not been achieved due to the lack of a harmonised approach to the vehicle load control problem. Following recent studies undertaken in the EAC states, the EAC Council of Ministers in February 2012 approved a draft EAC Axle Load Control (VLC) Act 2012, for discussion and ratification by the EAC Legislative Council. The EAC VLC Act proposes to increase the permissible gross vehicle weight (GVW) limit to 56 tonnes within the EAC. This development will require harmonisation of axle load limits within the EAC trunk road network and will contribute towards reducing road freight transport costs through elimination of restrictive national laws and weighbridge fines and controls.

Rwanda should put in place an effective axle load control mechanism, which should include harmonising permissible load limits with those to be applied in the EAC, axle load control laws and regulations, installation and operation of weighbridges at all the major border posts and on the national road network.

3.3.4 Strengths, Challenges, Opportunities and Threats

The key strengths and challenges and opportunities and threats relating to the development of road transport infrastructure are summarised in Figure 3.3.

In compliance with the Roads Act 2012 and adherence to national design standards, issues related to low qual-

Figure 3.3: SWOT for Road Infrastructure Development and Maintenance

ity construction and maintenance will be addressed. The threat of heavy axle loads should be addressed by having weighbridges on major national roads near Kigali and at the main entry border posts.

3.4 Road Transport Services

3.4.1 Current Demand and Supply

Statistics compiled by the National Institute for Statistics Rwanda (NISR) and also by the Rwanda Revenue Authority (RRA) indicate a substantial increase in the registration of passenger and freight vehicles between 2004 and 2010. The total number of motor vehicles increased from 30,158 to 88,621 during this period with the majority being motor-cycles at 38,521 units in 2010.The annual motorised vehicle growth rates, however, declined from about 25% in 2005 to 7% in 2010. Over the six-year period, the number of buses increased from 56 to 397, semi-trailer trucks from 64 to 178 and motor cycles from 6,740 to 38,521. Trailer trucks recorded minimal growth from 533 units to 694 units over the same period. Rwanda Revenue Authority data in August 2012 (Table 3.7) indicate that the total number of registered vehicles has increased to 118,656, and motor-

cycles continue to record the highest growth. The number of trucks has also increased by a large margin to 3,849.

A traffic survey conducted in February 2010 on some paved national roads in Rwanda revealed that only four roads (apart from the City of Kigali) had average daily traffic (ADT) volumes of more than 2,000 vehicles per day (vpd) [Table 3.8]. The highest traffic flow of 4,334 vpd was recorded along the RN3 between Kigali and Rusumo.

Considering the low traffic volumes, the low levels of service currently experienced along rural roads may be attributed to factors like restrictive geometric alignment and narrow road widths that limit higher travel speeds, resulting in lower levels of service. It should also be noted that the mountainous terrain also imposes financial restrictions on road widths.

Table 3.7: Total Number of Registered Vehicles in Rwanda as at August 2012

Vehicle type	No.
Cars	21,422
Pick –ups	13,834
Jeeps	15,254
Minibuses	5,451
Buses	511
Trucks	3,849
Motor cycles	57,650
Others	685
TOTAL	**118,656**

Source: Rwanda Revenue Authority, August 2012

3.4.2 Public Transport Services

Road-based passenger transport services are provided by both the private sector and a public company called Office National des Transports Commune (ONATRACOM).According to the Transport Sector Strategic Plan for EDPRS II, individual operators and 41 companies including ONATRACOM provides capacity for 72,264 passengers for public transport services in Rwanda. Out of the total supply capacity, individual operators are the dominant providing 70% of the total seat capacity using vehicles of 18 seats and below.

ONATRACOM serves Kigali (about 15% of services), major provincial towns (57%) and rural routes (28%). In principle, ONATRACOM has the obligation of serving routes that are unattractive to the private sector providers and often withdraws from those that are over-supplied with private sector operators. Both services, however, share some characteristics such as operating without timetables, running uncoordinated services and having no prescribed passenger service levels. ONATRACOM will continue to play the role of connecting remote areas until such a time that these areas become profitable to the private sector.

Public transport services in urban areas (mainly Kigali) are confronted with a number of problems, which include a lack of dedicated facilities, uncoordinated services, and congestion at the terminals and along the city roads. Supply is by low-capacity vehicles which are not suitable for urban public transport. However, just like in rural areas, the scattered settlement pattern in Kigali and other towns makes provision of high-occupancy mass transport difficult.

Table 3.8: Year 2010 Traffic Volumes on Some Paved Roads

Road ID	Section	Length (km)	Average daily traffic (without motorcycles) (vpd)
RN1	Gitarama-Kamonyi	25	2,386
	Mukoni–Huye	126	3,020
RN2	Gatsatsa–Kibuye	7	3,038
RN3	Kanombe-Rugende	18	4,334
	Rugende-Rusumo	30	2,093
RN4	Kiryi–Musanze	93	2,408

Source: Technical Assistance for Institutional Capacity Building in Road Maintenance and Auditing of Programs to the MININFRA and the Road Authority, Egis BCEOM International, 2010.

In rural areas, farmers rely predominantly on walking and intermediate means of transport (IMT) in the form of head loading, bicycles, human drawn carts or motorbikes to transport their produce to the market. The use of motorised vehicles such as trucks and buses is constrained by the deteriorated condition of district Class 1 and 2 roads.

3.4.3 Critical Issues in Road Transport Services

Most transport in both rural and urban areas takes place on foot, motorcycles and IMT. Low levels of affordability and a lack of good infrastructure often leave the majority of the population with IMT as the only modes of transport. Infrastructure for IMT is also neglected in the planning, design, maintenance and development of road networks. In Kigali, key issues include: insufficient bus routes, absence of integrated ticketing and revenue-sharing mechanisms for public transport service in a multi-route and multi-operator environment and a lack of dedicated bus lanes to give public transport priority.

The national freight service providers are all from the private sector. Small pick-up trucks are the preferred mode of transport for short-distance delivery, while larger trucks are used for consignments for import and export along the major national roads. Rwanda's limited capacity to generate a balance between imports and exports has forced many truck return trips to be empty. The import or export haul often bears the full cost burden of the round trip.

According to the Rwanda Diagnostic Study of 2005, freight service providers face many challenges that have made their business uncompetitive. These include: (i) high cost of freight transport vehicles (ii) operation of small fleets that do not benefit from economies of scale in logistics and pricing (iii) poor mechanical condition of vehicles, leading to high operating costs that are in turn passed on to the consumers. The domestic road freight industry is deregulated and imposes no licensing requirements for transport operators. This is an area that RURA is currently addressing to create regulated competition. The Government of Rwanda adopted a Public Transport Policy and Strategy for Rwanda in October 2012 to address the existing and future transport challenges for road transport services and Non-Motorised Transport (NMT). The strategy, discussed in detailed in Chapter 4, is developed to improve public transport over a period of 20 years.

3.4.4 Strengths, Challenges, Opportunities and Threats

The key strengths and challenges and opportunities and threats relating to road transport services are summarised in Figure 3.4.

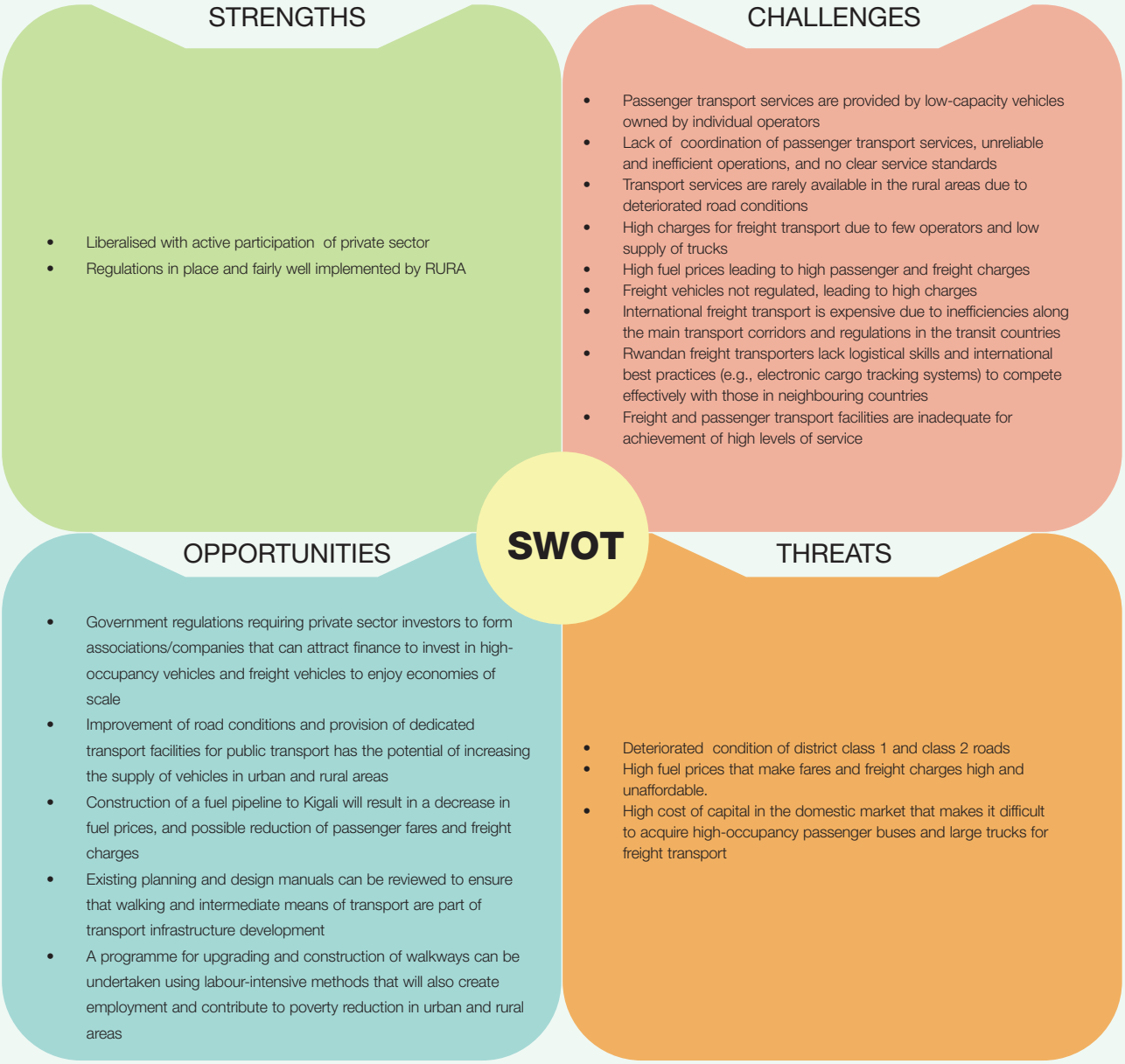
The many opportunities can be used to improve passenger and freight transport and address the few threats. All the issues relating to road transport services should be addressed in tandem with improved infrastructure conditions.

3.4.5 Road Transport Regulations, Safety and Controls

3.4.5.1 Regulations on Passenger and Freight Transport Services

As already mentioned, the basic function of the Rwanda Utilities Regulatory Agency (RURA) is to ensure fair competition in the market, quality service, and compliance of operators with national transport service laws and regulations. In order to increase passenger and freight service levels, improve reliability, and reduce transport costs, RURA should have the capacity to put in place regulations that require transport providers to operate through registered associations/companies. Individual operators should only be allowed on roads with low passenger volumes. It should also be a requirement for the associations/companies to operate scheduled high-occupancy buses on licensed routes. In the long term, RURA could develop more regulations for tendering routes through competitive bidding. This action will require RURA to undertake surveys to establish passenger travel demand on heavily trafficked routes to prepare appropriate tenders.

Figure 3.4: SWOT for Road Transport Services



3.4.5.2 Road Safety

An increase in transport accidents is a major undesirable outcome of transport infrastructure and services improvement. As access to transport facilities and services increase, there will be need to improve mechanisms preventing and reducing the severity and frequency of accidents. Transportation safety is particularly critical in road transport because motorised and non-motorised traffic often share the same space while having differing operating speeds, knowledge of traffic regulations and levels of protection.

According to MININFRA, the total number of road accidents between 2007 and 2010 more than doubled, increasing by 2,486 accidents. During the same period, the percentage of severe accidents decreased from about32% to 26%. In 2007 and 2010, there were about760 and 1,170 severe accidents in Rwanda. MININFRA and RTDA also estimated a total of 308 and 445 road-related deaths in 2007 and 2010. In 2010, pickups accounted for 1,944 accidents while cars and motorcycles accounted for 1,684 and 1,442 accidents respectively.

In the short term, a transport safety unit, similar to that in Kenya, should be established within the RTDA. In the medium to long term this unit can be converted to become a national agency to enhance its effectiveness as transport safety matters cut across many national institutions. The responsibilities of the transport safety unit should include coordinating transport safety, overseeing security and incident management, working with the other agencies responsible for transport, driver training and licensing, vehicle inspection, enforcement of traffic laws and security, health, and emergencies. The transport safety unit should have the capability to undertake road safety audits and accident investigation, and design mitigating measures.

The capacity of the Rwanda Police should be enhanced to effectively enforce traffic laws and regulations to reduce traffic accidents. In particular, the police should be given additional modern equipment for road transport speed control, alcohol detectors, and emergency vehicles with rescue and communications gear. In addition, the police should have the capacity to accurately collect, store and share accident statistics with other transport agencies to enable appropriate investment in measures that will contribute to transportation safety. The Ministry of Health should also have well-equipped and well-trained paramedic staff and trauma care centres capable of handling accident victims along the highly-trafficked national highways and major towns.

3.5 Water Transport

3.5.1 Current Demand and Supply

Currently there are neither significant inland water transport infrastructures nor services in Rwanda. The development of Lake Kivu transport project in Western Province and the feasibility of Akagera River transport project between Kagitumba in the Northern Province and Lake Victoria are currently under consideration by the Government of Rwanda.

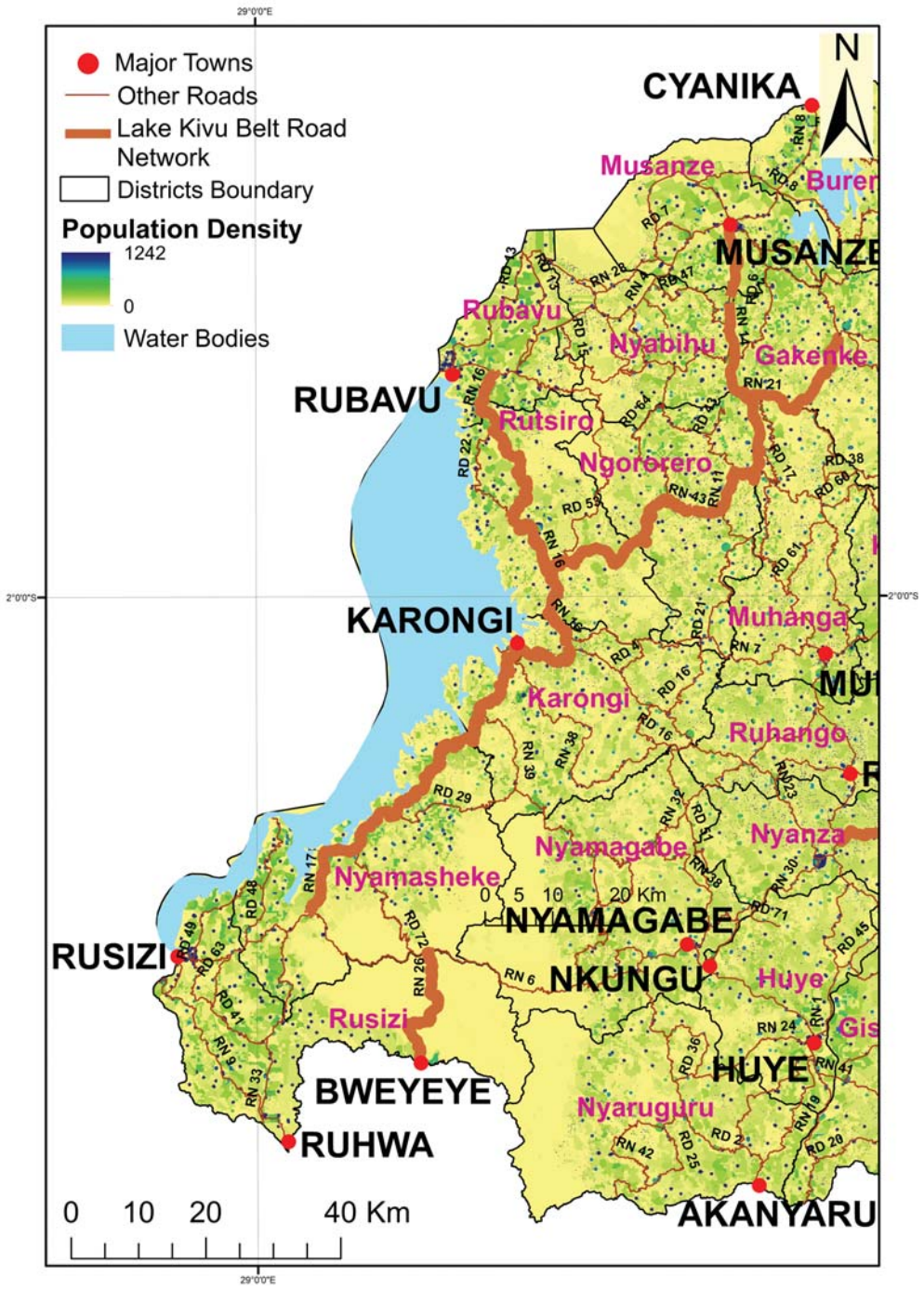
3.5.2 Future Demand and Supply

Economic and technical feasibility studies undertaken in 2010 (by KNUD E Hansen A/S and ASEC Consult) concluded that the Lake Kivu project is economically viable and should be developed. Economic analysis of the project produced an internal rate of return (IRR) of 20%, a net present value (NPV) of US$638 million, and payback time of five years. The expected socioeconomic benefits from the proposed development include employment creation, opening up the Western Province for tourism and the hotel industry, and increase in trade between Rwanda and the Democratic Republic of Congo. However, the instability in eastern DRC could undermine the development of the Lake Kivu project and more generally, Rwanda's potential of becoming a regional economic and logistics hub. However, security measures being implemented by the Rwanda Defence Forces jointly with the marine operating on Lake Kivu are expected to minimize the impact of conflicts in eastern DRC.
Moreover, the signing in February 2013 of the UN-brokered Peace, Security and Cooperation Framework for DRC and ten other countries including Rwanda is an initial but fundamental step towards a lasting solution to the regional instability.

The proposed Lake Kivu Transport project has a target of transporting an estimated 200 passengers and 10 to 15 tonnes of freight daily. It will involve the construction of three main ports at Rubavu, Karongi, and Rusizi and four small terminals at Nkora, Mugonero, Kirambo and Nyamirundi. Construction at each main port will include a warehouse with a security guard service and an office for the Rwanda Revenue Authority for customs control of imported goods, the Immigration and Migrations services and a police post. The ship repair workshop will be located at the headquarters in Rubavu.

The estimated total cost of the project is US$12.12 million for infrastructure and supply of vessels. It is expected that the vessels and the four terminals (76% of total cost) will be financed by a special-purpose company with public and private shareholdings, while the port buildings and ship

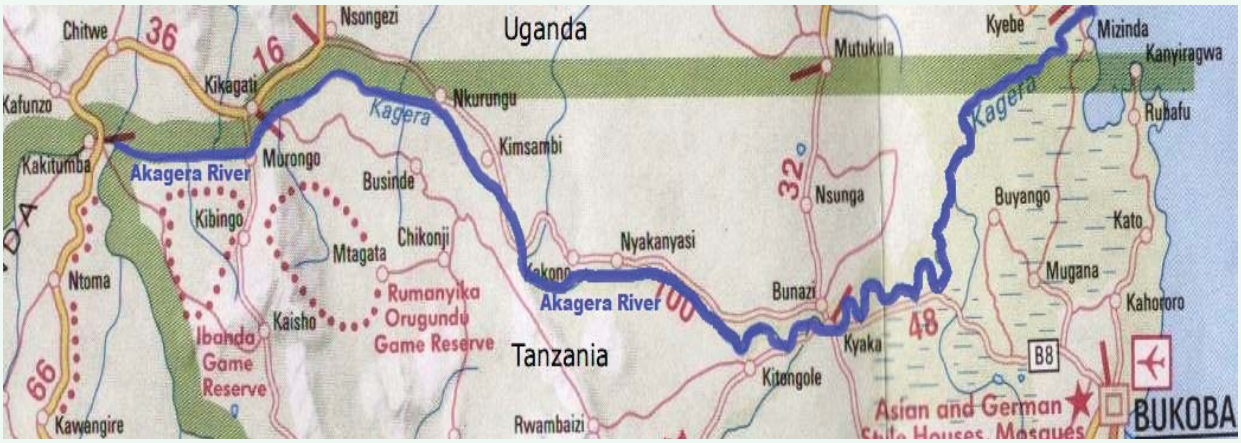
Figure 3.5: Lake Kivu Road Network Map



Source: Population densities from www.afripop.org and roads from www.diva-gis.org

terminals will be financed by the Government of Rwanda. The project will require the establishment of the Rwanda Maritime Authority (RMA) as the regulatory authority, the development of maritime regulations, navigation charts and appropriate training and technical assistance to RMA. The success of the Lake Kivu project will depend on the development and maintenance of the road link from Rubavu – Kibuye – Cyangugu – Rusizi (RN16, RN17 and RN 6) and several other national roads (Figure 3.5). These roads are part of the Sumbawanga regional transport corridor through Burundi and Tanzania and will serve as the main distributors of lake transport traffic into the western and other

Figure 3.6: Location of Akagera River project



Source: Roads from www.diva-gis.org

parts of the country.

The interim feasibility study report[9] of the Akagera River's navigability concluded that it is technically feasible between Kagitumba in Rwanda and Lake Victoria. The study estimated that the Northern and Central Transport Corridor traffic (export and imports) amounting to 320,000 tonnes in the base year (2010) would be diverted to the Akagera River. A large proportion of the diversion will be from the current Northern Transport Corridor. The study concluded that the project would only be viable if the total demand was about 50% of the Northern Corridor traffic, estimated at 454,143 tonnes in 2010.

The study, however, had certain limitations related to the methodology and source of data used in the economic analyses. First, the surveys undertaken to determine traffic flows were limited to only a few days. The study recommended that extensive studies were necessary to achieve statistically significant samples to determine travel times, type of cargo being transported, origin and destination of export and import traffic and establish seasonal variations in movements. Second, the use of secondary data for sensitive factors like transport costs and freight transport growth rates could have influenced the results. This study, therefore, recommends a more detailed economic feasibility study as this mode of transport could offer Rwanda the option of transporting petroleum products from the Kenya Pipeline Company depot at Kisumu through Lake Victoria. The current petroleum consumption of 250,000 tonnes per year is substantial and is likely to ensure economic viability of the project. Figure 3.6 shows the location map for the Akagera River project.

3.5.3 Strengths, Challenges, Opportunities and Threats

Figure 3.7 summarises the key strengths and challenges and opportunities and threats relating to water transport respectively.

3.6 Rail Transport

The planned rehabilitation and upgrading of the Dar es Salaam to Isaka railway line and the construction of a new line from Isaka to Kigali in Rwanda with a link to Burundi is expected to provide vital connection to the port of Dar es Salaam. The cost of rehabilitation of the Dar es Salaam to

9 The study was undertaken by ITECO Engineering Ltd (Switzerland) in association with ITECO Engineering Ltd (Tanzania) in 2009.

Figure 3.7: SWOT for Water Transport Sub-sector

Isaka railway line and of the new railway lines to Rwanda and Burundi is estimated at US$4.7 billion[10]. Construction of a new railway line in Tanzania between Isaka and Rusumo has been estimated at US$1.034 billion, that in Rwanda at US$650 million, and that in Burundi at US$1.183 billion. The DB International study of 2009 recommends the project be financed through a split-concession model consisting of (i) train operating concessions (TOCs) limited to financing of rolling stock for passengers or freight to certain sections of the new lines, issued by respective national railway regulators and (ii) infrastructure manager concessions (IMCs) to finance, build and maintain the rail infrastructure in each country through the respective governments of Tanzania, Rwanda and Burundi. The TOCs will be financed through user charges, while the IMCs will levy train access charges to be paid by the TOCs for use of the infrastructure. The split concession model is proposed to help in mitigating country-related risks such as regulations and also to reduce risks related to construction and operation of the rolling stock.

Another proposal is to construct a railway link between Kigali and Rubavu through Musanze in the north western part of the country to link Rwanda with eastern DRC. The

10 Feasibility Study undertaken by DB International in 2009.

development of this line will depend largely on the success of the Isaka–Kigali railway line and growth in freight and passenger traffic along the corridor.

The key determinants of quality for both railway passenger and freight services are adequate capacity and frequency, safety, security, cleanliness, speed and reliability. The other success factors that should be considered in the development of the new railway line are (i) integration with road-based freight network and other transport chains (mainly pipeline and air) to reduce the extra cost of local road pick-up and delivery for long-distance rail freight transport (ii) efficient cross-border coordination to increase service quality (transit time, reliability, and security) and (iii) allowing concessionaires the commercial freedom, flexibility, and incentive to provide services that meet demand. It is expected that these issues will be addressed during the on-going detailed design of the project.

3.7 Pipeline Transport

Pipeline transport has a number of advantages as the most preferred mode of transport for petroleum products including low per-unit handling cost, storage and transportation; safety; reliability and efficiency; and assurance that the right quantity and quality is delivered. These are critical issues in the region, especially for a land-locked country like Rwanda. In particular, since fuel costs account for the largest proportion of vehicle operating costs[11], Rwanda urgently needs to reduce the price of fuel transport through the use of pipelines or road/water transport. Transport costs per tonne-kilometre for road, rail and pipeline transport along the Northern and Central Transport Corridors are estimated at US$0.113, US$0.068, and US$0.043[12] respectively.

Rwanda is currently served by a pipeline belonging to the Kenya Pipeline Company (KPC), which runs along the Northern Corridor from the oil refinery in Mombasa through Nairobi, Eldoret and Kisumu. The line also serves Uganda, Rwanda, Burundi and the Eastern DRC through transhipment in tankers on the Northern Corridor roads. The current pipeline system experiences capacity constraints that have forced fuel dealers to use more expensive road and rail-based transport systems. Prior to the discovery of oil in Uganda, there was interest in extending the KPC pipeline to Uganda and Rwanda.

This interest appears to have been shelved because the Government of Uganda has already signed a Production Sharing Agreement with Tullow Uganda Limited for petroleum exploration licences for two blocks around Lake Albert, while Total SA of France and China National Offshore Oil Corporation are also engaged in the petroleum exploration.

Moreover, studies have shown that the development of a refinery in Uganda is a feasible and economically better option than a crude export pipeline from Uganda. Moreover, Uganda has agreed to build a 30,000 barrel-per day refinery with Tullow, Total SA of France and China National Offshore Oil Corporation. These developments imply that oil from Uganda is more likely to be the most economical source of petroleum products for which to construct pipeline transport to serve Rwanda.

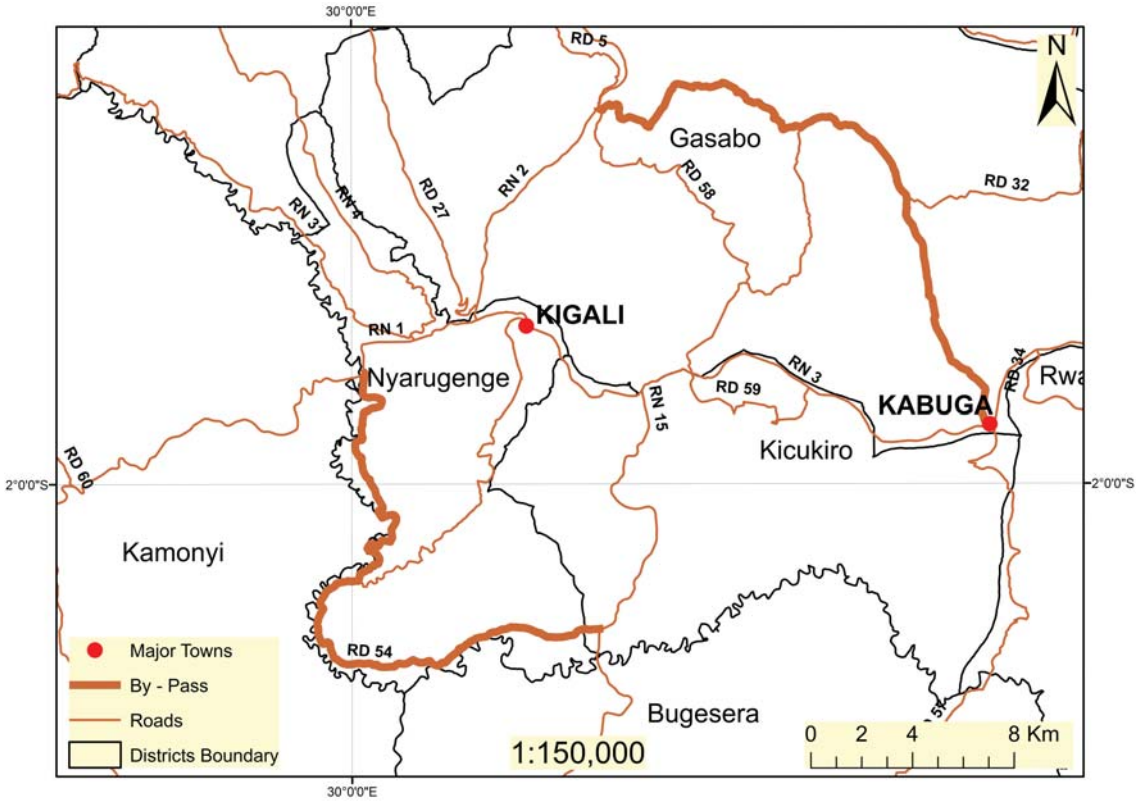
3.8 Urban Transport

Rapid growth of the urban population, low incomes and inequalities in the provision of urban transport are some of the main underlying causes of transport problems in developing cities like Kigali. A study conducted in 2004 to inform the conceptual master plan for the City of Kigali identified many transportation problems that are still evident in 2012, albeit to varying degrees. These challenges include growing congestion in public transport services, congestion at the terminals, and insufficient public transport facilities in the city centre. The study also identified transport

11 According to "Kenya Economic Update" June 2012, Edition No. 6, The World Bank, fuel costs constitute about 17% of total vehicle operating costs. Other sources like the CPCS study of 2010 estimate fuel costs to vary from 30 – 65% depending on the type of trucker formal/informal and the size of the company. World Bank estimates

12 "Analytical Comparative Transport Cost Study along the Northern Corridor Region" Draft Final Report, by CPCS, Northern Corridor Transit Transport Coordination Authority, June 2010.

Figure 3.8: Kigali By-passes



Source: Roads from www.diva-gis.org

infrastructure problems such as the deteriorated condition of unpaved roads, lack of facilities for cyclists and pedestrians, inadequate drainage and narrow road spaces. The Public Transport Policy and Strategy adopted in October 2012 and the Transport Sector Strategic Plan finalized in March 2013 will guide interventions aimed at addressing these challenges (see also Chapter 4).

Moreover, the following recommendations contained in the Kigali Conceptual Master Plan for improvement of transportation in Kigali are still relevant and should be considered as priority for implementation:

1. Provision of a south western bypass following the Nyabugongo river to improve linkage between Bugesera District and the Nyabugongo Bus Terminal (Figure 3.8)
2. Provision of a north eastern bypass connecting the road to Byumba and the road to Rwamagana to provide better accessibility to the interior of Gasabo District, and continuing south through the Masaka Sector where it would connect with the national road RN15 to the proposed Bugesera International Airport. (Figure 3.8)
3. Creating a regional road hierarchy by upgrading existing roads and constructing new ones.

In line with the Conceptual Master Plan and the STMP, the Government of Rwanda should develop and implement an urban transport policy that encourages the use of public transport supplemented by non-motorised transport and other intermediate means of transport.

Such a policy should include strategies to reduce dependence on personal cars, the use of low capacity shared-taxi systems and motorcycles. In the long term, the urban trans-

port policy should encourage rapid transit lines in Kigali, such as the Bus Rapid Transit systems, and the use of high occupancy bus systems in other large towns. In addition, the policy should ensure that land use planning and urban transport planning are synchronised to control unplanned development, which increases dependence on motorised transport and raises the demand for transport infrastructure. In addition, a special unit responsible for urban transport development should be created within the RTDA to coordinate and regulate transport planning and infrastructure development.

The unit, in conjunction with RURA, should be charged with the responsibility of introducing realistic user charges such as parking fees and operating permits for public transport. The unit should also be able to generate the required funds to operate, maintain and develop urban transport infrastructure in a manner that is consistent with other national development objectives. The existing Kigali City Council's public transport management team should be able to perform this role for Kigali City in collaboration with RTDA and RURA, and thus the specialized unit in RTDA will focus on the other urban centres.

In the short term, a national programme should be launched to plan, design and construct facilities for public transport, walking, and intermediate transport on existing roads. This programme should also be part of any future road transport developments both in rural and urban areas. The facilities to be promoted should include separate walkways, cycle lanes and tracks, zebra and footbridge crossings, and parking facilities for bicycles.

With adequate public road transport infrastructure, fair regulations, safety and security, and properly integrated facilities for pedestrians and other intermediate modes of transport, the private sector will most likely be attracted to invest in public road transport services as in many parts of Africa. Increased private sector participation will restrict the role of the public sector to enactment and enforcement of laws and regulations.

3.8.1 Strengths and Challenges, Opportunities and Threats

The key strengths and challenges and opportunities and threats relating to urban transport development are summarised in Figure 3.9.

3.9 Regional Transport

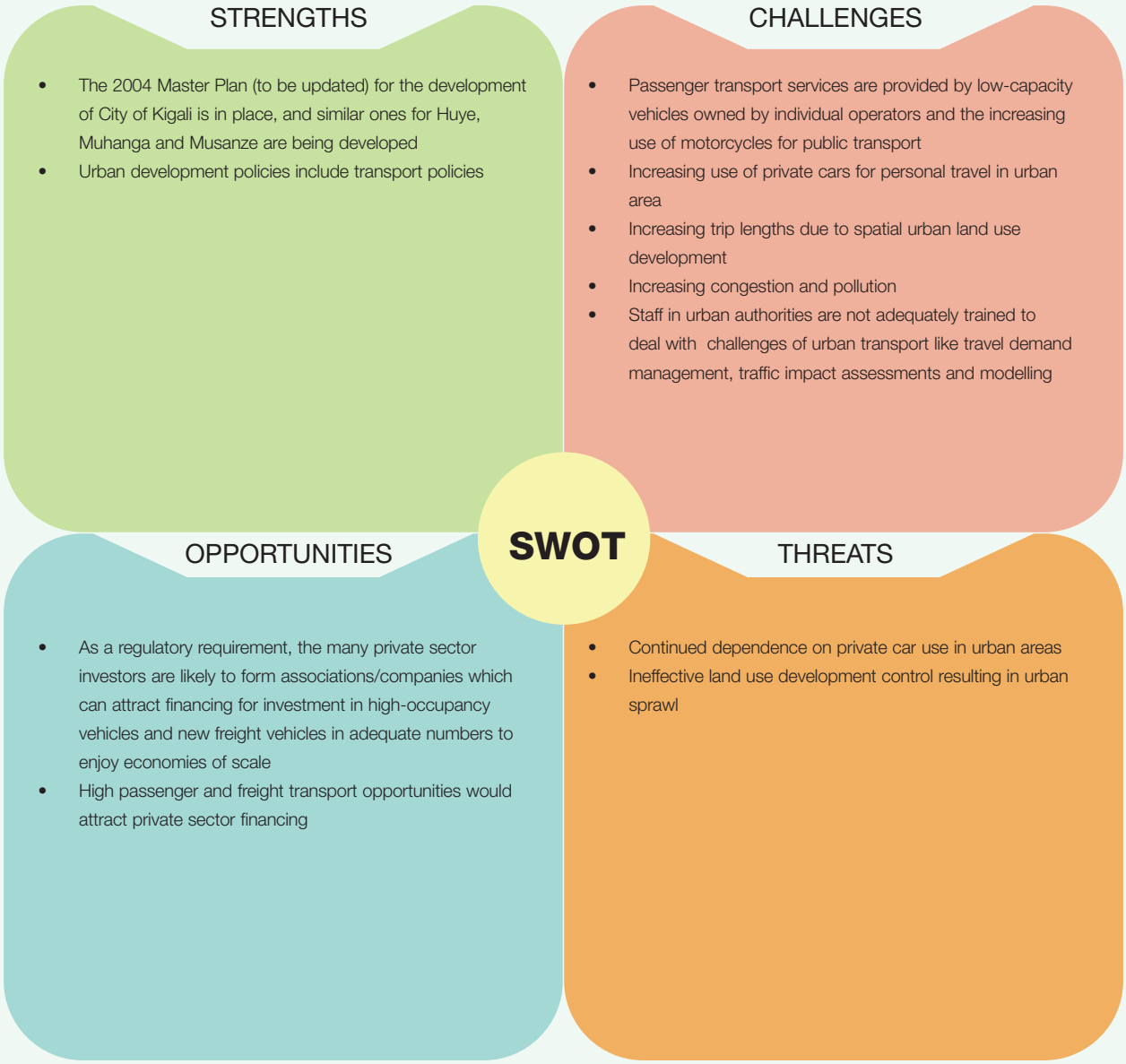
Rwanda's strategic location between the eastern and west/central regions of Africa has the potential of providing an important link between the two regional blocks and the Northern and Central Transport Corridors. Analysing Rwanda's position in regional transport strengthens the case for her domestic and external investors to provide the much-needed resources. It also provides lessons that can inform general regional transport strategies. Furthermore, Rwanda is a member of three Regional Economic Committees namely, EAC, COMESA and SADC that support the development of regional infrastructure and can use her position to lobby other partner states to enact regulations that facilitate regional transport and trade. The following sections review various regional transport infrastructure and interventions that should be of interest to Rwanda.

3.9.1 Ports of Mombasa and Dar es Salaam

The ports of Mombasa and Dar es Salaam carry a lot of relevance for Rwanda as the other ports of Durban, Maputo, and Cape Town are distant. In 2011, the East Africa Corridor Diagnostics Studies[13] on the two transport corridors concluded that berth and yard congestion and the lack of coordination in customs clearance contributed to excessive dwell time of up to 9 days in Mombasa and 12 days in Dar es Salaam. The two East African ports need to have adequate capacity in addition to increased efficiency to improve overall corridor performance. The establishment of an optimised port/inland container depot (ICD) integration programme could alleviate capacity constraints in the short term by transferring cargo handling at the marine terminals' container yards to near-port ICDs, although increasing berth and yards would

13 The studies were undertaken by Nathan Associates Inc., April 2011.

Figure 3.9: SWOT for Urban Transport Development



provide a longer term solution. Rwanda has embarked on strategic discussions both via the EAC transport dialogue and bilaterally with the concerned countries to secure ownership of property in regional ports particularly Mombasa, Dar-es-Salaam, Isaka, Djibouti and Bujumbura.

3.9.2 Railway Transport

Railway lines along the two transport corridors (through Kenya and Tanzania respectively) are not performing to expectations. The railway line in Kenya and Uganda, which has been under the Rift Valley Railways (RVR) since 2006, has underperformed mainly because of a lack of funds to maintain the old infrastructure. There are indications from media reports that RVR secured US$19 million from a financier for redevelopment of the Nairobi – Mombasa sections of the line.

This investment is expected to enhance transit speeds from the current 25–30 km/hr to about 70 km/hr. The African Development Bank has also provided some support to RVR. These developments, although welcome, will not result in substantial improvement of transport along the corridor for Rwanda's benefit. The Tanzania railway line suffers from similar problems but detailed design work for its upgrading and extension to Rwanda and Burundi is in progress.

Rehabilitation of the two regional railway lines is of utmost priority not only for Rwanda but for the region as a whole. Strategies to increase volumes could include establishing customs bonded container depots near the ports, improvement on modal integration with road transport and establishment of frequent scheduled passenger and freight services. Targeting container and petroleum products can be another strategy as these are easier to handle compared to loose cargo. Again, Rwanda will need to engage the neighbouring countries to ensure that the intended investments in the railway lines are undertaken before her own domestic railway lines are developed. A new initiative is to extend the Kampala line to Kigali via Goma and Rubavu.

Following the termination of the concession agreement between a private sector company and the Government of Tanzania (GoT) in 2011, GoT has embarked on the revitalization of the Tanzania Railway Limited (TRL). Short-term plans include assessing the priority requirements for the rehabilitation and enhancement of TRL infrastructure and business processes respectively. This assessment is expected to inform a TRL's resource mobilization strategy to finance the rehabilitation of the central line that links Burundi, Rwanda, Uganda and DR Congo to the port of Dar-es-Salaam.
The African Development Bank's funded study, which will inform the financing structure for the Dar-es-Salaam/Isaka/Kigali/Musongati railway link is also expected to be finalized by end-2013. These interventions are expected to bolster railway transport development along the central corridor.

3.9.3 The East African Community Regional Trunk Road Network

The Regional Trunk Road Network (RTRN), as defined by the East African Community, is shown in Figure 3.10.

There are more than 10 corridors within the EAC, but currently Rwanda can access the ports of Dar es Salaam and Mombasa though two main ones: (i) the Northern Corridor from Kigali through Gatuna, Kampala, Malaba and Nairobi to Mombasa (ii) the Central Corridor from Kigali through Kayonza, Rusumo and Isaka to Dar es Salaam. The two corridors intersect in Kigali.

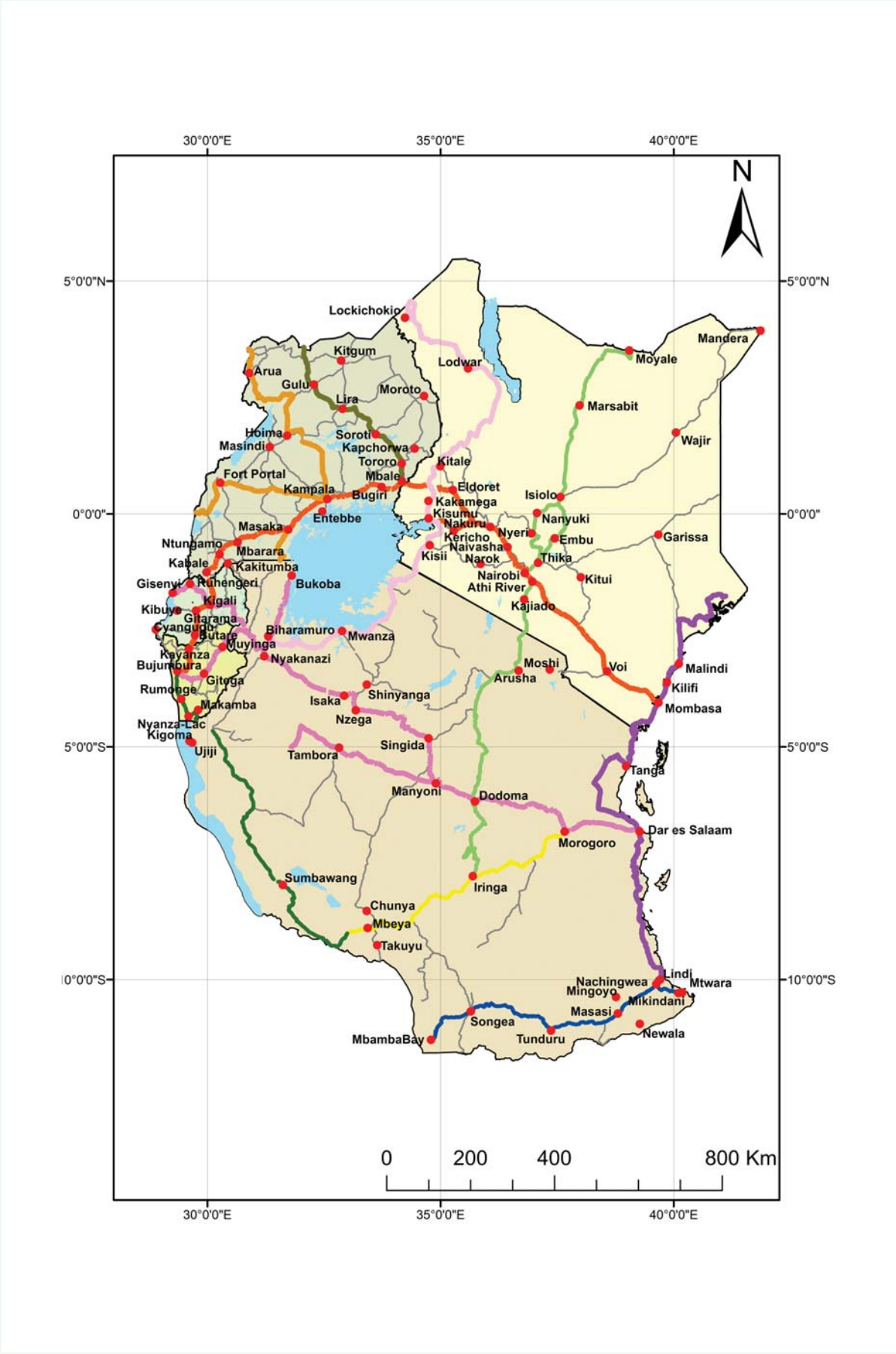
Within Rwanda, the Northern Corridor extends from the Gatuna border through Kigali to Akanyaru and Bujumbura where it connects with the Sumbawanga Corridor. The Sumbawanga Corridor connects Bujumbura with Dar es Salaam through Kigoma, Uvinza and Tabora and joins the Central Corridor in Manyoni, Tanzania. The Central Corridor traverses Rwanda from the Rusumo border posts through Kigali to Musanze and Rubavu. The national roads of regional importance in Rwanda are listed in Table 3.9 and illustrated

Table 3.9: National Roads Forming Part of the EAC Regional Trunk Road Network

No	Corridor	Cities/towns served by the Corridor	Road Class/code
1	Northern Corridor: Mombasa – Voi –Eldoret – Bugiri – Kampala – Masaka – Kigali – Huye – Kayonza – Bujumbura	Gatuna – Kigali	RN2
		Kigali – Huye – Akanyaru	RN1
2	Central Corridor: Dar es Salaam –Morogoro -- Dodoma– Singida –Nzega --Nyakanazi-- Rusumo– Kigali --Rubavu	Rusumo – Kayonza-Kigali	RN3
		Kigali Musanze-Rubavu	RN4
		Kigali-Nyamata-Nemba	NR15
3	Sumbawanga Corridor: Tunduma – Sumbawanga – Kasulu – Mayonvu – Makamba – Nyanza Lac – Rumonge – Bujumbura – Ruhwa – Rubavu – Cyanika	Ruhwa – Rubavu	RN10, 9, 6, 17, 16, and 8
4	Kagitumba corridor: Mbarara – Kagitumba	Kayonza – Kagitumba	RN5

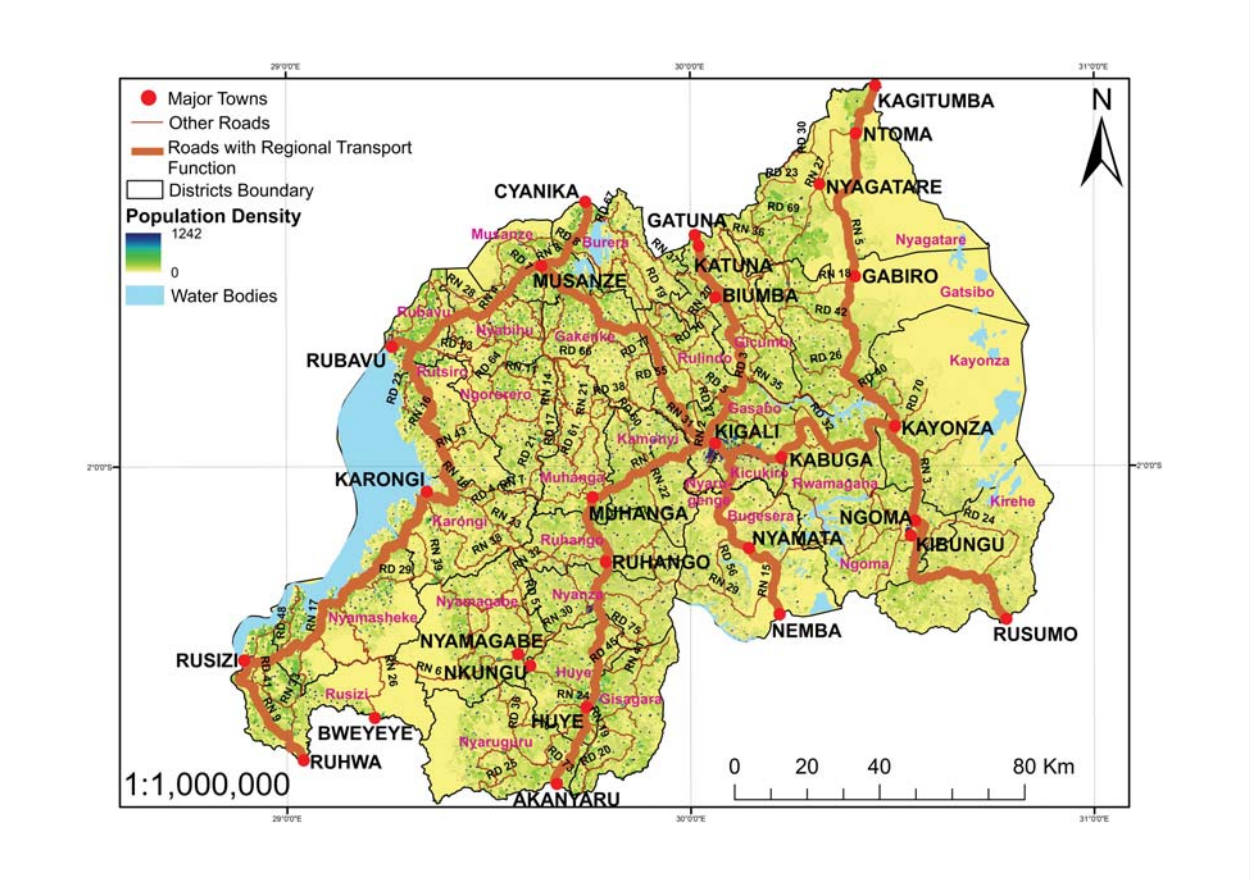
Source: Adapted from East African Transport Strategy and Regional Road Sector Development Programme, EATTFP, 2011.

Figure 3.10: The East African Regional Trunk Road Network



Source: EAC website

Figure 3.11: National Roads Forming Part of the EAC Regional Trunk Road Network



Source: Population densities from www.afripop.org and roads from www.diva-gis.org

in Figure 3.11.

Investment in upgrading and rehabilitation of the roads shown in Figure 3.11 and those in the neighbouring countries along the Central and Northern corridors will have substantial positive impact in reducing travel times for Rwandan-bound traffic. Apart from the RN16 and RN17along the Lake Kivu road belt, investments required to improve service standards on those roads with regional function are included in the recently completed STMP as discussed in Section 4.3.

Road infrastructure improvement projects and elimination of non-tariff barriers (NTBs) are central to performance improvement along the two transport corridors. The main infrastructural and service improvements that would benefit regional transit freight vehicles by decreasing travel times include construction of town bypasses and roadside amenities like truck rest stops; expansion of capacity and conditions of road links; and construction of one-stop-border posts. Gains in travel times due to good roads are, however, often eroded by NTBs along the two corridors, which include: (i) time lost at weighbridges and police road checks (ii) time lost due to enforcement of national regulations like providing escort for sensitive transit freight (iii) delays due to double customs and border-post procedures.

The nature of these NTBs suggests that there are many deficiencies in the regulatory regime relating to transit traffic that need to be addressed at the regional level. Some

of the regulations that need to be harmonised in the region are axle load control, reduction of the number of weigh-bridges and police checks, establishment of one-stop border posts (OSBP) and implementation of harmonised customs procedures.

Progress has been made at the EAC level with the adoption of the East African Community Common Market Protocol in July 2010, and the OSBP Act in 2012. The vehicle Axle Load Control Bill has also been presented to the East African Legislature Assembly for ratification. This legislation, when applied in the EAC region, is expected to achieve smooth and free movement of persons and goods, harmonised border post operations and uniform management of axle load control. Full implementation of the Common Market Protocol and the OSBP law, and ratification of the Vehicle Axle Load Control Bill will significantly alter the costs associated with each of the other modes/routes considered and this may in turn shift preferences from the available modes of travel to cheaper ones. Rwanda should continue to pursue the removal of the remaining NTBs (like restrictions on the transportation of domestic goods by foreign trucks) at the regional level.

Other regional infrastructure projects should include: (i) improvements on Lake Victoria water transport by rehabilitating ports, the supply of vessels, and development on the Akagera River between the lake and Kagitumba in Rwanda (ii) development of pipeline transport either between Kisumu and Kigali or Kampala to Kigali.

3.9.4 The East Africa Trade and Transport Facilitation Project

The East Africa Trade and Transport Facilitation Project, which is funded by the World Bank and the African Development Bank, aims to: (i) enhance the efficiency of customs agencies› clearance processes for the EAC Partner States participating in the East Africa Customs Union (ii) improve the efficiency and reliability of transport and logistics services along the key transport corridors (iii) enhance safety in identified areas and reduce the recipient's fiscal transfers to railway institutions by rationalising the workforce on the Kenya-Uganda railway. The project is expected to be fully implemented by September 2014.

The project will achieve its objectives by: (i)strengthening of the EAC Secretariat and providing support to customs departments in Kenya, Rwanda and Uganda; (ii) strengthening of the Northern and Central Corridor Transit Transport Coordination Authorities; (iii) supporting implementation of the EAC Protocol on inland transport; (iv) supporting the implementation of regional/national transport regulation in Kenya, Rwanda, Tanzania and Uganda; (v) enhancing security and providing Information Communication Technology (ICT) investment for more efficient operations at the ports of Mombasa and Dares Salaam; (vi) supporting the improvement of load security and control in Kenya, Tanzania, Uganda and Rwanda; (vii) financing the establishment of key joint border posts at main cross-border posts within the region; (viii) supporting investment in inland container depots (ICD) and intermodal platforms in Tanzania, Uganda and Rwanda; and (ix) providing various support to the Kenya – Uganda Railway Concession.

The project is expected to contribute to the following achievements by 2014:

1. Reduced transit time from Mombasa to Kigali along the Northern Corridor from 9 to 5 day;
2. Reduced dwell time for a standard Twenty Foot-Equivalent Unit (TEU) for domestic cargo at Mombasa port from 8 to 3 days and at Dar es Salaam port from 14 to 8 days;
3. Seamless and effective cargo tracking system on the Northern Corridor;
4. Simplified customs procedures and documents;
5. Strengthened Central and Northern Corridor Transit Transport Coordination Authorities; and
6. Reduced border crossing times at Malaba (Kenya/Uganda) from 7 to 4 hours, at Serare/Isebania (Kenya/Tanzania) from 7 to 5 hours, at Mutukula (Tanzania/Uganda) from 7 to 5 hours, and at Katuna/Gatuna (Uganda/Rwanda) from 3 to 2 hours

3.9.5 Lessons learned from Implementation of Regional Transport Projects

In 2001, the New Partnership for Africa's Development (NEPAD) was launched with the objective of eradicating poverty, promoting sustainable development and arresting the marginalisation of Africa in the global context. NEPAD

developed the Short-Term Action Plan (STAP) which was adopted by the Heads of State and Government Implementation Committee (HSGIC) in 2002.

The STAP proposed a series of hard and soft programmes and projects to develop regional infrastructure. The progress of STAP was reviewed in considerable detail in 2004 and more recently in 2010.

The third review of the NEPAD infrastructure STAP undertaken in 2010 covering 103 projects established that implementation progress of the STAP programme was below expectations. In total, 89% of study projects had taken off, followed by 80% of investment projects, 65% of facilitation projects and 36% of capacity-building projects. In summary, 33% of studies were completed followed by 20% of investment projects, 6% of facilitation projects and 0% of capacity-building projects. The main constraints identified in the implementation of the STAP projects were: (i) difficulties in securing financing (ii) lack of political support (iii) lack of technical capacity of the Regional Economic Communities. The other constraints identified were: (i) unclear roles and responsibilities of NEPAD and RECs, (ii) lack of a well-defined project framework, (iii) capacity-building challenges, (iv) a lack of information on environmental impacts.

Following the lessons learnt and recommendations from the review of STAP, the AU Summit established the Programme for Infrastructure Development in Africa (PIDA).The aim of PIDA is to have a realistic programme of regional and continental infrastructure projects in transport, energy, information and telecommunication technologies (ICT), and trans-boundary water resources management (TWR).

This initiative establishes an Africa-owned pipeline of implementable and financeable continental and regional projects in support of continental integration into the world economy. The horizon for the PIDA study is 2020 for the short-term, 2030 for the medium-term and 2040 for long-term interventions.

The transport sector priority action plan projects within the PIDA that are relevant to Rwanda include:

1. Uganda-Kenya Petroleum Products Pipeline: a 300 km long pipeline for a lower cost mode of transport of petroleum products to be implemented by COMESA/EAC at an estimated cost of US$150 million;
2. Single African Sky Phase 1, which is a continental programme to create a high-level, satellite-based air navigation system for the continent estimated to cost US$275 million;
3. Accelerate implementation of Yamoussoukro Decision by identifying countries that are ready to fully implement it, estimated to cost US$5 million;
4. Smart corridor programme Phase I which includes both the development of model smart corridor technology and the design and implementation of a continental and regional corridor efficiency monitoring system estimated to cost US$100 million;
5. Development of the Northern Multi-modal Corridor to facilitate travel by people and transport of goods across the borders between Kenya, Uganda, Rwanda, Burundi and DRC with a spur to South Sudan estimated to cost US$1billion; and
6. Development of the Central Multi-modal Corridor to facilitate travel by people and transport of goods across the borders between Tanzania, Uganda, Rwanda, Burundi and DRC with a spur to South Sudan estimated to cost US$840 million

The key recommendations of this study, based on the lessons learnt from STAP and PIDA studies, include the need to:

1. Establish local regional body coordination offices to strengthen the relationship between national government, RECS and sponsoring agencies;
2. Standardise the interstate agreements which are pre-approved by all member states of the REC
3. Undertake capacity-building programmes by RECs to raise their skills levels;
4. Designate one regional organisation as the main point

of contact for inter-state projects;
5. Frame clear milestones for projects by RECs with a definite timeframe and define clear roles and responsibilities;
6. Enact uniform environmental protection legislation;
7. Develop multi-modal transport facilities for modal integration; and
8. Enforce trade and transport facilitation policies at the country level

3.10 Transport Sector Human Resource Capacity

A draft report[14] compiled by the Ministry of Public Service and Labour (MIFOTRA) and the Public Sector Capacity Building Secretariat (PSCBS) indicates that MININFRA requires 45 staff with masters' degree training in Highways Engineering, 10 in Railways and 5 in Transport Economics. According to the report, an additional 60 professionals trained to the level of Bachelor of Science in Railway Engineering will be required. The RTDA requires more than 350 professional staff with Masters of Science training in various engineering disciplines in addition to 6,000 technicians to be effective in performing its functions. In the aviation industry, RwandAir requires more than 250 professional staff including 160 pilots and aircraft engineers for the airline to manage the fleet to be acquired in the short and medium term. The RCAA has a staff gap of about 200 engineers in the fields of communications, civil and electrical engineering.

These figures indicate that the shortage of professionals with the required training and experience is a serious setback to the achievement of the country's infrastructure development goals. These data also imply that Rwanda may be forced to continue to rely on the services of expensive expatriates for infrastructure development unless significant steps are taken to build local human capacity. The Government of Rwanda is addressing this challenge through the Multi-Sector Capacity Building Programme (MSCBP), which is supported by the World Bank, African Development Bank and European Union. Under a technical assistance project financed by the World Bank, about 25 transport sector professionals were trained at the postgraduate level in Highway Engineering and Management, and Transport Engineering and Economics during EDPRS-1 period.

The PSCBS is government's strategic approach to addressing capacity critical skills gaps in a holistic manner. In particular, the Strategic Capacity Building Initiative was launched in July 2011 as a key initiative under the PSCBS to improve public sector capacity in the government's priority sectors including transport. PSCBS's cross-sectoral capacity development initiatives are complemented with other sector specific program's such as the Ministry of Infrastructure's Young Engineers Skills Development Program (YESDP). The YESDP aims to create a critical mass of skilled engineers to support infrastructure development in both the public and private sectors.

In the short-term, the Ministry of Infrastructure, with support from development partners, has also embarked on a programme of hiring expatriate staff for technical assistance and providing in-house capacity building and skills transfer for civil servants. This initiative is complemented with the postgraduate training of civil servants at the Kigali Institute of Technology (KIST), which is expected to produce 90 transport professionals by 2015. The training programme should be prioritised by the GoR as more professionals will be required in the future both in the private and public sectors. Similar training programmes should be developed for all the transport sub-sectors to create core competencies in the various areas of operation. In addition, and in line with the Pay and Retention Policy (2012), the GoR should fast-track the implementation of competitive remuneration packages to ensure staff retention and continuity.

Regulation of professional practice, registration and development through legislation is also recommended for the sound growth of both the public and private sectors. Such legislation should at least cover: (i) establishment of institutions to regulate the transport professional industry (ii) qualifications and registration of individuals and firms for participation in transport infrastructure development and services provision (iii) incentives to encourage growth and self-regulation (iv) sanctions for professional misconduct. The intention of the GoR to create an Engineers Registration Board for registration of engineers and technicians

14 "Indicative Report on Critical Skills Gap and Strategies to Close the Gap" Draft Report, May 2012.

Figure 3.12: SWOT Relating to the Transport Sector

of all disciplines will ensure quality and accountability of professionals in the transport sector.

The GoR should also consider creating a National Construction Authority to oversee the construction industry and coordinate its development. The key responsibilities of this authority should include undertaking research, prescribing the qualifications and other attributes required for registration as a contractor, encouraging standardisation and improvement of construction techniques and materials, and encouraging continuing education of contractors.

3.11 Transport Sector SWOT Analysis

The key strengths and challenges and opportunities and threats relating to the transport sector as discussed above are summarised in Figure 3.12.

The key opportunities, strengths, and challenges identified in this chapter inform the actions and recommendations for enhancing Rwanda's transport sector. Particular attention is

paid to the fact that Rwanda has the potential to develop her transport infrastructure for domestic use. Further, this potential can translate into regional benefit if the right multi-modal connections are put in place between the domestic and regional transport corridors.

3.13 Key Focus Areas

The Rwanda transport sector SWOT analysis recognises the existence of the national Vision 2020 development plan, EDPRS and a medium-term transport policy that provides general guidelines and direction for development of the sector. However, the analysis also indicates that Rwanda's transport sector requires a prioritised action plan to systematically continue addressing infrastructural and transport services concerns and challenges.

Overall, the transport sector requires an integrated transport policy to guide the development of all transport infrastructure and services; human and institutional capacity building; a system to ensure sustainable financing, for example, enhanced private sector participation for increased investment in infrastructure development and maintenance; cost-effective transport services, and a monitoring and evaluation framework to track implementation progress.

This study recommends five key actions to ensure continued systematic and prioritised investment in the sector. The first action targets the development of comprehensive long-term transport sector policies and strategies as an extension of the current sub-sector medium term policies[15]. The policy document should cover the whole transport sector and build upon the achievements and lessons learnt over the past years. The policy should cover the legal and regulatory framework, institutions, sector coordination, modal integration and cross-cutting issues. The transport policy should also be aligned to the country's long-term development policy, the Vision 2020. From the sector policy, specific sub-sector policies should subsequently be derived to guide the development of each sub-sector in such key areas as skills development, planning and implementation of programmes and projects, and measures to support integrated development. The sector and sub-sector policies will ultimately form the basis for the development of strategic plans for the Ministry of Infrastructure and its agencies and contribute to the development of medium-term national development plans.

The second action should be to develop adequate human capacity in all transport sub-sectors. The SWOT analysis has identified major skills gaps in all sub-sectors, particularly in air, water and railway transport, which have high potential for national and regional transport development. Programmes for training staff within the country and at international colleges should be scaled-up. In the short term, there will be need to hire international experts and send more personnel abroad for training in the most critical skills gaps so as to meet the minimum skills level required to undertake the required responsibilities. Simultaneously, national colleges should be established and the capacity of existing ones enhanced to offer courses in the relevant areas. Training at national colleges is less expensive and will make training accessible to more people in the long term.

The Government of Rwanda is already addressing the shortage of skilled personnel in the transport sector through the Multi-Sector Capacity Building Programme (MSCBP), but more resources are required for scaling up the programme to achieve adequate numbers of infrastructure development professionals. The MSCBP itself will require a capacity assessment to establish its strengths and achievements to date and how to further enhance its effectiveness.

Institutional capacity building of transport institutions will also be required by giving institutions in the sector additional tools and equipment to undertake their responsibilities much more effectively. The institutions will require software for analysis and control of operations; equipment for collection, collation and storage of data; software for programming, planning and execution of asset maintenance; software for financial management systems; and aircraft and air navigation systems, among others. Specifically, transport sector agencies should develop Transportation Asset Management Systems (TAMS) to enable better planning, development

15 Since the finalization of this study report in December 2012, MININFRA adopted in March 2013 a 'Transport Sector Strategic Plan (TSSP) for EDPRS-2' whose objective is to develop an integrated transport system for economic development and poverty reduction during the EDPRS-2 period (2013-2018).The TSSP identifies similar and additional imperatives for supporting transport infrastructure and services development.

and maintenance of infrastructure investments.

The AASHTO sub-committee on Asset Management defines TAMS as a strategic and systematic process of operating, maintaining, upgrading and expanding physical assets effectively throughout their lifecycle. TAMS focuses on business and engineering practices for resource allocation and utilisation, with the objective of better decision-making based upon quality information and well defined objectives]. The elements covered under TAMS include: (i) the strategic goals of the agency, performance measures and system performance (ii) all assets considered comprehensively (iii) comparison of performance with desired performance measures (iv) use of tradeoff analysis and life cycle performance to support decision making (v) application of economics, business and engineering principles, needs assessment/public involvement and risk assessment to manage assets and evaluate tradeoffs.

The fourth action should be to enhance the capacity of the transport sector to exploit opportunities for private sector financing of infrastructure development and provision of transport services. Already, some opportunities have been identified in air, water, and railway transport projects and are at various stages of development. The success of public-private partnership projects lies in the creation of an enabling environment for both the public and the private sectors. The public sector needs to prepare well-structured and bankable PPP projects to attract private investment while at the same time safeguarding the public interest.

Conversely, the private sector would like to minimise the risks inherent in projects but at the same time obtain profits. This balance is best achieved by building appropriate capacity in the public sector with the aim of: (i) increasing the capacity and skills of government officials to identify, develop and implement PPP projects; (ii) providing assistance to municipal and national authorities to introduce the economic, institutional and regulatory reforms needed to support PPPs; and (iii) providing opportunities for banks and commercial companies to invest in these projects.

Finally, the fifth action is to develop a comprehensive monitoring and evaluation framework with a list of indicators to track performance and assess the impact of transport sector interventions. The assessment should focus on: (i) institutional, legal, and regulatory frameworks; (ii) access to transport infrastructure and services; (iii) usage of transport infrastructure and services; (iv) transport costs and user charges; and (v) financial and technical adequacy of transport sector projects.


COMPUTER BYTES
ISUZU
MANA MPASHA
STELLA
RWANDAMOTOR

CHAPTER 4: TRANSPORT SECTOR INVESTMENT PROGRAMME

4.1 Introduction

This chapter discusses the transport sector investment programme based on the identified sector challenges and recommended action areas described in Chapter 3. It provides detailed programmes for investment and maintenance activities in air, road, water, rail, urban, and regional transport. The chapter covers the following areas: a review of on-going interventions in the transport sector for the period 2008-2012; the investment programme proposed by the Strategic Transport Master Plan for Rwanda; and a detailed investment programme proposed by the current study for the period 2013-2027 in air, water, rail, pipeline and roads sub-sectors in the context of the on-going projects. Also presented in the chapter is a consolidated investment programme for the whole transport sector and an alternative programme indicating other funding streams.

4.2 Transport Policy Sector Programme (2008 – 2012)

The Transport Policy Sector Programme (Table 4.1) for the period 2008–2012 was included in the Transport Sector Policy 2008. It formed the basis for the sector investments outlined in the EDPRS (2008 – 2012). The total budget for the programme was US$995.573 million.

This study draws the following conclusions regarding the implementation of the Transport Policy Sector Programme (2008-2012):

1. Good results have been achieved in the rehabilitation and maintenance of national paved roads with more than 450 km completed;
2. Construction work was still in progress in some sections of three national roads (RN14, RN16, and RN17) programmed for upgrading from unpaved to paved standards;
3. Maintenance of national paved roads was very effective with 97.5% of them in good condition in 2011. However, the condition of the national unpaved road network and district roads was not satisfactory with 32% and 15% in good condition, respectively. Generally, feeder (district Class 2) roads were reported to be in deteriorated condition; and
4. Rehabilitation of urban roads in a number of towns was about 90% complete.

4.3 Strategic Transport Master Plan for Rwanda

The Government of Rwanda commissioned the preparation of a Transport Sector Master Plan in 2010 with the purpose of formulating detailed transport strategies for medium-and long-term planning (10 years and beyond). The final report of the Strategic Transport Master Plan for Rwanda (STMP)[16] contains a review of the transport sector and has recommendations for improvement of transport sector performance with regard to the strategic national transport network. These recommendations include: (i) investment in roads, air, water, rail, pipeline, and multi-modal infrastructure and services; (ii) available financing options (public or private sector); (iii) required institutional reforms; and (iv) a priced and prioritised capital investment programme. Table 4.2 and Figure 4.1 summarise the STMP's recommended investment programme and indicative cost estimates.

Under the road infrastructure development programme, the STMP proposes construction of about 380 km passing/climbing lanes to increase capacity and enhance safety along some sections of national roads RN1 to RN10 between 2013 and 2022. This investment alone was estimated at US$618 million, which accounts for 36 percent of the whole investment programme in the same period.

The STMP is the most comprehensive study so far undertaken covering the whole transport sector and which also addresses national, regional and international issues. The STMP study also identified possible projects that were eligible for various forms of private sector financing. These projects include:

1. Proposed development of the new Bugesera Interna-

16 Final Report, June 2012

Table 4.1: Transport Sector Programme (2008 – 2012)

Projects	Cost (US$ million)	Status (2012)
1. Road Transport		
Rehabilitation, maintenance, and upgrading of paved road network – 2,143km	747.162	On-going
Maintenance and expansion of unpaved road network – 3,105km	86.131	On-going
Rehabilitation of urban roads in Kigali, Huye, Musanze, Rubavu, Muhanga, and Rusizi – a total of 88km	44.400	Musanze, Rubavu, and Muhanga complete, the rest are on-going.
Funding allocations for emergency road works, rehabilitation of district roads, and consultancy services.	54.545	On-going
2. Transport Facilitation and Feasibility Studies		
Feasibility studies for Isaka Dry Port, One Stop Border Posts, and Isaka – Kigali rail design;	21.170	Isaka – Kigali railway detailed design still on-going. Others completed.
Support to customs operations;		On-going
Border crossing improvements;		On-going
Corridor security and transport regulation;		On-going
Electronic single window		On hold
3. Air Transport		
Air Traffic Management;	24.195	On-going
Feasibility studies for the new Bugesera International Airport;		Completed
Rehabilitation and extension of aerodromes.		Extensions of KIA on-going
4. Water Transport		
Akagera River Navigability Feasibility Study	3.870	Complete but not satisfactory
Feasibility study for quays on the Lake Kivu and construction of harbours on Lake Kivu and other lakes		Study complete but construction yet to start
Study and Construction of a shipyard on the Lake Kivu		Not started
5. Capacity Building		
MSc Training	2.850	On-going
Short-Term courses	0.700	On-going
Traffic data collection	0.400	On-going, last one in 2010 on paved roads
Transport master plan	0.800	Completed
Road works costs and standards	0.300	On-going
Axle load stations	0.600	Not started
Road Safety training and data management	0.300	On-going
Transport database and M&E	0.500	On-going
Technical support to MININFRA	6.800	On-going
Regional dialogue facilitation	0.250	On-going
Capacity Building to RCAA	0.600	On-going

Source: Transport Sector Policy MININFRA (2008)

Table 4.2: Investment Programme for Strategic Transport Master Plan for Rwanda

Project category	Short (within 2 years)	Medium (2 - 5 years)	Long (5 - 10 years)	Total (US$ million)
Strategy, Policy and Institutional	18.93	0.00	0.00	18.93
Road infrastructure Development Programme (Capacity and safety improvements along national paved roads, weighbridges, town bypasses, border posts and truck stops)	361.16	445.61	0.00	806.77
Surface Public Transport Infrastructure and Services (Quality bus corridors pilot project and consultancies and multi-modal facilities)	14.15	55.90	23.10	93.15
Aviation Infrastructure and Services (Expansion of KIA, aviation college, construction of new Bugesera International Airport and planning of regional airports)	28.00	553.38	2.00	583.38
Inland Waterways Infrastructure and Services (Lake Kivu transport project, Akagera River studies and development, Lake Victoria ferries and vessels, and development of transport in other lakes)	0.35	254.90	16.10	271.35
Rail Transport Infrastructure and Services (Dar es Salaam – Isaka – Kigali and reserves)	0.00	0.00	1,126.00	1,126.00
Pipeline infrastructure and Services (Kampala – Kigali – Bujumbura and link to Lake Kivu)	0.00	0.00	1,135.77	1,135.77
TOTAL	**422.59**	**1,309.79**	**2,302.97**	**4,035.35**

Source: Strategic Transport Master Plan for Rwanda, Final Report, September 2012, RTDA

tional Airport and the Dar es Salaam – Isaka – Kigali railway line which are at various stages of study;

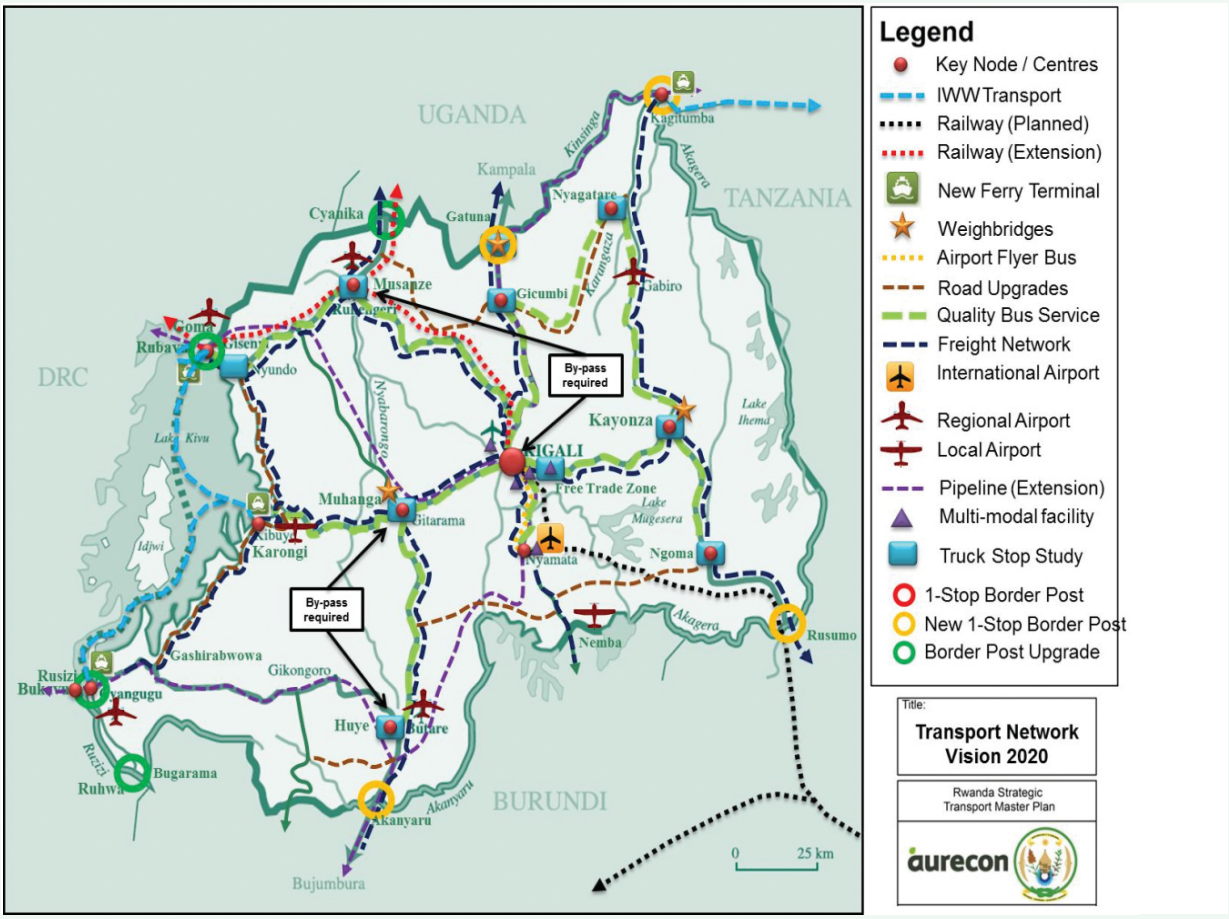
2. Development of overloading control facilities;
3. Development of new truck-stop facilities;
4. Development of the four passenger and freight multi-modal facilities in Kigali;
5. Operation and maintenance of three high-trafficked roads: Kigali – Rwamagana (RN3); Kigali – Muhanga (RN1); and Kigali – Gatuna (RN2);
6. Participation in performance-based management and maintenance contracts (PMMR) on national roads;
7. Management and operation of regional airports (including Kamembe, Rubavu, Musanze, and Huye) and domestic aviation services; and
8. Provision of road, lake and river passenger and freight transport services.

However, the STMP study did not cover a number of issues this study considers crucial for the delivery of the Master Plan. These include:

1. Only capital investments for the development[17] of the required transport infrastructure are captured, leaving out maintenance and operation costs, which influence service conditions;
2. While a recommendation is made for the development

17 For road infrastructure, the STMP covers the capital costs of upgrading national paved roads to address capacity constraints and road safety, but not upgrading of the network to all-weather standards.

Figure 4.1: Strategic Transport Master Plan Network



Source: Strategic Transport Master Plan for Rwanda, Final Report, June 2012, RTDA

of a framework for the management of the district Class 1 and 2 roads, the actual approach that the agencies responsible should take to rehabilitate and maintain these roads is not covered;

3. Sources of funding are not identified; and
4. Equipment and human resource capacity, which are critical for the delivery of the investment programme, are only priced and prioritised for air transport leaving out the other sub-sectors.

These issues are addressed by this study, which includes maintenance requirements for the entire road network; capital and maintenance investments for district Class 1 and 2 roads; institutional capacity building for delivery of the proposed investment programme and possible sources of financing for the whole sector.

4.4 Proposed Transport Sector Investment Programme

The proposed investment programme presented in this section is derived from the on-going EATTF project, the implementation status of the 2008–2012 Transport Sector Policy investment programme, and the recommendations of the Strategic Transport Master Plan of Rwanda. Additional investments in areas that are not covered under these investment programmes, like the rehabilitation of district Class 1 and 2 roads, are also identified and prioritised, while their cost estimates included in the investment programme.

4.4.1 Air Transport Investment Programme

The on-going and planned air transport projects are summarised in Tables 4.3 and 4.4.The costs provided are based on current estimates from the RCAA, RwandAir, EDPRS II and previous studies like the STMP for Rwanda. Addressing the bottlenecks in the aviation sector is estimated to cost US$1,040.4million with US$254.3 million required in the short term, US$494.4 million in the medium term and US$294.8 million in the long term.

RwandAir's 5-year plan (2013 – 2017) aims to: (i) Increase aircraft fleet from 7 narrow bodied aircraft to 12 including 3 wide-bodied aircraft (ii) Increase destinations served from the current 13 to at least 25 (iii) Increase staff from the current 560 to about 1,000 employees (iv) Increase annual revenues from US$46million to US$388million during the period and net results from a loss to a profit of US$2.5 million (v) Local (Rwandan) pilots and engineers to account for more than 50% of the employees in that category (vi) IOSA Certification achieved and full AMO set up and able to serve third party carriers.

4.4.2 Water Transport Investment Programme

Investments in the Lake Kivu transport project have been shown to be economically viable in the medium term[18]. The Lake Kivu project also has additional socio-economic benefits such as job creation, trade facilitation, and tourism development in the Western Province. Provision of safe and comfortable vessels, initially by the public sector, will be a major step towards encouraging water transport services on Lake Kivu. It will also be necessary to develop local capacity for building and maintaining water vessels to support private sector investments. Building the capacity of RURA to develop regulatory structures will further promote the development of the water transport sub-sector in the short term. The establishment of a maritime authority will become necessary as the water transport sub-sector develops.

A detailed study to determine the navigability of the Akagera River should be commissioned because this has the potential for linking Rwanda to the regional transport system via Lake Victoria, particularly for transport of fuel products from the Kenya Pipeline Company (KPC) in the Kisumu depot. Development of the Kisumu and Fort Hall port infrastructure on Lake Victoria, increasing the supply of vessels operating in Lake Victoria, improving road connections and increasing the pumping capacity of the Kisumu line of the Kenya Pipeline Company (KPC) are complementary investments that are likely to make the project economically viable. This is a regional project with high potential that Tanzania, Kenya, Uganda and Rwanda should take up with development partners such as the African Development Bank and the World Bank.

The STMP estimates that the total cost of implementing the Lake Kivu project is US$44.5 million, which includes works, vessels and crew training[19], including setting up the legal and regulatory frameworks and the strengthening of RURA. The current study estimates that the cost of detailed feasibility design studies for the Akagera River project at US$0.34 million. The cost of stage 1 civil works and port equipment for the Akagera project was estimated[20] at US$74.066 million, which was to be invested in the medium term. However, this estimate was rather on the lower side as the 2012 STMP estimate is US$209.9 million including the construction of a port at Kagitumba, refurbishment of Kisumu Port, acquisition of port equipment and river channel improvements to accommodate 50-tonne vessels. An allowance of US$0.5 million has been made for the acquisition a port reserve at Kagitumba in the medium term. The project is a potential regional operation that can be implemented by Kenya, Uganda, Tanzania and Rwanda as a PPP project. The proposed water transport investment programme is summarised in Table 4.5.

4.4.3 Rail Transport Investment Programme

The immediate priority in the railway sub-sector should be the completion of detailed design studies and the subsequent development of the Dar-es-Salaam/Isaka/Kigali railway line as a regional project. Comprehensive studies should be undertaken to investigate the viability of extending the railway line to the western parts of the country (Rubavu) and into Goma in eastern DRC. This line could be extended to

18 Economic and Technical feasibility study undertaken by KNUD E. Hansen A/S and ASEC Consult in 2010.

19 STMP Final Report (2012), Table 9-4.

20 Interim Report of the Akagera River Navigability by ITECO, MININFRA, 2009

Table 4.3: Rwanda Civil Aviation Authority Investment Projects and Indicative Cost Estimates

Project number	Project	Short Term (2013-2018)	Medium Term (2019-2024)	Long Term (2025-2030)	Total (US$ Million)
1	Establishment of Aviation Training School	0.1			0.1
2	Safety and Security of Air Service: ACC & Automation Set up	1.0			1.0
3	Mateo Automation Upgrade :SADIS	0.9			0.9
4	Improvement in Airspace Safety	1.9			1.9
5	Installation of CNS Equipment (Comms, Nav, Surv & Data broadcasting)	14.4			14.4
6	ICAO Compliance	1.1			1.1
7	Upgrading of Kamembe and Rubavu Airports (Expropriation, resurfacing (Kamembe airport only), runway extension, construction of new terminal building, installation of Navaids & airfield lights, and establishment of fuel firm).	88.7			88.7
8	Maintenance of Kamembe and Rubavu Airports	4.9			4.9
9	Land Acquisition for the Construction of the New BIA	27.7			27.7
10	Expansion of Terminal Building at KIA	16.2			16.2
11	Maintenance of Extended Terminal Building at KIA	0.8			0.8
12	Expansion of Apron & Taxiway at KIA	6.8			6.8
13	Maintenance of KIA Apron and Taxiway	0.7			0.7
14	Fuel Hydrant at KIA	6.9			6.9
15	Construction of Air Cargo Centre (ACC) and Commercial Mall	10.0			10.0
16	Creation of Air transport regulatory authority separate from air operations Authority	1.0			1.0
17	Capacity Building for Air transport sector	1.5			1.5
18	Development of Business Plan for all airports	0.2			0.2
19	New BIA Feasibility Design Costs		30.0		30.0
20	New BIA Construction Costs		350.0	250.0	600.0
Sub-total (US$)		**184.7**	**380.0**	**250.0**	**814.7**

Source: RCAA, June 2012 and EDPRS II

Table 4.4: RwandAir Investment Projects and Indicative Cost Estimates

Project number	Project	Short Term (2012-2014)	Medium Term (2014-2016)	Long Term (2016-2017)	Total (US$ Million)
1	Aircraft Purchase for RwandAir	39.15			39.15
2	Route Expansion by RwandAir	30.44			30.44
4	Aircraft Lease		74.70	41.00	115.70
3	Human Capital Development: Pilots/Technical/ Management		8.00	3.00	11.00
5	Other Capital Expenditure		28.70	0.75	29.45
Total Cost Estimate (US$)		**69.59**	**111.40**	**44.75**	**225.74**

Source: RwandAir, June 2012 and EDRPS II

Table 4.5: Water Transport Investment Programme and Indicative Cost Estimates

Intervention	2013 - 2018	2019 - 2024	2025 - 2030
Lake Kivu Inland Waterway Transport Development (Detailed design, EIA and PPP; Construction of Infrastructure incl. 7 ports; Delivery of Vessels; System implementation and Operation	4.38	44.50	
Operation and Maintenance of Lake Kivu IWT System and Service	0.22		
Feasibility & Detailed Design of Akagera River Project	0.34		
Akagera River port reserve at Kagitumba		0.50	
Akagera River Project Development		209.90	
Total	**4.95**	**254.90**	**-**

Source: STMP Final Report – June 2012 (see Table 9-4), EDRPS II and author estimates

connect to the Northern Corridor line in Kampala through Goma and Kabale to Kasese. The study should also evaluate the possible increase in traffic and the economic viability of the corresponding railway investment. According to the STMP, the forecasted freight traffic demand of 2,500 tonnes per day by 2020 for the proposed railway link to the western parts of Rwanda and eastern DRC is insufficient to support the development and maintenance of the railway line between Kigali and Rubavu. In the medium term, therefore, only the land reserve should be acquired and preserved for future.

It will be necessary to build the national human resource capacity for the overall development and sustainability of rail transport services in Rwanda. Parallel investments in other sectors like agriculture, tourism and trade promotion will further create opportunities for the growth of rail transport. Investment for the rehabilitation and construction of the new railway line from Dar es Salaam to Rwanda and Burundi is estimated at US$4.7 billion. This is a potential a PPP project financed through user charges. The proposed rail transport investment programme is summarised in Table 4.6.

4.4.4 Pipeline Transport Investment Programme

In the short term, the Government of Rwanda should consider undertaking studies to map out a feasible pipeline route to Kigali and other major consumption centres to enable acquisition and preservation of the required land reserves. In the long term, development of infrastructure to support multi-modal transport will be critical to the success of the pipeline system. A programme for development of the national human resource capacity will also be vital to the overall development and sustainability of pipeline transport in Rwanda.

The Kampala–Kigali line, which is estimated to cost US$636 million, should be programmed for implementation in the medium term while future extension to Lake Kivu, at a cost of US$500 million, should be implemented in the long term.

The proposed phased implementation of the pipeline extension project is recommended because the current petroleum consumption of 0.25 million tonnes/year in Rwanda is well below 2 million tonnes/year, which is the threshold for the

Table 4.6: Rail Transport Investment Programme and Indicative Cost Estimates

Project	2013 - 2018	2019 - 2024	2025 - 2030
Feasibility Study and Detailed Design of Kigali - Rubavu Railway line	1.97		
Kigali-Rubavu Route alignment Railway Reserve		1.00	
Upgrade/construction of the Dar es Salaam-Isaka-Kigali/Keza-Gitega-Musongati railway line		1,125.00	
Total Cost Estimate (US$ Million)	**1.97**	**1,126.00**	**-**

Source: STMP Final Report – June 2012 and EDPRS II

Table 4.7: Pipeline Transport Investment Programme and Indicative Cost Estimates

Project	2013 - 2018	2019 - 2024	2025 - 2030
Feasibility Study and Detailed Design of Kampala - Kigali - Bujumbura pipelines	0.65		
Feasibility Study and Detailed Design of Kigali - Muhanga - Rubavu and Huye - Rusizi Pipelines	0.50		
Kampala-Kigali-Bujumbura products line reserve and construction		635.77	
Additional Future Pipeline Reserve and Linkages from Lake Kivu onto Kampala (Kigali-Muhanga-Rubavu and Huye-Rusizi)			500.00
Total Cost Estimate (US$)	**1.15**	**635.77**	**500.00**

Source: STMP Final Report – June 2012 and EDPRS II

economic viability of a pipeline[21]. In the short term, US$1.15 million should be included in the investment programme for studies and possible acquisition of reserves for the identified pipelines. Financing of the pipeline projects through PPP will depend on their economic viability to be determined after completion of detailed studies. The proposed pipeline transport investment programme is summarised in Table 4.7.

4.4.5 Road Transport Infrastructure Investment Programme

Prioritisation of National Roads for Capital Investment

The prioritisation of investment for roads with high traffic volumes should be based on the economic and social benefits of these roads to the country. The most widely used model for prioritisation is the Highway Development and Management Standards Model Software (HDM-4), which is based on the consumer surplus approach.

The HDM-4 software is used for planning, programming and preparation of individual road schemes. At the planning stage, the software is used to undertake strategy analysis of the entire network to determine funding needs and/or predict future performance under budgetary constraints. The software, thus, allows for the setting of road development and management policies, strategies and standards and prediction of long-term estimates of expenditure. Programme analysis is concerned with the preparation of single or multi-year (medium term) road works and expenditure frameworks under specific budgetary constraints. The software prioritises candidate road projects in each year within annual budget limitations, which are obtained from the strategic maintenance plans. The software prioritises roads in terms of the net present value (NPV), internal rate of return (IRR) and cost-benefit ratio.

In order to prioritise roads in a given network, the following inputs are required: (i) the basic characteristics and economic unit costs of the vehicle fleet using the roads in the network; (ii) characteristics of the road network such as road class, traffic volumes and categories, road pavement type and condition, and traffic loading; and (iii) road works standards to be applied, including their economic capital and maintenance units costs.

Currently, data on traffic volumes and condition of the road network are available for some national road links, while the rest of the requisite data are unavailable. It was therefore not possible to use this approach in the current study to identify and prioritise the national roads of economic importance to the country. The STMP analysed and identified priority national roads (RN1 to RN10) and the required investment covering 15 years from 2013. However, the proposed construction of about 380 km passing/climbing lanes to increase capacity and enhance safety along some sections

21 Data on transit demand of petroleum particularly to DRC is not readily available, but it is expected that this demand coupled with Rwanda's petroleum consumption increases the economic viability of the Kampala-Kigali pipeline.

of national roads RN1 to RN10 between 2013 and 2022 is estimated to some US$618 million.

This study, therefore, recommends that the STMP proposed investments on the strategic national roads are shifted to the medium- and long-term future. In the short term, specific economic analyses and prioritisation for each road section should be undertaken before investments can be made. The study is estimated to cost about US$0.42 million according to EDPRS II.

Other proposals contained in the EDPRS II short-term plan regarding National Strategic Roads include:

- Feasibility study on the development of RN4 from Musanze to Rubavu(Rubavu) as a low-cost Toll Road at a cost of about US$0.21 million; and
- Acquisition of about 2930km of road reserve for all national roads at a cost of about US$67.7 million.

The medium/long-term investments are summarised in Table 4.8, while the relevant road links are shown in Figure 4.2.

The proposed programme and cost estimates for capital investment and maintenance are provided in Table 4.9 assuming that all the roads will be provided with adequate maintenance, and a capacity of about 185 km of the strategic roads will be implemented in the medium and long term.

Table 4.8: Investment Programme and Indicative Cost Estimates for Capacity and Safety Improvement of National Roads

Road	2018 - 2027	
	Length (km)	US$ million
Kigali – Akanyaru(RN1)	75	103.04
Kigali – Gatuna (RN2)	63	86.02
Kigali – Rwamagana – Rusumo (RN3)	63	85.88
Kigali – Musanze – Rubavu (RN4)	78	108.11
Kayonza – Kagitumba (RN5)	18	25.46
Huye – Rusizi (RN6)	31	41.8
Muhanga – Karongi (RN7)	26	36.28
Musanze – Cyanika (RN8)	7	9.6
Rusizi – Bugarama (RN9)	7	9.5
Bugarama – Ruhwa (RN10)	1	1.9
Total	**369**	**507.59**

Source: STMP cost estimates and author calculations of approximate road lengths

Prioritisation of Unpaved National and District Roads for Capital Investment

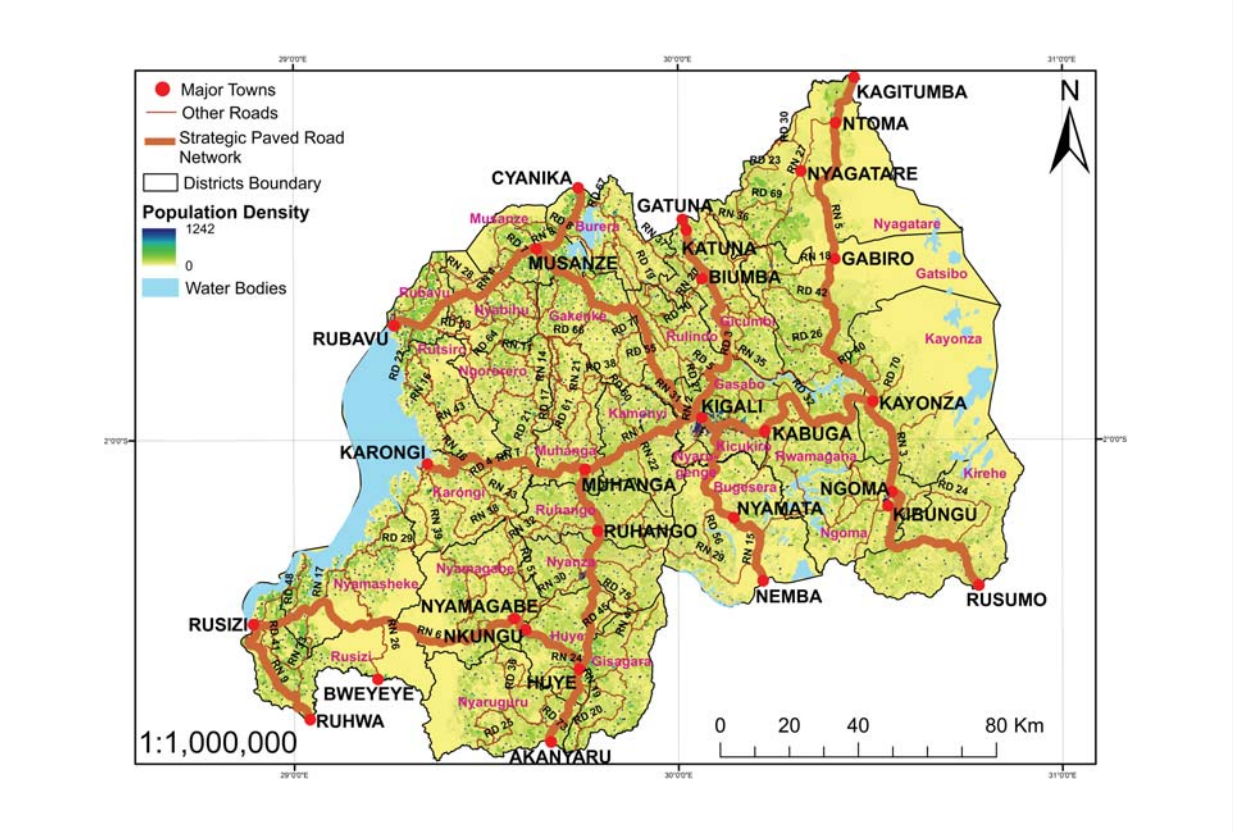
Prioritisation of these roads was based on (i) importance for national and regional connectivity; (ii) support to other transport modes like the proposed new airport at Bugesera; and (iii) the producer surplus approach that takes into account agricultural production and other geographical factors like population densities, poverty levels and paved road densities.

The importance of a road link for national and regional connectivity is determined with reference to linkages to the Northern, Central, and Sumbawanga transport corridors Another factor to consider is connectivity between the roads forming the corridors to reduce travel distances and related transport costs. For example, upgrading of the Byumba–Base road (RN20) connecting the Kigali–Gatuna road (RN2) on the Northern Corridor and the Kigali-Musanze road (RN4) on the Central Corridor would reduce travel times and costs significantly. Similarly, the upgrading of the Rubavu–Karongi–Buhinga roads (RN16 and RN17) will complement the proposed Lake Kivu water transport system, while upgrading of the Ngoma–Ramiro road (RN34) and the Kibugabuga–Gasoro road (RN29) will provide improved road transport between the proposed Bugesera International Airport and the western and eastern parts of the country without necessarily passing through Kigali.

Some of the unpaved national roads that meet the connectivity criteria above were identified for upgrading in the 2008 – 2012 transport investment programme. These roads are therefore considered as belonging to the second tier in the national road hierarchy, after the paved national roads. In order to achieve better connectivity of this second tier road network, a section of RN21 from Tubungo on RN14 to Mavumba, and the district road RD66 between Mavumba and Nyarutovu, have been added to the proposed investment programme. Table 4.10 gives the list of these roads and their implementation status by 2012 while Figure 4.3 shows the second tier road network.

From Figure 4.3, roads RN16 and RN17form part of the Lake Kivu belt road network that links the Western and Northern Provinces to Lake Kivu. These two roads, together with

Figure 4.2: Strategic Paved National Road Network



Source: Population densities from www.afripop.org and roads from www.diva-gis.org

Table 4.9: Investment Programme and Indicative Cost Estimates for Capacity Improvements on Strategic National Paved Roads

Road Name and Code	Length (km)	2013 - 2018 US$ Million	2019 - 2024 US$ Million	2025 - 2030 US$ Million
Capital Investment (US$ Million)		0.42	253.8	253.8
Routine maintenance (US$ Million)		33.32	33.32	33.32
Total Investment		**33.74**	**287.12**	**287.12**

Source: various sources and author calculation

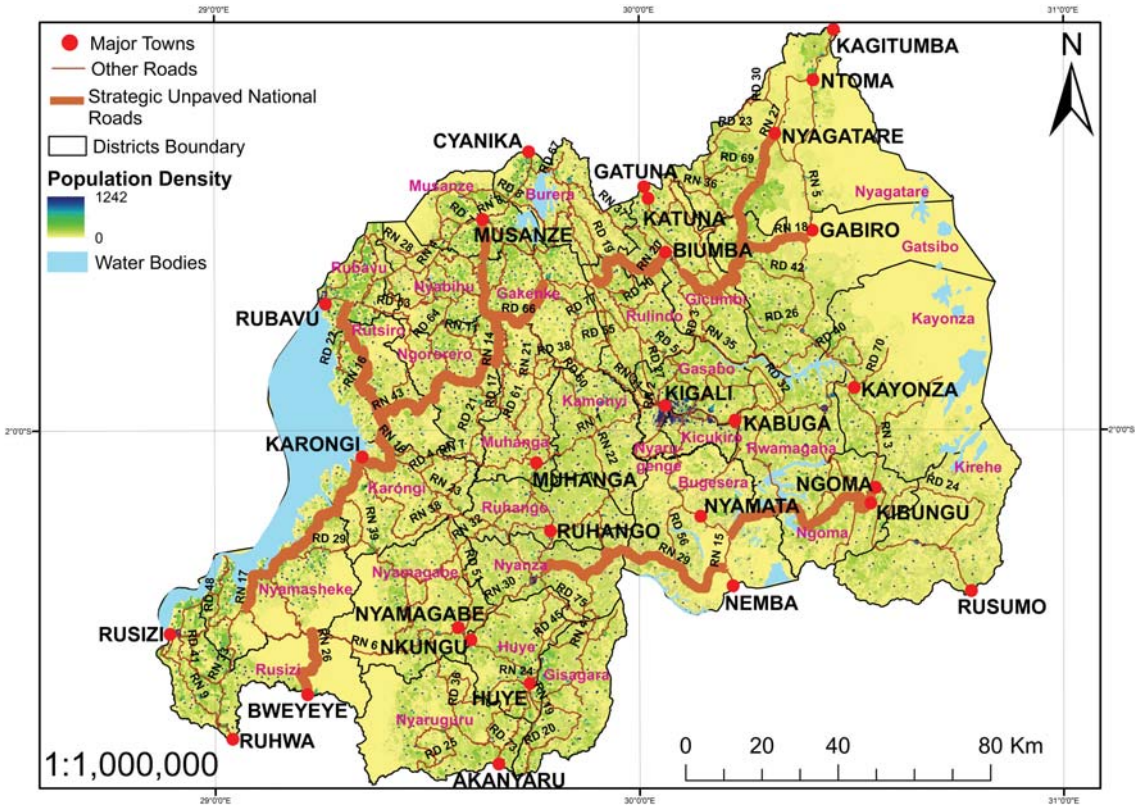
RN14, RN43, RN18, RN20, RN4, RD66, RN26 and part of RN21 form the vital link between the Cyanika and Ruhwa border posts. They pass through the Lake Kivu area, where water transport development is planned to enhance trade with the DRC and the port towns on the lake. The roads RN34, RN29 and part of RN15 are the other national roads that link the Eastern and Southern provinces and have the potential of opening up large parts of the country. In addition, RN34, RN15, and RN29 will provide the necessary connectivity to the proposed new Bugesera International Airport to the Western, Kigali and Eastern Provinces. The network length of these strategic unpaved roads is 697.6 km. The District road RD 66 should be re-classified to a national road to ensure continuity in the network between

Table 4.10: Second Tier Unpaved National Roads in the 2008–2012 Investment Programme

Name	Length (m)	Remarks
Musanze – Gataba (RN14)	36.9	Construction in progress
Rubengera– Pfunda (RN16)	80.6	One section with funding from BADEA, OFID, Kuwait Fund and AfDB. Two sections (2 lots): Rubengera - Gisiza and Gisiza- Pfunda are not started
Kibuye – Ntendezi (RN17)	93.0	Cyangugu - Mwityazo (50Km) section is on-going with funding from AfDB and China Exim Bank and GOR. The Mwityazo–Ruvuma–Kibuye not yet started but awarded. The project will form part of the multinational Burundi-Rwanda : (Lake Kivu Belt road)
Byumba–Nyagasa – Gabiro (RN18)	70.0	Not started
Byumba– Base (RN20)	45.6	Not started
Pindura– Bweyeye (RN26)	31.8	At tendering stage
Nyagasa–Nyagatare (RN27)	38.0	Not started
Kibugabuga–Nyamiyaga –Gasoro (RN29)	68.2	Not started
Ntendezi–Mashyuza–Bugarama (RN33)	37.4	Not started
Kagasa–Kibungo (RN34)	56.5	Not started
Lake Muhazi Ring Road (RN35)	51.3	Not started
Kazabe– Rutsiro (RN43)	57.5	On-going for periodic maintenance
Total length (km)	**690.6**	

Source: various sources and author calculation

Figure 4.3: Unpaved National Roads



Source: Population densities from www.afripop.org and roads from www.diva-gis.org

Table 4.11: Second Tier National Unpaved Roads Investment Programme and Indicative Cost Estimates

Period	Road Sections/ Districts	Length (Km)	Total cost	Maintenance
			USD Million	USD Million
2013 - 2018	RN14 Musanze – Gataba Road; RN16 -Rubengera - Pfunda Road; RN17 Kibuye – Ntendezi Road; RN43 - Kazabe– Rutsiro Road; RD66Nyarutovu – Muvumba Road; RN21 Muvumba – Tubungo Road; RN18 Byumba–Nyagasa – Gabiro Road; RN20 Byumba– Base Road; RN26 Pindura– Bweyeye Road; RN27 Nyagasa–Nyagatare Road; RN29 Kibugabuga–Nyamiyaga –Gasoro Road; RN33 Ntendezi–Mashyuza–Bugarama Road; RN34 Kagasa–Kibungo Road; and, RN35 Lake Muhazi Ring Road.	666.8	1,213.3	27.8
2019 - 2024	RN41 Gisagara and Nyanza Districts; RN24 Huye, Nyaruguru and Nyamagabe Districts; RN31+RD38 Gakenke, Muhanga and Rulindo Districts; RN23 Ruhango, Karongi and Nyanza Districts; RN21 Muhanga and Gakenke Districts; RN37 Burera and Gicumbi Districts; RN32 Nyamagabe and Ruhango Districts; RN28 Musanze and Nyabihu Districts; RN40 Kayonza Districts; RN39 Nyamagabe and Karongi Districts; RN24 Nyamagabe and Nyaruguru Districts; RN42 Nyaruguru District; RN30 Nyamagabe and Nyanza Districts; and, RN22 Ruhango and Kamonyi Districts.	753.2	1,370.5	25.4
2025 - 2030	RN18 Nyarukoni and Gabiro Districts; RN31 Gakenke District; RN28 Musanze and Nyabihu Districts; RN25 Musanze and Burera Districts; RN36 Nyagatare and Gicumbi Districts.	246.3	448.2	39.4
Total		**1,666.3**	**3,031.9**	**92.53**

Source: various sources and author calculation

RN4 and RN21 as proposed in this investment programme.

The cost of interventions recommended for these roads include capital costs for upgrading to paved standards at about US$1.82 million per kilometre, routine maintenance at an average cost of US$27,765 per kilometre per year for the upgraded paved sections and US$833 per kilometre per year for the unpaved sections throughout the plan period.

The unpaved road investment programme will increase the paved national road network progressively from 1,201 km in 2012 to 1,867.8 km in 2018 to 2,621.0 km in 2024, and finally to 2,867.3 km in 2030.The investment programme proposed for the second tier unpaved national by this study is presented in Table 4.11.

The approximate lengths of the individual roads summarised above is given in Tables below;

For the rest of the national roads (planned for the medium and long term investment period as shown in Tables 4.11 – 4.13 above) and the district roads (described in Table 4.17 below), this study has adopted the producer-surplus approach which considers the benefits that will accrue to the affected population in the various districts in Rwanda when the unpaved road links are improved. The two main producer benefits expected from the road improvements are greater agricultural productivity due to increased access to market and extension services; and economic diversification due to improved access by the rural population to non-agricultural commercial activities and social services. These benefits are expected to accelerate poverty reduction. Similar approaches have been used to identify priority districts where district Class 2 road improvements would have the highest benefits[22].

The criteria for ranking of the 30 districts, therefore, consisted

22 "Farm to Market Study" in Rwanda by the OTF Group funded by the USAID, and "Formulation Mission for the Rural Feeder Roads Sector Policy Support Programme in Rwanda" by Atkins and COWI funded by the EU Delegation to the Republic of Rwanda.

Table 4.12: Prioritised Unpaved National Roads for Upgrading to Paved Roads (2019 – 2030)

Rank	Road	Districts			Length (km)
1	RN41	Gisagara	Nyanza		60.8
2	RN24	Huye	Nyaruguru	Nyamagabe	46.8
3	RN31+RD38	Gakenke	Muhanga	Rulindo	79.4
4	RN23	Ruhango	Karongi	Nyanza	68.8
5	RN21	Muhanga	Gakenke		46.5
6	RN37	Burera	Gicumbi		50.7
7	RN32	Nyamagabe	Ruhango		98.9
8	RN28	Musanze	Nyabihu		55.2
9	RN40	Kayonza			29.2
Total Length (km)					**536.2**

Source: various sources and author calculation

Table 4.13: Unpaved National Roads for Upgrading to Paved Roads (2019 – 2030)

RN39	Nyamagabe	Karongi	53.8
RN24	Nyamagabe	Nyaruguru	34.0
RN42	Nyaruguru		50.6
RN30	Nyamagabe	Nyanza	33.8
RN22	Ruhango	Kamonyi	44.8
RN18	Nyarukoni	Gabiro	29.0
RN31	Gakenke		52.6
RN28	Musanze	Nyabihu	55.2
RN25	Musanze	Burera	76.0
RN36	Nyagatare	Gicumbi	33.5
Total Length (km)			**463.3**

Source: various sources and author calculation

of the following parameters: population density, hectares/km^2 under agricultural production, poverty levels and density of paved and unpaved roads. The ranking was undertaken by giving "scores" of 10 each for the top district in population density, hectares/km^2 of land under agriculture and high poverty prevalence.

Scores of 5 were given for the districts with no paved road and those with the lowest densities of unpaved road. Starting with the highest score, the scores for the other districts were allocated proportionately depending on the relative weight of the parameters.

As an example, the District of Nyarugenge gets a score of 10 since it is one of the districts with the highest average population density at 1,450 persons per square kilometre, while Gisagara with a population density of 413 persons per square kilometre scores 2.8. In the same way, when area under agriculture is considered, Gisagara with 23 hectares per square kilometre crop coverage scores 7.2 while Nyarugenge with zero crop coverage scores zero. For poverty prevalence, Gisagara, being one of the poorest districts in the Southern Province with 65 percent of its population in poverty, scores 10, while Nyarugenge with 14.3 percent poverty scores 2.2.

Considering road densities, Gisagara district has the highest score of 5 for lack of paved roads, and 0.72 for having unpaved road density of 0.21 km/km^2. Nyarugenge with a paved road density of 0.1km/km^2 scores the lowest at 0.1, and 0.69 for having an unpaved road density of 0.22 km/km^2.

The overall score for Gisagara District of 25.8 is the highest, while Nyarugenge Districts at an overall score of 12.9 ranks 29 out of the 30 districts. The overall scores and ranking

for the districts are presented in Table 4.14 and Figure 4.4.

From the foregoing analysis, the districts with the highest paved road density are Gicumbi 0.21km/km^2 Ngororero (0.20 km/km^2,) and Musanze (0.18km/km^2). Conversely, Gisagara District currently has no paved road, while Nyaruguru has only 17 km of paved road. These two districts may, therefore, be considered as having the worst transportation problems given that most unpaved roads (more than 68%) are generally in unacceptable condition. Muhanga and Gicumbi districts have the highest unpaved road density at 0.3km/km^2 and 0.25km/km^2 respectively. Kirehe has the least unpaved density at 0.03km/km^2.

The unpaved national roads were then prioritised for upgrading on the basis of the ranking of districts as presented above, while also taking into account network connectivity between the districts. Two sets of lists were made. The first consisted of national roads, which are prioritised at the third tier in the national road hierarchy for routine maintenance and upgrading to paved roads (Table 4.12). The aim is to ensure that each district has at least one paved road by 2025. The second list consisted of roads which are prioritised for routine maintenance and upgrading to sealed roads between 2025 and 2030 (Table 4.15).

Rehabilitation of District Roads Class 1

The priority list of district roads Class 1 (Table 4.17) for rehabilitation between 2013 and 2018 was identified using the priority list of districts in Table 4.14 after making the assumption that all national road investment programmes will have been adopted for implementation.

Rehabilitation costs were estimated at US$1.82 million/km for upgrading to bitumen standards and US$138,823 for upgrading to gravel standards; while for routine maintenance (after rehabilitation) at US$27,765/km for maintaining paved

Figure 4.4: Overall Ranking of Administrative Districts for Unpaved Road Investments

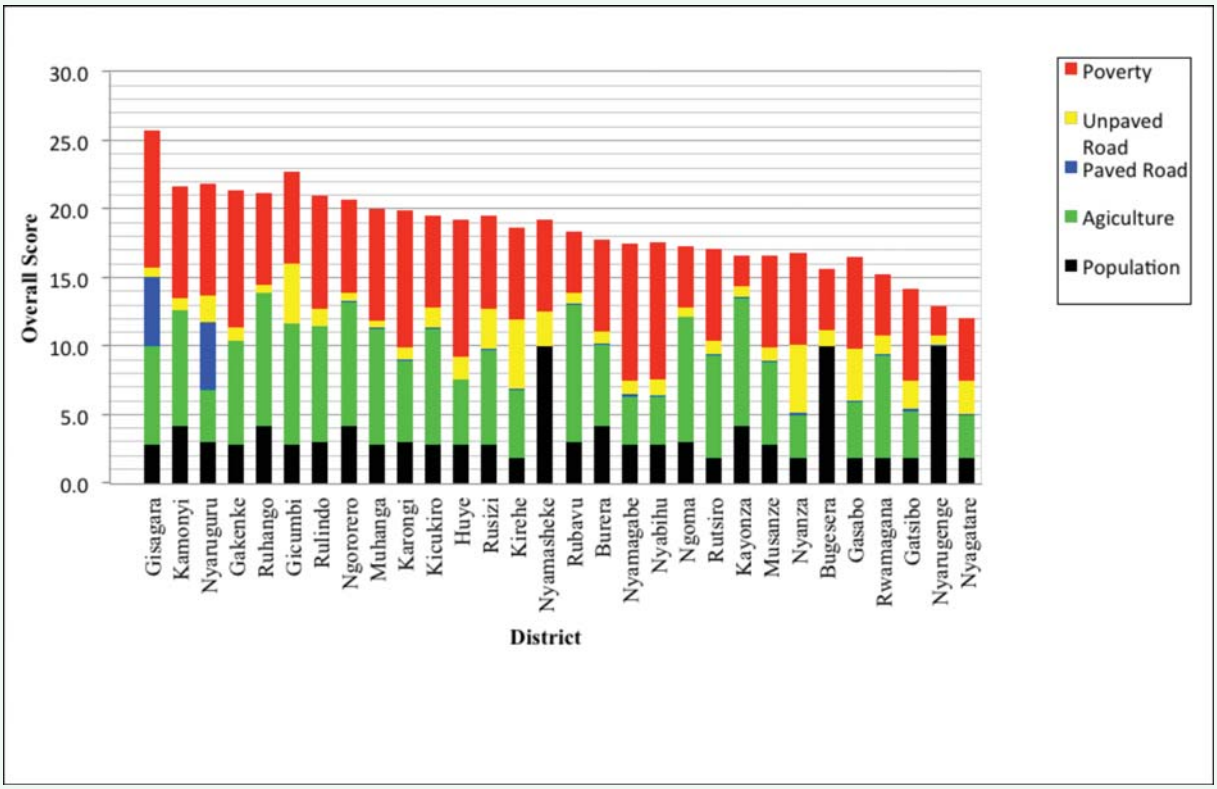


Table 4.14: Prioritisation of Districts for Investment in Unpaved National and District Roads

Rank	District	Population density		Agricultural coverage		Paved road density		Unpaved road density		Population in poverty		Overall Score
		(pers/km²)	Score	(ha/km²)	Score	km/km²	Score	km/km²	Score	%	Score	
1	Gisagara	413	2.8	23	7.2	0.00	5.0	0.21	0.72	0.650	10.0	25.8
2	Kamonyi	602	4.1	27	8.4	0.07	0.1	0.18	0.84	0.532	8.2	21.7
3	Nyaruguru	440	3.0	12	3.8	0.00	5.0	0.08	1.87	0.532	8.2	21.8
4	Gakenke	413	2.8	24	7.5	0.06	0.1	0.16	0.96	0.650	10.0	21.4
5	Ruhango	602	4.1	31	9.7	0.11	0.0	0.25	0.61	0.436	6.7	21.2
6	Gicumbi	413	2.8	28	8.8	0.06	0.1	0.03	4.29	0.436	6.7	22.7
7	Rulindo	440	3.0	27	8.4	0.21	0.0	0.12	1.25	0.532	8.2	20.9
8	Ngororero	602	4.1	29	9.1	0.08	0.1	0.23	0.64	0.436	6.7	20.6
9	Muhanga	413	2.8	27	8.4	0.10	0.1	0.30	0.50	0.532	8.2	20.0
10	Karongi	440	3.0	19	5.9	0.09	0.1	0.18	0.83	0.650	10.0	19.9
11	Kicukiro	413	2.8	27	8.4	0.14	0.0	0.10	1.50	0.436	6.7	19.5
12	Huye	413	2.8	15	4.7	0.13	0.0	0.09	1.66	0.650	10.0	19.2
13	Rusizi	413	2.8	22	6.9	0.12	0.0	0.05	2.99	0.436	6.7	19.5
14	Kirehe	266	1.8	16	5.0	0.06	0.1	0.03	4.99	0.436	6.7	18.6
15	Nyamasheke	1450	10.0	0	0.0	0.18	0.0	0.06	2.50	0.436	6.7	19.2
16	Rubavu	440	3.0	32	10.0	0.10	0.1	0.19	0.80	0.291	4.5	18.4
17	Burera	602	4.1	19	5.9	0.04	0.1	0.18	0.81	0.436	6.7	17.7
18	Nyamagabe	413	2.8	11	3.4	0.02	0.2	0.15	0.97	0.650	10.0	17.5
19	Nyabihu	413	2.8	11	3.4	0.05	0.1	0.13	1.15	0.650	10.0	17.5
20	Ngoma	440	3.0	29	9.1	0.12	0.0	0.22	0.69	0.291	4.5	17.3
21	Rutsiro	266	1.8	24	7.5	0.07	0.1	0.15	1.00	0.436	6.7	17.1
22	Kayonza	602	4.1	30	9.4	0.20	0.0	0.18	0.85	0.143	2.2	16.6
23	Musanze	413	2.8	19	5.9	0.03	0.2	0.16	0.95	0.436	6.7	16.6
24	Nyanza	266	1.8	10	3.1	0.03	0.2	0.03	4.99	0.436	6.7	16.8
25	Bugesera	1450	10.0	0	0.0	0.16	0.0	0.13	1.15	0.291	4.5	15.7
26	Gasabo	266	1.8	13	4.1	0.04	0.1	0.04	3.74	0.436	6.7	16.5
27	Rwamagana	266	1.8	24	7.5	0.08	0.1	0.11	1.34	0.291	4.5	15.2
28	Gatsibo	266	1.8	11	3.4	0.04	0.1	0.07	2.09	0.436	6.7	14.2
29	Nyarugenge	1450	10.0	0	0.0	0.10	0.1	0.22	0.69	0.143	2.2	12.9
30	Nyagatare	266	1.8	10	3.1	0.06	0.1	0.06	2.46	0.291	4.5	12.0

Source: Data from the Third Integrated Household Living Conditions Survey (EICV 3): Main Indicators Report – 2010/11, National Institute of Rwanda (NISR), and study calculations.

Table 4:15: Unpaved National Roads Investments and Indicative Cost Estimates (Third Tier)

	Total (US$ million)	2013 - 2018	2019 - 2024	2025 – 2030
Capital investment	3,031.9	1,213.3	1,370.5	448.2
Routine maintenance of paved roads	92.5	27.8	25.4	39.4
Routine maintenance of unpaved roads	1.04	0.83	0.21	0.0

Source: various sources and author calculation

Table 4.16: Targets for the Paved and Unpaved National Roads Investment Programme

Road Class	Indicator	2018	2024	2030
Paved national	Length of road improved (km)	0	369	
	Roads in good condition (%)	100	100	100
Unpaved national	Length of road upgraded to paved standards (km)	666.8	753.2	246.3
	Roads upgraded (%)	40.0	85.2	100

Source: various sources and author calculation

roads and US$833 for maintain gravel roads. Acquisition of road reserve for all the classified district roads will also be carried out at a cost of about US$ 40 million as contained in the EDPRS-II. The investment programme is summarised in Table 4.17.

The proposed targets are to rehabilitate 150 km to paved condition and another 150km to gravel standards within the first 5 years. The district roads class 1rehabilitation programme after 2018 should be prioritised based on traffic levels and the potential of the roads to support other sectors of the economy like agriculture and tourism. A participatory approach to prioritisation involving the communities and local government officials should be applied.

Rehabilitation of District Roads Class 2

Two studies [23] undertaken in Rwanda ranked all rural administrative districts based on land under agriculture and types of crops. Subsequently, this ranking was used to determine the neediest districts for rehabilitation of district roads Class 2. The USAID study prioritised investments in feeder (district Class 2) roads by considering two main factors:

1. Geographic areas (administrative districts) with the strongest demand for district Class 2 road investment in terms of agricultural production
2. District Class 2 road links that were more likely to offer the highest returns in terms of basic access to markets, schools, health centres and water collection points.

Table 4.19 summarises the administrative districts selected by the EU and USAID studies for rehabilitation of district roads Class 2. It also contains the lengths of district roads Class 2 to be covered and the estimated capital investment for each road.

The EU study recommends the following actions when identifying the priority district roads Class 2 within a prioritised administrative district:

23 Rural Feeder Roads - Sector Policy Support Programme (SPSP), Formulation Study, Final Report, March 2012, EU Delegation to the Republic of Rwanda; and Farm To Market Study by OTF Group, USAID, July 2009.

Table 4.17: Prioritised District Roads for Rehabilitation

Period	Programme	Road Sections/ Districts	Length (Km)	Total cost	Maintenance
				USD Million	USD Million
2013 – 2018	Upgrade to Paved Road	RD72 Nyamasheke District; RD26 Gatsibo and Gicumbi Districts; RD61 Muhanga District; RD1 Rulindo District;	148.5	270.2	42.8
	Upgrade to Gravel Road	RD53 Rutsiro, Ngororero and Rubavu Districts;RD49 Rusizi District ;RD48 Rusizi District ; RD21 Ngororero District; RD31 Nyagatare District;	149.3	20.7	1.3
2019 - 2024	Upgrade to Paved Road	RD53 Rutsiro, Ngororero and Rubavu Districts;RD49 Rusizi District ;RD48 Rusizi District ; RD21 Ngororero District; RD31 Nyagatare District; RD19 Burera District; RD13 Rubavu District;RD23 Nyagatare District; RD30 Nyagatare District ; RD42 Gatsibo District ; RD27 Rulindo District;	306.3	557.3	36.9
	Upgrade to Gravel Road	RD10 Rulindo District; RD24 Kirehe District; RD22 Rutsiro District; RD64 Ngororero District ;RD34 Rwamagana and Ngoma Districts ;RD60 Muhanga District; RD20 Gisagara District.	206.6	28.7	1.1
2025 - 2030	Upgrade to Paved/Gravel Road	Remaining District Roads	1180	2147.1	18.4
Total			**1,841**	**3,023.99**	**100.46**

Source: various sources and author calculation

Table 4.18: District Roads Investment Programme

Intervention	2013 -2018	2019 - 2024	2025 - 2030	Total (US$ million)
Rehabilitation maintenance (US$ million)	290.9	586.0	2147.	3,024
Routine Maintenance - Unpaved (US$ million)	44.1	38.0	18.4	100.5

Source: various sources and author calculation

1. Involving the District Development Plan (DDP) teams and community in the identification process for project ownership and participation in future routine maintenance;
2. Using agricultural data available at sector (administrative unit) level to rank sectors based on the staple crop gross cultivated area per capita. This will indicate areas of higher production and hence greater marketing demand. The roads in the higher ranking districts/ sectors should be given preference while those in the lower ranking districts/sectors are taken up in subsequent years;
3. Selecting district roads Class 2 closer to the valley bottom for rehabilitation as most of the productive areas and those serving grain storage houses are in valley bottoms (marshlands);
4. Prioritising roads where there are still wooden or buried pipe culverts and roads without proper shape;
5. Selecting roads in a cluster (or a network) where the branch roads also serve agricultural areas; and
6. Prioritising roads that support irrigation, land consolidation and land terracing projects

The proposed investment programme for the district roads Class 2 will begin in 2013 and is expected to run until 2018 with the achievement of 2,550 km of rehabilitated road with funding by USAID, World Bank, EU, Netherlands government and the Government of Rwanda. The remaining 6,750 km will be rehabilitated from 2018 for the next ten years. The unit rates applied for upgrading district roads Class 2 to gravel standards is as per the EDPRS II estimate of US$4,165 per km and subsequent maintenance at US$555 per km.

Table 4.19: Priority Districts for District Roads Class 2 Rehabilitation

Period	Donor/Districts	Length (Km)	Total cost	Maintenance
			USD Million	USD Million
2013 - 2018	USAID: Nyagatare, Gatsibo, Kayonza, Rwamagana, Ruhango, Nyanza, Kamonyi, and Nyabihu.	2,550	10.6	1.4
	Netherlands: Nyamasheke, Rusizi, Burera, Gicumbi, and Musanze.			
	World Bank: Rwamagana, Gisagara, Karongi, and Nyamasheke.			
	GoR/EU: Ngoma, Bugesera, Rulindo, Huye, Rubavu, Ngororero, Muhanga (Gakenke, Nyamagabe, Rutsiro, Nyaruguru).			
2019 - 2024	Other Districts	3,000	12.5	3.1
2025 - 2030	Other Districts	3,750	15.6	5.2
Total		**9,300**	**39**	**10.0**

Source: various sources and author calculation

Table 4.20: District Roads Class 2Rehabilitation Investment Programme and Indicative Cost Estimates

Intervention	2013 -2018	2019 - 2024	2025 - 2030	Total (US$ million)
Improvement maintenance (US$ million)	10.6	12.5	15.6	39
Routine maintenance (US$ million)	1.4	3.1	5.2	10

Source: various sources and author calculation

The target is to rehabilitate at least 2,550 km within the first five years to achieve 27.4% of district roads Class 2 in good condition by 2018. Like the district roads, the district roads Class 2 to be included in the rehabilitation programme should be selected based on their potential to support agricultural production. Similarly, the prioritisation process should follow a participatory approach involving the affected local communities and government officials. Involvement of the local communities will promote ownership and generate employment through the use of local labour and equipment like trailers for haulage of road construction materials and tools. The HIMO[24] approach for investment in rural district roads Class 2 stimulates growth of related Small and Medium Enterprises (SMEs), and farmer organisations. MINALOC has developed a National Labour Intensive Public Works Strategy, which is a multi-sector programme to promote employment of the youth in public works. The main areas of intervention for the programme include road infrastructure; agricultural and environment protection infrastructure; water supply and schools and health infrastructure. The main objective of the programme is to reduce poverty, provide support to the decentralisation process and promote local economic development.

One of the strategies towards sustainable maintenance of district Class 2 roads is to include the training and capacity development in basic labour-based road engineering and construction management techniques for small-scale contractors and supervisors.

It will also be necessary to establish a special mid-level technical college, or to introduce courses at existing tech-

24 The approach employs labour-intensive methods for the rehabilitation of roads, through contracts to farmer-based organizations and SMEs, with technical and managerial expertise from an international NGO for coordination with local authorities. The objective is employment creation in the context of accelerated agricultural production.

nical colleges, to train engineering technicians, surveyors and managers in local resource-based approaches[25] to road development and maintenance. In the short term, a training programme for district engineers in labour-intensive approaches should be initiated in existing technical institutions. These interventions will complement the community-based routine road maintenance initiatives currently being implemented by districts in Rwanda.

4.4.6 Consolidated Road Transport Infrastructure Investment Programme

A summary of the consolidated investment programme for road transport infrastructure for the period 2013-2030 is given in Table 4.21.

Prioritisation for Road Maintenance

Prioritisation for maintenance and rehabilitation of roads should be based on inventory and road condition data that are collected regularly and analysed as part of a Road Maintenance Management System (RMMS). This approach will require an inventory of all roads, their condition and development of unit rates for various items of work and operations. It will also require the establishment of intervention levels based on desired levels of service, budgetary constraints and scenarios, and a continuous monitoring and evaluation framework. Currently, the maintenance practice in Rwanda is more reactive than planned and is not always based on traffic volumes or economic justification.

4.4.7 Rural and Urban Public Transport Infrastructure Investment Programme

The Government of Rwanda adopted a Public Transport Policy and Strategy for Rwanda in October 2012 to address the existing and future transport challenges for road transport services and Non-Motorised Transport (NMT). The strategy is developed to improve public transport over a period of 20 years. Some of the key strategies to be implemented in the first 5-year action plan are: (i) development of public transport policies and regulations (US$0.257 million) (ii) development of quality bus corridors for intercity travel (US$6.75 million) (iii) development of regulations for City of Kigali public transport services(US$1.246 million) (iv) City of Kigali public transport infrastructure (US$377.025 million) (v) administration (US$11.03 million). The infrastructure for Kigali includes construction of 120 km of dedicated bus lanes, upgrading of 108km of unpaved roads to paved standards, 17km of Bus Rapid Transit corridor, 1,000 bus shelters, development of a central intercity bus terminal, high quality facilities for pedestrians and park-and-ride facilities. The total investment required over the 5-year period is substantial at US$386.408 million.

25 Local Resource Based Approach may be defined as: "The optimum utilisation and development of locally available resources where technically and economically feasible and in a socially and environmentally sustainable manner".

Table 4.21: Consolidated Road Transport Infrastructure Investment Programme and Indicative Cost Estimates

Investments	**2013 - 2018**	**2019 - 2024**	**2025 - 2030**	
Capital				**Total (US$ million)**
National roads	1,281.6	1,624.3	702.0	3,607.9
District roads	330.2	586	2,147.1	3063.3
District roads Class 2	10.6	12.5	15.6	38.7
Maintenance				**Total (US$ million)**
National roads	61.12	58.72	72.7	192.56
District roads	44.1	38	18.4	100.5
District roads Class 2	1.4	3.1	5.2	9.7
TOTAL	**1,729.02**	**2,322.62**	**2,961**	**7,012.64**

Source: various sources and author calculation

This study recommends that public transport infrastructure investments should be phased out over a longer period to reduce the likely financial gap in the short-term.

It is proposed that dedicated bus lanes, upgrading of about 54 km of unpaved roads within Kigali and administrative costs should be pushed forward to the medium term while investments in Bus Rapid Transit (BRT) corridors can be implemented in the long term. The rest can be in the short term. Adopting this recommendation phases the financial needs in the short-, medium, and long-term to US$146.7, US$302.4, and US$22.8 million respectively. The Conceptual Master Plan of Kigali, the STMP and the Public Transport Strategy Action Plan identified various investment programmes for urban transport. These are consolidated in Table 4.22.

In the short term, investments should target the construction of the Kigali city north-eastern bypass that connects the Kigali – Rwamagana road and the Kigali – Gicumbi road to relieve congestion in the city centre.

4.4.8 Investment Programme for Weighbridges and Upgrading of Border Posts

Axle load control weighbridge stations with full traffic control will be required at the four main border posts of Gatuna, Rusumo, Rubavu, Akanyaru and Cyangugu to ensure that overloaded incoming international trucks are not allowed on the national road network. In addition, mobile weighbridges will be required along the four main national roads (RN 1, 2, 3 and 4) near Kigali and at major transport nodes at Huye, Gitarama, Rubavu and Kayonza. This network of weighbridge stations should be installed in the short term to ensure effective control of overloading and preservation of road pavement structures.

Delays at the Gatuna and Rusumo border posts are expected to reduce once they are upgraded to one-stop border posts. The World Bank and Government of Japan will fund the projects. The remaining border posts at Kagitumba, Akanyaru and Cyangugu should also be upgraded.

Construction of four road side Truck stops/ Roadside

Table 4.22: Urban Transport Investment Programme and Indicative Cost Estimates

Project	2013 - 2018	2019 - 2024	2025 - 2030
Development of a Business Model for bus operation under route franchising approach for rural bus service	0.22		
A new public limited company is fully operational to provide improved bus services in 98 rural routes	0.03		
Consolidated public limited companies or operators' cooperatives working in the Public Transport Sector for Bus Services	0.03		
Full tax rebate for importation large standard bus for public transport (approximately 292)	8.67		
Development of a public transport fare policy	0.20		
Review of Public Transport Regulations	0.01		
Designing and bundling routes	0.03		
Publication of route operators	0.00		
Study on Parking Management Strategies for Kigali City	0.30		
Implementation of Recommended Parking Strategies for Kigali City	0.49		
Feasibility study and preliminary design on the construction of 3 town bypass roads in Huye, Muhanga and Musanze	0.49		
Feasibility study and preliminary design on the construction of Kigali City Ring road cum Expressway	0.69		
Construction of Kigali City Bypass/Ring Road		104.00	
Construction of Muhanga Bypass		52.0	

Construction of Huye Bypass		26.0	
Construction of Musanze Bypass		52.0	
Nyabugogo (Gatsatsa) Multi-Modal Facility (Kigali City North-Western Sector)		11.4	
Free Zone freight Multi-Model Facility (Kigali City Eastern Sector)		22.8	
Bugesera Airport Multi-Modal Facility (Kigali City South Sector)		11.4	
Free Zone freight Multi-Model Facility (Kigali City Eastern Sector)		22.8	
Kicukiro Multi-Modal Facility (Kigali City Southern Sector)			22.8
Development of standard bus routes and schedules for Kigali City	0.14		
Development of a Business model for bus operation under route franchising approach for Kigali City	0.22		
Pilot project of standard scheduled bus service and integrated ticketing system under a route franchising approach in Kigali City	0.48		
30 km of Dedicated Bus Lanes (DBLs) for exclusive use by Dedicated Right-of-Way Buses in bus routes with expropriation;	31.73		
Maintenance of 30 km of Dedicated Bus lanes	1.59		
Detail Design Study for a BRT system for Kigali City	0.34		
Improvement of 650 bus shelters in Kigali City	14.72		
Maintenance of Bus Shelters in Kigali City	0.74		
100 Automated smart fare collection system in bus shelter	0.29		
Integrated Smart ticketing system with micro processing ability (1000,000 cards)	6.83		
Intersection upgrade (Queue jumps at 6 numbers of signalized interactions)	0.14		
Intersection upgrade (Queue jumps at 7 numbers of Intersections)	0.17		
Establishment of a Public Transport Operation control centre	0.60		
Development of a Central Intercity Bus Terminal;	1.68		
Maintenance of Central Intercity Bus Terminals	0.08		
Development of Bus Sleeping Ground by upgrading existing taxi park	0.02		
Maintenance of Existing Bus Sleeping Ground	0.00		
Establishing a new sleeping ground for bus	0.05		
Maintenance of New Sleeping Ground	0.00		
100 km of High Quality footpath on both side of roads with shade tree at 10 m interval including wheel chair access facilities for disables	4.81		
Maintenance of 100 km of Footpath	0.10		
Improvements to pedestrian access ways/tracks (100 km)	3.37		
Maintenance of Pedestrian Access Ways/Tracks	0.07		
100 number of pedestrian crosswalks with signal	1.92		
Maintenance of Pedestrian Crosswalks with Signals	0.04		
3 number of Park-and-ride facility (open lot parking) peripheral area	5.77		
Maintenance of Park and Ride Facilities	0.17		
Bicycle parking at 25 sites	0.19		
Maintenance of Bicycle Parking at 25 sites	0.00		
82 km of City of Kigali unpaved roads upgraded to paved road for bus routes	41.00		
Maintenance of Upgraded Roads of Kigali City	4.10		
Construction of a Grade Separated Intersection at Nyabugogo	7.50		
Maintenance of the Grade Separated Intersection	0.38		
Development of a Business Model and Detailed Design of Quality Bus Corridor Service for Intercity bus service	2.40		
Quality Bus Corridor Service Pilot Project	0.48		
Implementation of Quality Bus Corridor Service in 11 routes	3.37		
140 km of all main roads in major urban centres have basic facilities for NMT and pedestrians	0.04		
Maintenance of NMT and Pedestrian Facilities in Urban Centres	0.001		
Total	**146.7**	**302.4**	**22.8**

Source: Study estimates based on the STMP and EDPRS II

stations should also be done within the short term as envisioned in the EDRPS II. The cost estimate for these projects are summarised in Table 4.23.

4.4. 9 Regional Transport Investment Programme

The EATTF project discussed in section 3.10, and other projects identified in the air, water, pipeline, railway and road transport will address Rwanda's regional transport challenges and contribute to reducing transport costs along the Central and Northern corridors.

Active participation of the Government of Rwanda through a dedicated high-level committee in regional initiatives will be necessary to ensure timely implementation of the regional projects.

4.4.10 Institutional and Capacity Building Investment Programme

Several sector policy, regulation and institutional capacity-building issues that cut across many sub-sectors as discussed in Chapters 2 and 3 should form part of the investment programme. All the projects in this category, except human capacity building, will be implemented in the short term. These projects are summarised in Table 4.24.

Support to the human capacity-building programme should be channelled through the Multi-Sector Capacity Building Programme, which is a long-term Government Strategic Framework meant to guide and direct the preparation and implementation of capacity building actions in Rwanda.

The US$3.5 million expected to support the training of about 100 graduates and 200 technicians in the fields of road, rail, water and pipeline transport.

Consolidated Transport Sector Investment Programme

Table 4.25 gives a summary of the proposed investment programme for the whole transport sector and the estimated funding from the public and private sectors.

Discussions on how this investment programme can be financed are presented in Chapter 6.

Table 4.23: Investment Programme on Weighbridges and Border Posts and Indicative Cost Estimates

Project	2013 - 2018
Feasibility Study and Detailed Design of 5 OSBP (3 at primary border posts of Kagitumba, Rusumo and Akanyaru Haut & 2 at secondary border posts of Rusizi/Cyangugu and Cyanika)	0.49
Development of 5 OSBP (3 at primary border posts of Kagitumba, Rusumo and Akanyaru Haut & 2 at secondary border posts of Rusizi/Cyangugu and Cyanika)	112.25
Operation and Maintenance of 5 OSBP	0.56
Feasibility Study and Detailed Design of 4 Truck Stops/Roadside Stations	0.02
Construction of 4 Truck Stops/Roadside Stations	6.74
Operation and Maintenance of 4 Truck Stops/Roadside Stations	0.34
Approval of Axle Load Control Policy and Strategy	0.02
Install weighbridge at Akanyaru, Cyangugu, Gatuna, Rubavu and Rusumo Border Posts	10.09
Operation and Maintenance of 5 Weighbridges at Border Posts	0.10
Mobile weighbridge stations at Huye, Rubavu, Gitarama and Kayonza; and on RN1, 2, 3 and 4 near City of Kigali	4
Total (US$ Million)	**134.60**

Note: Study estimates based on the STMP and EDPRS II

Table 4.24: Institutional and Capacity Building Investment Programme and Indicative Cost Estimates

Priority	Project description	2013 - 2018	2019 - 2024
1	Strengthen legal and institutional capacity and improve service delivery system	0.18	
2	Implementation of Performance Based Maintenance and Management of Roads (PMMR) Contracts (PPP)	0.39	
3	An effective M&E system with objectively verifiable indicators in place	0.30	
4	Restructuring of RTDA to undertake tactical functions for public transport	0.74	
5	National Reference Laboratory for Road/airport Infrastructures created and operational	3.08	
6	Laboratory Design and Establishment of Trauma centres in Rusizi and Rubavu	0.25	
7	Operation of Trauma Centres	0.15	
8	Establishment of an advanced Accident Investigation System and Accident Database for National Police in collaboration with RTDA;	0.98	
9	Development of Safety Standards and Establishment of annual safety auditing system	0.59	
10	Establishment of Transport Safety and Vehicle Fitness Investigation and Control Unit in RTDA under the proposed restructuring plan	0.49	
11	Establishment of a separate emergency work management unit in RTDA	0.49	
12	Allocation of at least 6% of funds from GoR for emergency work and disaster management	15.00	
13	At least four regional vehicle inspection centres established under private sector ;	0.98	
14	Study on reduction of fuel costs for motor vehicle in Rwanda	0.42	
15	Study on alternative fuel and fuel efficient engine for motor vehicles in Rwanda	0.42	
16	Categorization and registration of conductors on the basis of technical and financial capabilities	0.20	
17	Technical teams of all District trained	2.00	
18	Postgraduate research degrees in Transport introduced in KIST and NUR	0.79	
19	100 transport sector professional trained at Master level;	1.97	
20	50 technicians in transport sector provided on-job practical training	0.02	
21	Training for 50 transport professionals and contractors on contract and project management;	0.49	
22	400 roadside local communities to be trained on Labour Intensive Public Works (HIMO/ LIPW) activities related to road construction and maintenance	39.38	
23	Land use and Transport Plan for Kigali City	1.00	
24	Develop strategy for integration of quality bus corridor service with other public transport modes		1.00
25	Develop National Road Safety Standards in line with Road Safety Strategy to be implemented by RTDA.		3.00
26	Review of Road Traffic and Safety Act to include Road Safety Strategy		3.00
27	Develop and Implement Rural Road Management Programme in association with ASSETIP		0.50
28	Rwanda participation in regional initiatives		2.00
29	Design and establish a Road Management System (RMS) / Integrated Road Network Management System (IRNMS)		1.50
30	Develop Rwanda OLC strategy (aligned with the EAC)		0.50
31	Develop and implement Rwanda Roads Classification System, including Road Design Specifications and a signage strategy		1.00
32	Develop Technical Guidelines and Standards for planning and operation of infrastructure of Rwanda, including feasibility and funding approaches (road, rail, inland waterways and airports)		4.00
33	Establish and empower a Transport Safety and Urban Planning Units in RTDA		3.00

34	Strengthen RURA to have capacity in regulating Water Transport and Public Transport planning		2.00
35	Human Capacity Building Programme (10 years)		3.50
36	Provide Rwanda Police with Transport Enforcement Equipment		2
37	Preferential treatment and Incentive for companies employing women labourers and supervisors for road construction and maintenance	0.25	
38	Campaign for companies employing women labourers and supervisors for road construction and maintenance	0.12	
39	Encouragement of women to run transport companies by arranging special campaign and preferential treatment	0.06	
40	Incentive for Bus/Taxi operators for ensuring access for disable and infirm passengers	4.92	
41	Reserving parking facilities for disables in all parking lots	1.23	
42	Special provisions in all tender documents for large capital projects incorporate HIV prevention activities, Gender equality and access to transport for disables and infirm	1.62	
43	Regional initiatives to reduce transit time in sea ports	15.00	
44	Regional initiatives to expand the capacity of sea ports	0.98	
45	Regional initiatives for simplification of custom, scanning, tracking, clearing and forwarding of international freight	0.32	
46	Integrated regional logistics service	55.00	
47	Maintenance of Logistics centres	2.75	
48	Development of Agro-logistics and Multi-Service Centres	16.32	
49	Maintenance of Agro-logistics and Multi-Service Centres	1.63	
50	Improved Communication in freight transport services	3.50	
	TOTAL	**174.05**	**27.00**

Source: STMP, EDPRS II, and author estimates

Table 4.25: Consolidated Transport Sector Investment Programme and Indicative Cost Estimates

Sub-sector/ Project	**2013 - 2018**	**2019 - 2024**	**2025 - 2030**	**Total (US$ million)**	**Public Sector (US$ million)**	**Private Sector (US$ million)**
Institutional/Capacity Building	174.05	27.0		201.05	201.5	0.00
Roads	1,729.0	2,322.6	2,961.0	7,012.64	7,012.64	0.00
Aviation	254.29	494.4	294.75	1,043.44	260.86	782.58
Pipeline	1.15	635.77	500	1,136.92	284.23	852.96
Rail	1.97	1,126.00	0	1127.97	281.99	845.98
Water	4.95	254.9	0	259.85	64.96	194.89
Border Posts and Weighbridges	134.6	0	0	134.6	134.6	-
Urban Transport and Multi-Modal Facilities	146.7	302.4	22.8	471.9		-
Total (US$)million	2,446.71	5,136.07	3,483.80	11,388.37	8,240.78	2,676.41

Source: various sources and author calculation

CHAPTER 5: IMPACTS OF TRANSPORT PROJECTS ON INCLUSIVE GROWTH

5.1 Introduction

Integration of environment, gender, poverty and other cross-cutting themes like youth employment can be effectively achieved if they are built into transport sector programmes and projects, and mainstreamed through adequate ring-fenced budgets. Implementation of strategies to achieve inclusive growth and the gradual adoption of green growth interventions will ensure that these cross-cutting issues are addressed effectively.

Measurement of progress toward these objectives in programmes and project reports is necessary to create a base for appropriate monitoring and evaluation. Strengthening these practices will facilitate funding by international partners, who are expected to report on cross-cutting themes in their worldwide and regional activities.

5.2 Transport and Environment

Transport projects are intended to improve people's economic and social welfare. Adequate transport systems can reduce travel times and lower user costs, while also increasing access to markets, jobs, and education and health services.

Transport related activities often have significant negative effects on the built and natural environment, and hence, human lives. Some of these activities contribute significantly to global warming. Transport can therefore be unsustainable in the medium to long term unless mitigation measures are in place against the detrimental effects. The environmental effects of transport result from emissions of carbon monoxide, particulate matter, lead, hydrocarbons, and nitrogen oxides and from noise pollution. Other impacts include (i) the exploitation of large amounts of oil-based resources (ii) extraction of materials for infrastructure construction (iii) emission of carbon dioxide and other global warming gases (iv) motors vehicle wastes like tyres and fluids (v) habitat fragmentation and land use for infrastructure development (vi) pollution of water from spillage and runoff, and changes to water systems during infrastructure construction.

The environmental impacts cover the full lifecycle of transport activities from development to the operational phase. The largest impacts, however, are experienced during the operational phase, although they are not always given much attention by regulatory authorities. Most policies and strategies employed by governments to regulate the transport operational phase have mainly focussed on improving vehicle technology and fuel quality to reduce pressure on the environment.

However, trends and projections in the European Union where such policies have been in force longer show that they have not been adequate in reducing greenhouse gas emissions and that the effect of mitigation measures has been more than offset by increased transport volumes. The European Environmental Agency (EEA) recommends that to achieve reasonable levels of emission reductions, any measures and policy instruments introduced must also adequately address demand for transport. The EEA further suggests that "to address transport demand, measures and policy instruments must go beyond the transport sector itself and be introduced into sectors of the economy such as households, industry and service, within which the demand for transport actually originates".

The Rwanda Environmental Management Authority (REMA) was established in 2006 to lead the development and implementation of policies and strategies related to environmental management and climate change mitigation and adaption. In October 2011, Rwanda adopted a Green Growth and Climate Resilience Strategy (GGRCS) to guide the achievement of Rwanda's Vision 2050: a developed, climate-resilient, and low carbon economy by 2050. The GGRCS, among other things, prioritizes the development of climate resilient transport systems including low carbon urban systems. To ensure sustainability of the GGRCS proposed interventions, the Rwanda Environment and Climate Change Fund (FONERWA) was established in 2011 to mobilize domestic and global resources. Current achievements include the establishment of a motor vehicle inspection centre to

ensure compliance with the regulatory emission standards. Moreover, the Ministry of Natural Resources reviews and approves Environmental and Social Impact Assessments (ESIAs) and, in collaboration with the Rwanda Development Board and REMA, also monitors the implementation of ESIA mitigation measures in transport investments.

International experiences also present some lessons for Rwanda. For instance, all transport projects should be developed in compliance with the country's environmental regulations, and should also address other issues covered in international development agencies' safeguard policy documents. ESIA reports should comprehensively and adequately cover the construction, operation and maintenance stages of transport projects.

Anticipated changes to the health and socio-cultural well-being of communities and impacts on the biophysical environment and biodiversity must be considered in the ESIAs. The needs of the poor and of future generations should also be taken into account. The full range of impacts on the natural and social environment needs to be identified and quantified. Procedures can then be established for avoiding, mitigating and compensating for the impacts include provisions for consulting affected communities and following up with implementation plans and training. The ESIA approach is not solely for identifying the negative effects of a project in the area it is being planned for, but also should be crafted to optimize the positive effects of the project.

A sustainable transport policy needs to build on a broader range of policy tools to achieve the shift towards more environmentally friendly transport modes where appropriate, especially for long distance travel, in urban areas and on congested corridors. At the same time, each transport mode must be optimised to become more environmentally friendly, safe and energy-efficient. Finally, multi-modality, or the efficient use of different transport modes on their own and in combination, will result in optimal and sustainable resource utilisation. These measures offer the best guarantee toward the simultaneous achievement of a high level of mobility and environmental protection.

Specific policies should be put in place to (i) discourage the use of environmentally inefficient means of transport such as private cars and promote the use of non-motorised modes (ii) adopt pricing measures that will enhance the use of sustainable means of transport such as mass transit (iii) improve on the efficiency of the transport system to minimise environmental effects through the use of cleaner fuels and other new technologies for transport vehicles (iv) manage travel demand through better land use and transport planning.

Just like good transport project planning, management and execution requires well-trained transportation professionals, conducting technically credible and environmentally sensitive projects requires experienced environmental professionals to support the engineering team. These personnel should be available at the transport agencies and must be incorporated into the project development process at a very early stage.

5.3 Transport and Gender

Women and men in developing countries have different transport needs and priorities, and are thus often affected differently by transport interventions. For example, rural transport projects that build roads for motorised transport often do not benefit rural women, who mainly work and travel on foot in and around the village on paths leading to local shopping areas, markets, water collection points and firewood gathering sites. Similarly, urban transport systems designed to move people to and from employment centres may also be inadequate for the needs of women who must combine income generation with household activities such as taking children to school and visiting the market.

The failure of the transport sector to meet women's needs and priorities affects women negatively in several ways. Because of a lack of access to adequate transport facilities, women enjoy less mobility than men; hence their access to

Box 5.1: Peru's Rural Roads Program

The joint World Bank/Inter-American Development Bank Peru Rural Roads Program (RRP) worked with men and women of the Andean region to improve main roads and smaller roads and tracks. It involved rural women in its design and implementation by requiring that women comprise 20% of the members of the road committees, 10% of the members of road maintenance micro-enterprises and 30% of direct beneficiaries. The project repaired and improved transport systems heavily used by women, such as 3,000 km of pedestrian tracks often forgotten by road upgrading programs.

After project completion, women participated more in markets and fairs and spent less time obtaining fuel and food supplies. Over 77% of surveyed women reported that the rehabilitated roads and tracks enabled them to travel farther, 67% reported that the project enabled them to travel more safely and 43% reported that they were able to obtain additional income (Making Rural Roads Work, 2005). The project helped reduce travel times for both women and men by up to a half. Improved transport services enhanced communities' access to health services and markets, improved the quality of education and facilitated social interaction. Women's participation in local initiatives and politics also increased.

Source: Gender and Development Group, Briefing Notes, March 2007, the World Bank.

markets and employment is constrained. Women's safety suffers when their needs are not taken into account in transport project design, for example, due to the absence of street lighting or when good roads are located in isolated areas. Women's health can also be impacted negatively by the lack of adequate transport in times of emergencies like child birth.

Addressing transport-related gender inequalities is beneficial to the society as a whole. Reducing women's time costs and increasing their mobility and safety increases their productivity, which makes society as a whole more productive. Gender-responsive transport services can thus help empower women, improve health, provide education opportunities and ultimately reduce poverty, which are important concerns of the Millennium Development Goals (MDGs).

Several transport projects in countries such as Guatemala, India, Indonesia, Senegal and Yemen have sought to address the particular needs of women. The success of such projects depended not only on the project design, but ultimately on the work of staff who believed in gender equality. Yet, once implemented effectively, these projects produced benefits that accrued to all members of society (Box 5.1).

Improving social and gender equality in transport infrastructure and services is a key priority in Rwanda's Transport Sector Strategic Plan (TSSP) for EDPRS-2. In particular, the TSSP identifies several key strategies for enhancing social inclusion in particular gender quality in the transport sector including: (i) gender-informed transport project planning, implementation and evaluation; gender-responsive intermediate or non-motorized means of transport; (iii) promoting women's participation in the transport sector; (iv) expanding women's access to public transport, district roads Class 2 and paths; and (v) awareness raising and advocacy on gender and transport.

The TSSP also proposes an incentive structure for: (i) companies employing women labourers and supervisors in road construction and maintenance and (ii) establishment of female-owned and/or female led/managed transport infrastructure and service companies. These initiatives are expected to improve social inclusion and gender equality in the provision of transport infrastructure and services.

5.4 Transport and Poverty

Poverty is a major constraint to travel and transport, either directly or as an opportunity cost that makes it difficult to afford or which forces people to forego certain activities so they can travel or transport goods. Opportunities and markets may thereby be effectively "inaccessible" and real "choice" restricted. The transport sector consumes a considerable part of the overall budget for infrastructure investments in developing countries, which makes it necessary to increase the benefits toward poverty reduction. In the short and medium term, pro-poor transport policies and strategies, like encouraging labour-intensive road construction methods and the use of intermediate road transport vehicles, should be implemented. Such interventions can be effective ways of increasing the benefits to the poor.
The provision of transport services, including the construction and maintenance of transport infrastructure, generates

demand for labour (often unskilled) and provides income-earning opportunities for the poor. If a transport project generates jobs for the poor who are otherwise unemployed or underemployed, it contributes to the poverty reduction.

In Rwanda, poverty is mainly a rural problem, where the majority live and depend primarily on agriculture. Reaching out to the poor in the rural areas is therefore essential for promoting economic growth. Some transport policies and strategies that can address poverty include (i) encouraging the construction and maintenance of infrastructure (urban and rural) through labour-intensive methods (ii) upgrading of non-motorised transport infrastructure that is safe, convenient and direct; (iii) and maintaining district Class 2roads used by poor farmers in transporting their agricultural inputs and produce to markets, to reduce transport costs manifested as high fares and the loss of produce incurred due to the deteriorated road conditions.

The Vision 2020 Umurenge Programme (VUP), the second flagship programme under EDPRS-1 (2008-2012) has expanded access to economic opportunities for the poorest and most vulnerable Rwandans including through public works programs. The percentage of eligible households granted direct support under the VUP has remained at 100% in both FY 2010/11 and 2011/12 while the percentage of eligible households benefiting from public works programmes increased to 54% in 2011/12 and higher than the 35% target. As a result, marked progress has been achieved in reducing extreme poverty, a key objective of the VUP, from 35.8% in 2005/06 to 24.1% in 2010/11. It is projected that the MDG extreme poverty target of 17% will be met by 2013/14 if this rate of reduction is maintained. While the decline in extreme poverty was experienced across all provinces, rural and urban areas, the reductions were faster in rural (from 39.5% to 26.4%) compared to the urban areas (16% to 10.4%). Sustaining the implementation of such programmes as the VUP will enhance the transport sector's contribution to the overarching poverty reduction and inclusive growth objectives.

5.5 Inclusive and Green Growth

The principal objective of the African Development Bank's Ten Year Strategy (2013-2022) is to ensure that growth is more inclusive and that inclusive growth is sustainable through a gradual transition to 'Green Growth'. Inclusive growth calls for equitable allocation of resources so as to create opportunities for the whole community. An inclusive growth strategy should also ensure prosperity by expanding economic activities beyond the barriers of age, gender and geography. Investments in infrastructure including transport are critical enablers of required transformations such as private sector development, job creation and improved competitiveness. Prioritizing inclusive growth is also likely to unlock the potential of the private sector and promote effective community participation in infrastructure development. Green growth leads to protection of communities from the social and environmental impacts of development, improved water, energy and food security, and sustainable use of local natural resources.

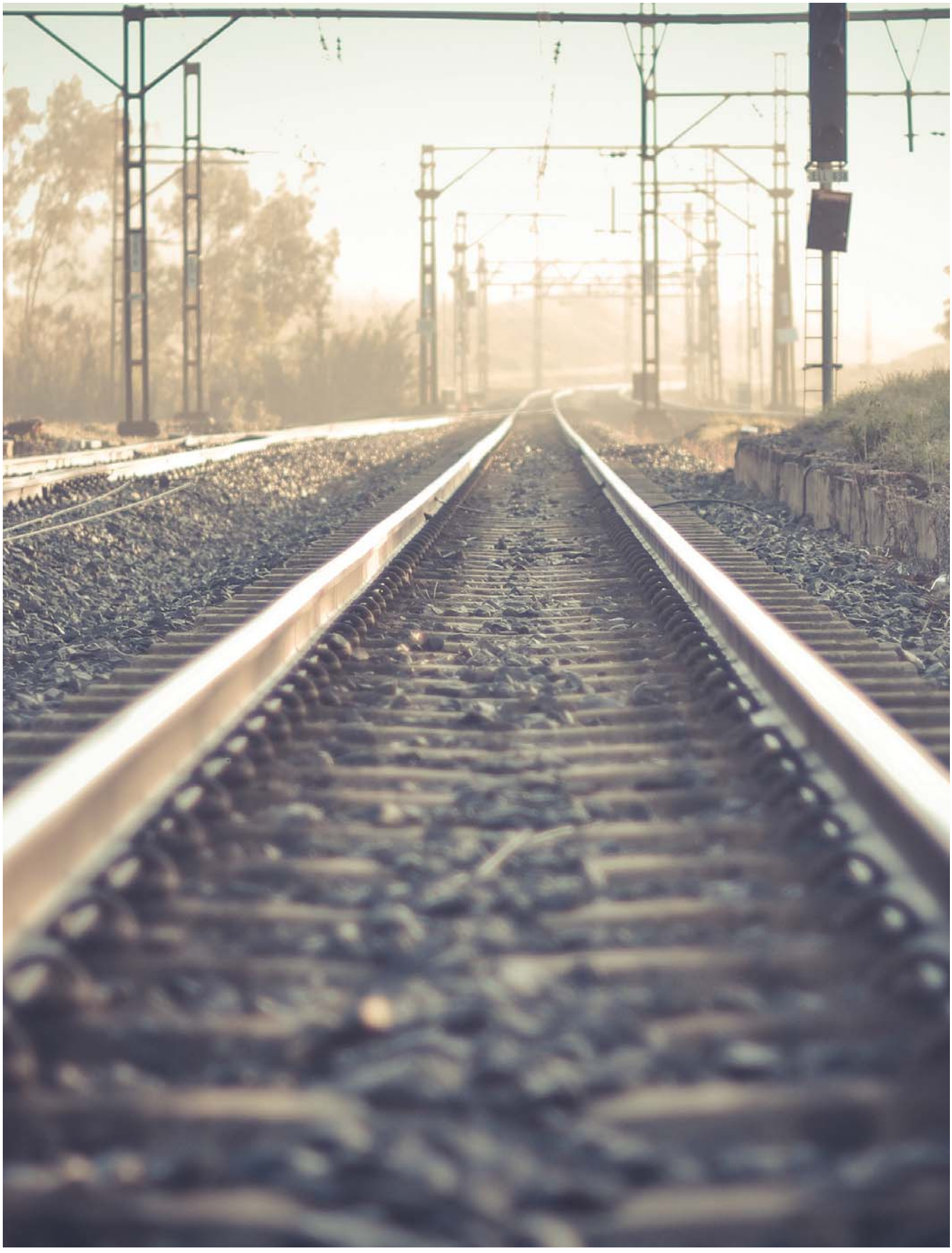
Rwanda is considered a promising candidate for implementation of inclusive growth and transition to green growth. As elaborated in Section 2.2, the overarching vision of the National Transport Policy (NTP) is to ensure the provision of modern and cost-effective infrastructure and services with due regard to safety and environmental concerns. In addition, the NTP envisions that transport infrastructure should be developed in a sustainable manner to reduce transport constraints and promote sustainable economic growth and contribute to poverty reduction. The NTP strategies that are consistent with the Bank's inclusive growth strategy include: (i) encouraging the private sector to play a greater role in the development of infrastructure and provision of transport services (ii) involving and supporting local communities in the maintenance of rural access transport infrastructure.

The GGCRS also advocates for the implementation of climate-resilient transport systems. This strategy envisions that the country will need to strengthen the institutions that are mandated with the implementation of climate-resilient

and low-carbon development pathways. This is expected to contribute to increased collaboration and partnership with development partners, civil society, the private sector and the other agencies responsible for transport projects. Short-term capacity building programmes will also need to be initiated and a long-term plan to provide the support required implementing the GGCRS developed.

Rwanda plans to reduce the heavy dependence on imported petroleum products in the transport sector through the use of locally produced bio-fuels, ethanol from solid wastes and methane from Lake Kivu. However, until cleaner and cheaper alternative fuels become readily available, the transport sector should focus on efficiency and travel demand management. In this regard, Rwanda will need to: (i) improve vehicle efficiency through vehicle and fuel quality regulations and taxation policies, especially in urban areas; (ii) provide incentives for mass transit and transport services; and (iii) promote new technologies to reduce transport emissions, such asencouraging the use of hybrid vehicles. The TSSP also prioritizes several 'sustainable and eco-friendly' transport solutions to be implemented during the EDPRS-2 period. Among other things, these solutions will focus on vehicle testing and rating, non-motorized transport and pedestrian transport enablersin such areas as: (i) establishing four additional regional vehicle fitness and environmental rating inspection centres; (ii) construction of 3 'park-and-ride' facilities for the city of Kigali; and (iii) public transport incentives such as parking control and bus lanes; and development of 100km of footpaths with tree shade and wheel-chair access.

The steep and hilly topography makes Rwanda particularly susceptible to landslides and flooding, and makes it financially and technically challenging to provide adequate transport infrastructure and services. High population density coupled with dispersed human settlements further complicate the efficient provision of transport infrastructure and services. The government has embarked on the development of a land use planning strategy to guide human settlements and the efficient provision of transport infrastructure and services. Moreover, guaranteeing sustainability will require ensuring that roads, railways and bridges are designed to accommodate climate resilience, especially during flooding and storms. To the extent that resources will remain scarce in the short to medium terms, investments will have to be prioritised to ensure value for money. Timely and systematic maintenance of transport infrastructure will also be essential in sustaining the expected benefits and ensuring wider access to transport services.



CHAPTER 6: FINANCING OF TRANSPORT SECTOR INVESTMENT PROGRAMME

6.1 Introduction

Estimates of the required funding for the transport sector during the next 5 years (2013 - 2018) is RWF 1,590 billion (US$2,446 million), and some US$11,388 million is required for the implementation of the proposed investment programme during the period 2013 - 2030. This financing budget is large and other (existing and new) sources of funding should be explored.

It is, however, expected that the main sources of funds for the investment programme will be the public sector, development partners and the private sector. Some strategies that should be considered for bridging the expected financing gap include (i) identifying and reducing inefficiencies to make more funds available from existing budgets (ii) mobilising additional resources from domestic taxes and user charges (iii) lobbying development partners for additional support (iv) raising funds from the local and regional stock markets and through infrastructure bonds (v) encouraging Public-Private Partnerships(vi) adjusting the implementation plan to fit within the available funds. These strategies are discussed in this section.

6.2 Public Sector Financing

The sources of funds for public sector financing of the transport sector investment programme are discussed in this section.

6.2.1 Improving the use of existing resources

Reducing inefficiencies in public spending can make available more funding. This can be achieved in at least two ways. First, there should be improvement in budget execution rates so as to fully exploit resources allocated to public investments. This option will require tracking of transport sector expenditure for the last three years to obtain information on those areas prone to leakages. Sealing the identified loopholes will make spending more effective and at the same time increase absorption capacity. Low project readiness resulting from poor timing of project appraisals and late release of budgeted funds due to lengthy procurement processes often limits the full absorption of budgeted resources. Delays affecting the release of funds within the financial year also contribute to poor project preparation, leading to changes in the initial terms agreed upon with contractors (such as timelines, technical specifications, budgets and costs). Project readiness and absorption of funds allocated to infrastructure development are critical for the efficient and effective use of available resources. Second, a higher allocation of resources for asset maintenance (avoiding backlog maintenance) would substantially improve efficiency both by preventing costly rehabilitation (particularly for roads) and by offering direct benefits to the users of infrastructure. Again, tracing historical transport sector expenditure should provide requisite data that will inform future allocation of resources for infrastructure maintenance.

6.2.2 Mobilising domestic revenue

Raising resources to finance public projects, including the proposed transport investment programme, is dependent on the revenue-raising capacity of the economy. There are three main categories of domestic revenue sources: (i) taxes on goods and services (comprising Value Added Tax, excise duty, and withholding taxes) (ii) direct taxes (including Pay As You Earn, corporation income tax, personal income tax and tax imputed on turnover) and (iii) tax on international trade. Over the years, taxes on goods and services have constituted the largest proportion of total domestic revenues at about 48%.

Rwanda's total domestic revenue as a percentage of GDP rose from 8.4% in1993 to 14.4% in 2011/12. On average, the revenues have been split between tax (93.3%) and non-tax revenues (6.7%).According to the International Monetary Fund, Rwanda's tax growth had ranged between 0.25% and 0.3% of GDP every year from 1997. Furthermore, in line with GoR's aspiration for Vision 2020 of being less dependent on international development organisations (IDOs), it was observed that the "tax effort needed to be scaled up". The GoR has implemented tax reforms since1998, with the aim of increasing the revenue-to-GDP ratio by 0.5% per year.

Raising domestic revenue to allow for more allocation of funds to the transport sector requires widening of the tax net and the government has implemented several reforms to meet this objective. The tax policy measures introduced in FY 2012/13 are expected to yield an additional US$45 million in tax revenues and these include: revisions to the investment code, increase in the tax rate on imported construction materials from 5% to 10%, and introducing a gaming tax.

Improvements in tax administration efficiency are also expected to expand the revenue net. Key measures have been introduced such as e-filing and e-payment systems; merging of the social security, La Rwandaised' Assurance Maladie (RAMA) and income tax files to reduce evasion of income taxes and the operationalization of the electronic single window for customs. Other measures include introduction of One-Stop Border Post facilities at Nemba (Burundi); introduction of electronic cargo tracking to complement the 24-hour-a-day, seven-days-a-week-borders policy. A Queue Management System has also been introduced to facilitate quarterly VAT and personal income tax payments for SMEs. These measures combined have contributed to an expansion of the tax base with 8,304 newly registered tax payers across various tax categories in FY 2011/12. Sustaining this reform momentum in public revenue mobilization will increase the fiscal space for financing national development priorities including infrastructure development.

6.2.3 Levying Road User Charges

Raising user charges closer to maintenance cost-recovery levels would increase agency revenues, especially in road transport given that a large portion of the road maintenance and rehabilitation cost in Rwanda is funded through public sources. Implementation of this option will require a detailed study on the inventory, condition, usage and asset value of all transport infrastructures to determine the most appropriate level of user charges. As already discussed, raising the fuel levy may not be a viable option. From the investment programme, the average amount required annually for routine maintenance is US$64.5 million in the short term (2013 – 2014), which is already twice the revenue of the RMF in 2010/11.

The other sources of funding that the RMF should explore include charging for advertisements and locating utilities within road reserves, as successfully done by the Nairobi City Council in Kenya; providing road construction material testing facilities at a fee, and leasing equipment to small/medium-sized contractors for road construction work financed by the Fund. In this case, the RMF would have to first invest in the equipment purchases and then establish a unit that can manage and lease it to private contractors. Having equipment at the RMF can also help to address the problem of emergency road work because repairs can be done quickly with in-house resources. Examples of successful implementation of this option can be drawn from the Public Works Ministry and the Constituency Development Funds in Kenya, which have been procuring and leasing facilities to contractors. There is a need for additional investment in large plant facilities in this case.

6.2.4 Revamping of RMF

As discussed in Chapter 2, the RMF has the right building blocks to become an effective "second generation" road fund. Further transformation can be achieved by first expanding its objectives to make them flexible enough to include provision of financial support to road development and maintenance contracts and undertaking Public-Private Partnerships in the long term. The flexibility in financing different types of programmes will ensure that the efficiency of the RMF to address the needs of the network is maximised rather than being limited to maintenance only.

The suggested changes will require restructuring so that the RMF can have the mandate of mobilising finances from various sources for provision of transport infrastructure and services. Such a mandate will give the RMF the responsibility of directly advising MININFRA and MINECOFIN on issues related to mobilization and utilization of resources for instance from user charges and motor vehicle taxes.

6.3 Development Partner Participation

Development of road infrastructure has so far been financed by the Government of Rwanda from public resources with support from development partners. The active partners include, but are not limited to, the African Development Bank, the World Bank, and the European Commission, USAID, Arab Bank for Economic Development in Africa (BADEA), the Republic of Germany, Japan and the United Nations. As stated in the current transport policy, coordination and consultation with development partners is undertaken at all stages of planning and development through the Transport Sector Working Group (SWG).

Development of the all-inclusive transport sector investment programme as proposed by this study requires sustaining coordination including within the SWG framework to ensure efficient implementation. This can be achieved through an investment forum and/or Development Partners Meeting- where the government formally presents the investment programme and requests for financial and other technical support from various stakeholders including development partners and the private sector.

6.4 Private Sector Financing

6.4.1 Potential Projects

Currently, there are no PPP projects in the transport sector. The following potential projects as identified in Chapter 4 will require private sector participation:

1. ***Road Transport:*** Financing, design, operation and maintenance of weighbridge stations (traffic control centres); roadside amenities such as truck stops, passenger and freight transport services; and construction of public transport terminals;
2. ***Air Transport:*** Financing, design, operation and maintenance of the proposed new airport at Bugesera, management of aerodromes in the regions, and provision of domestic air transport services;
3. ***Rail Transport:*** Operation and maintenance of the proposed railway lines;
4. ***Pipeline Transport:*** Financing, design, operation, and maintenance of the proposed Uganda-Rwanda pipeline;
5. ***Water Transport:*** Financing, operation, and maintenance of ships and boats in Lake Kivu and possibly the Akagera River; and
6. ***Development of Multi-Modal Facilities*** in the Vicinity of the City of Kigali

The projects are at various stages of conceptualisation, planning and preparation. The success of PPP projects lies in creating a supportive environment for both the public and the private sectors. The Government of Rwanda, through the Ministry of Finance and the Rwanda Development Board, has set up a Public Private Partnership (PPP) unit that has the responsibility of managing joint ventures between public and private partners. The functions of Unit are to (i) mobilise financing for large projects (ii) assist in negotiations of complex projects(iii) establish favourable legal and regulatory frameworks for PPPs. The unit is still in its nascent stages and will require capacity building and empowerment to effectively perform the stated functions.

The officials at the PPP Unit should have the capacity and skills to identify, develop and implement PPP projects in addition to providing assistance to municipal and national authorities to introduce the economic, institutional and regulatory reforms needed to support PPPs. Further, public agencies like the RTDA and the RCAA will be required to engage experienced advisors and use sector-specific standardised project documents for all PPPs. These agencies should partner more effectively with the PPP unit in originating, designing and implementing operations funded through the PPP.

6.4.2 Mobilising Private Sector Financing

In order to succeed in raising private sector financing in the transport sector, the government will have to adopt a three-step approach as follows: (i) laying the foundation and defining and measuring the depth and breadth of private sector opportunities (ii) developing the market for private sector finance (iii) sustaining the private sector finance market.

Laying the Foundation for PPPs

Laying a good foundation for private sector finance requires a supportive investment climate. A predictable political, legal, regulatory and financial environment that leaves no uncertainties about how government will act in the future is of utmost value to private finance. The Texas P3 Road programme in the United States is a good example of programme where unpredictable government policy changes led to massive

Box 6.1: Texas Government Road Toll Programme

The Texas Government passed laws in 2005 allowing for public-private partnerships, which led to the Road P3 Program to be established allowing private sector to collect tolls. However, within two years, a moratorium was passed preventing private companies from collecting tolls and the tolling of existing roads. While a small number of projects proceeded, the scale of the P3 program as originally planned was not realised.

Source: Paving the Way: Maximising the Value of Private Finance in Infrastructure, World Economic Forum, 2010.

scaling down of the programme (Box 6.1). Rwanda has been improving its investment climate over the years and should continue building upon the gains made to attract more private investment in infrastructure development.

Successful private sector investment will also require sound and objective financial forecasts and practical debt repayment schedules. The Mexico toll roads project illustrates the impact of poor forecasting (Box 6.2). In this case, the projections used in attracting financiers to the toll road investment were not realised. The consequences of using inaccurate forecasts of costs and revenues over the long term can be disastrous, especially if they manifest in the form of public wrath against the government and huge losses and possible bankruptcy to the private investor.

Another key ingredient toward ensuring the success of investment projects is to involve all stakeholders, including the public users, in the development and planning phases of projects so that all parties are made aware of consumer response, which can make or break the project. The public must be involved in every stage of the project development process to articulate the options clearly and to ensure that transparent methods exist for measuring and maintaining operational quality.

Considering alternative models and analysing trade-offs among commercial, contractual and financing approaches can also help in building a strong foundation for private sector finance (Box 6.3). The factors to consider when establishing contract or concession policy are (i) protection of consumers if there are no alternatives (ii) repayment period of the debt raised to finance the infrastructure (iii) concession period for the investor to achieve an acceptable profit and the amount of that profit. The procurement and valuation of land for new infrastructure should be handled carefully, especially when determining who pays for and receives the benefit of the change in land value resulting from the infrastructure devel-

Box 6.2: Mexican Government Concessions

The Mexican Government let a series of 53 Concessions between 1989 and 1994. The program represented a combined total investment of US$13 billion in 1994, and more than doubled the size of the national road network. However, the viability of the toll roads was greatly undermined as a result of miscalculations of investment costs as well as over-optimistic forecasts of operating revenues. The 1994 Mexican currency crisis made this situation worse, essentially stalling the toll road program. As a result, commercial banks were left with non-performing loans estimated at US$4.5-$5.5 billion. Concessionaires were forced to write off large portions of their investments, and toll road users were burdened with very high tolls. By 1997, the government cancelled 23 of the 53 concessions and absorbed US$ 7.3 billion in bank loans and short-term borrowings.

Building upon these lessons, the Mexican government launched three new program models in 2003 that resulted in an increase in private investment in road projects. The first model, the new High Concession model, relied on the Ministry of Communications and Transport to provide final designs, set the maximum tenor of the concession to 30 years, set the tolls, and assigned the concession to the bidder which asked less government contribution or charged a higher cost for the concession. In which case, the lower government contribution reduced the need for high-calibre human resources on the government side, which would be critical to the implementation of the program.

The second model, the Service Contract Model, required the Ministry of Communications and Transport to assign a service contract and concession to a private-sector firm to design, finance, build, operate and maintain a highway for a period of 15 to 30 years. The third model, the Asset Utilization model, involved the Ministry preparing concessions of highways with more than 10 years of continuous operation. This involved the private sector operating old toll roads and constructing new ones.

Source: Paving the Way: Maximising the Value of Private Finance in Infrastructure, World Economic Forum, 2010.

Box 6.3: Chilean PPP Roads Programme

The Chilean PPP roads program was established in order to modernise the country's road network to meet the needs of the growing economy. The program invited the participation of the private sector in the construction, maintenance, operation, and financing of the roads. The aims were to (i) use private sector expertise to develop and finance public works, (ii) externalise the construction and operation of the facilities, improving the level of service and security, and (iii) to free public resources to focus on projects and programs with higher social impacts.

Between 1990s and 2000s, Chile awarded on a competitive basis, 21 toll road concessions worth an estimated USD 5 billion. Bidding started with smaller projects in order to test the markets and reduce risk to the private sector. Prior to launching the program, the government established a dedicated agency to manage the procurement process. They also enacted specific and detailed legislation relating to the concessions and put in place a transparent procurement process.

By starting with a number of pilot projects, the government was able to refine its bidding process. Some of the most notable changes to the contract terms tried to address some of the issues relating to predictability and realistic forecasting of traffic. The PPP program was transparent and competitive, and is generally considered a success story.

Source: Paving the Way: Maximising the Value of Private Finance in Infrastructure, World Economic Forum, 2010.

opment. This should be done by the government ministry or agency responsible for land to avoid any collusion between contracting and interested parties on the value of land for rent-seeking.

Finally, there is need to determine the meaning and impact of failure and to determine how to mitigate and manage risks. For private finance to be a viable option, thorough evaluation of the soundness and sustainability of different financing options throughout the asset life should be made. It is also necessary to consider the kinds of failure that might occur; for example, the financial collapse of the private-sector party or the sudden and complete shutdown of the asset. Ways of mitigating the impact of such failures should be clear to the government. The trade-off between the level of fees or charges for the infrastructure and the robustness of financing should be analysed in detail. The Delhi International Airport is a good example in mitigation measures (Box 6.4).

Developing and Sustaining Financial Markets

Developing sound markets for private sector financing of infrastructure development requires prioritisation of investment opportunities based on what is commercially achievable. It is also necessary to establish a unit solely responsible for PPPs at the Ministry of Finance.

Building and sustaining transaction capacity is also essential for establishing sound private sector finance; it involves leveraging the financing and transaction skills of multilateral institutions. Capacity building should focus on efficiency in procurement, provision of best value for money and improving efficiency in decision-making. Efforts should be made to recognise the skills needed for complex transactions, provide adequate training of staff, avoid staff rotation, and provide sufficient funding for public bodies involved in the promotion and procurement of infrastructure.

Sustaining private finance requires the involvement of exist-

Box 6.4: Delhi International Airport Private Limited

In 2006, following a competitive bidding process, the Government of India awarded the Delhi International Airport concession to the Delhi International Airport Private Limited (DIAL) with a mandate to operate, maintain, develop, design, construct, finance, upgrade and modernize the Indira Gandhi International Airport, Delhi, for a period of 30 years until 2036, with a further option to extend the concession by 30 years. It was decided that the existing aeronautical charges would remain the same until the completion of capital upgrades, when a 10 percent increase would be permitted. Thereafter, these charges were to be capped by the all India CPI-X increase to achieve target revenue for a five-year regulated period.

The Government of India had two main aims in wanting to modernize the airport and improve the efficiency of its operations and financing while retaining some influence. By choosing a public-private partnership, the Indian government has retained influence on the operation of DIAL through the Airports Authority of India's (AAI) 26 percent shareholding but does not have control. DIAL has arranged external financing to fund a major program to upgrade the airport, and DIAL's private-sector shareholders include specialist airport operators.

The Indian government took time to consider an approach that best met their aims and built a contract and procurement process that reflected this. Some changes were made to the national legal framework prior to launching the procurement to, for example: ensure that the state would continue to provide certain activities such as air traffic control, security and customs; provide commercial incentives, such as making land available; and prepare to establish an independent regulator for airports and airlines. There was significant interest in the opportunity, and the competitive bidding process has secured the Government of India a 45.99 percent interest in DIAL's revenues along with a 26 percent management stake. The contractual approach, revenue forecasts—including the regulated revenue structure—and sector knowledge demonstrated by DIAL meant that the project was strongly supported by commercial banks.

Source: Paving the Way: Maximising the Value of Private Finance in Infrastructure, World Economic Forum, 2010.

Box 6.5: Infrastructure Bonds in Kenya

In 2010, the Government of Kenya, through the Ministry of Finance, floated Sh31.6 billion (US$400 million) infrastructure bond which was over-subscribed by 18%, indicating the ever-increasing appetite for government paper. The bond came at a time when the money market had a high appetite for fixed income, despite declining returns, implying that timing of bond issue is critical. The increased uptake of these bonds is informed by the fact that State bonds are prime securities, more so for long-term investors. Furthermore, the specificity of the infrastructure bond made it least fungible and less likely to be used for consumption spending. Issuing such bonds however require good understanding of the market by those involved as well as ample capacity to manage the process.

The nine-year infrastructure bond returned a 118% performance, receiving 781 bids worth Sh37.4 billion against the Sh31.6 billion on offer. The weighted average for the successful bids was 7.293% and overall bids 7.737%, favourably comparable to other interest rates in the market. Local fund agencies including retirement benefits organizations and local private individuals were some of the subscribers to the bond.

The biggest chunk of the bond proceeds (Sh17.15 billion –or 52.3%) went toward funding the energy sector, including project works by the Geothermal Development Authority and Kenya Electricity Transmission Company to undertake exploration of geothermal resources and upgrade transmission lines. Some Sh. 6.07 billion was directed towards the construction of new roads and rehabilitation of existing ones. A further KSh8.35 billion (26.5%) was allocated to the water, sewerage and irrigation sectors. In total, the Kenya government had raised a total of Sh87billion from the four bonds issued with the last bond of Sh16.9 billion being issued in March, 2012.

ing sources of private finance. The experience and expertise already developed by the existing financial institutions could help in forestalling any investment pitfalls. Besides, the existing expertise could benefit the state personnel who may not be well-versed with commercial enterprise development and management. These conditions help in guaranteeing from the onset that the funding being sought will not be a one-off experiment. There is also need to stimulate long-term capital markets, continuously explore the development of new sources of private finance, and propose new ways of increasing the involvement of private finance in the infrastructure sector. Tapping into Diaspora funds and other non-conventional sources of finance would also enhance the sustainability of local sources of finance.

6.4.3 Potential Sources of Private Sector Finance

Potential sources for raising private capital therefore include: (i) capital markets (ii) retail investors (iii) regulated infrastructure utilities (iv) pension funds (v) state-owned infrastructure banks in cooperation with the private sector.

Capital Markets

Raising infrastructure bonds through regional and international capital markets is one source of financing for infrastructure development. A cross-section of development actors, including the African Development Bank, supports this financing option. In a message to Africa (August 2012), the President of the African Development Bank hinted at the prospect of raising US$40 billion worth of infrastructure bonds to finance infrastructure development in Africa. These funds could be sourced from the US$450 billion worth of reserves of African countries lying idle in foreign accounts.

In Kenya, funds raised from the capital market (Box 6.5) have been allocated to energy, transport, water, roads and renewable energy, suggesting that these are the sectors offering the most investment opportunities (Box 6.5). Issuing similar bonds in Rwanda would require setting up appropriate legal and regulatory environments. Ideally the process should be driven by the Ministry of Finance and Economic Planning with the support of the Bank of Rwanda and agencies like RTDA, RMF and RCAA. These institutions should also provide guidance on the identification of potential beneficiaries of such bonds.

It should however be noted that Rwanda's capital market is still nascent compared to others in the region as it was only launched in 2008. The Nairobi Securities Exchange (NSE), Dar es Salaam Securities Exchange (DSE) and Uganda Stock Exchange (USE) were established in 1954, 1996 and 1997 respectively. As of May 2012, there were 58 companies and 43 bonds listed on the NSE, 17 companies and 13 bonds listed on the DSE, and 14 companies

and 30 bonds listed on the USE.[26] Currently, the Rwanda Stock Exchange (RSE) has two domestic stocks - Bank of Kigali and Bralirwa Ltd., and two cross-listings from the NSE - Nation Media Group and Kenya Commercial Bank. This is in addition to five Treasury bonds and one corporate bond by the Commercial Bank of Rwanda. Integration of the regional stock markets within the EAC offers the best opportunity for Rwanda to raise capital market funds.

Retail Investors

Factors that enhance retail finance include education about risk; considering the financial and political environment; deciding on a single asset or portfolio of investment opportunities; determining when to bring an issue to the market; and determining whether to take the listed or unlisted route. These investments target both corporate and retail investors. For example in 2010, ARSS construction company of India issued offers divided in 60% to institutional investors, 10% to corporate and 30% to retail investors. The allocation to retail investors was 18 times oversubscribed. The Government of Rwanda can explore the possibility of engaging retail investors by drawing upon lessons from India and other countries that have engaged retail investors successfully.

Pension Funds

The pension fund has a natural fit with infrastructure finance given that both are long-term in nature. Obstacles to pension fund investments that need to be considered at inception include geographical mismatches, the role of pension trustees and positioning by the infrastructure industry. Money held in pension funds, for example, is not always located where the investment is needed, which means that pension fund managers will have to consider legal obligations before lending.

Roads and energy-related investment agencies floating shares in national and regional stock exchange markets and institutional investors such as social security funds and insurance companies are important sources of financing for transport infrastructure in the future. Institutional investors are good sources of long-term financing for transport infrastructure because their liabilities are suitable for the long terms of infrastructure projects. However, harnessing the significant potential of local capital markets, particularly local bonds market, to finance infrastructure is dependent on the development of these markets and on further reforms to strengthen the local institutional investor base. Rwanda should consider developing these markets.

At the local level, the financial sector in Rwanda remains shallow and might not be in a position to raise funds to finance the private sector investments in transport infrastructure. Syndicated lending to infrastructure projects by international financial institutions, such as the African Development Bank (AfDB), the International Finance Corporation (IFC), and OECD countries as well as countries such as Korea, China, India, and Brazil, may hold more potential for the private sector to access funds for transport projects. The funds can be channelled through intermediary local commercial banks, as was recently experienced in Kenya, where US$600 million in syndicated loans were raised in 2012.

Globally, it is now recognised[27] that the global financial crisis has changed the costs and terms of commercial debt. It is therefore a challenge to reinvigorate the capital markets as a source of finance for infrastructure. Thus, the GoR should move to more specialised infrastructure funds for better alignment of risk with reward. It is also recognised that retail finance participation in infrastructure funds is likely to grow, but this requires clear articulation of the value proposition and the threats to achieving it.

6.4.4 Conclusions and Recommendations

Apart from potential PPPs participation in aviation, rail and road transport services, other potential sources discussed above are unlikely to be mobilised in the short term. It is however necessary to put institutional and legal framework in place to ensure that these potential financing sources are harnessed in the medium and long term.

26 "Leveraging Capital Markets for SME Financing in Rwanda" Final Report, September 2012, African Development Bank.

27 WEF 2010, Paving the Way: Maximizing the Value of Private Finance in Infrastructure


KIGALI INTERNATIONAL

CHAPTER 7: MONITORING AND EVALUATION FRAMEWORK

7.1 Introduction

This chapter summarises the Monitoring and Evaluation framework for the investment programme presented in Chapter 4. It presents each of the monitoring and evaluation actions in capacity building, infrastructure development, and services provision together with the required time frames. The chapter also provides indicators for measuring implementation progress of the intended interventions.

7.2 Capacity Building Monitoring Framework

The monitoring framework for capacity building and transport studies is summarised in Table 7.1. All activities in this category should be implemented within the next 10 years as any delays in their completion will impact the start of subsequent projects.

7.3 Infrastructure and Services Monitoring and Evaluation Framework

7.3.1 Indicators

Maintaining comprehensive, comparable, reliable and up-to-date monitoring and evaluation (M&E) statistics on infrastructure and transport services is a widely recognized best practice. Monitoring and Evaluation (M&E) of outcome and impact indicators is required for the measurement of transport sector trends and to allow for benchmarking against the regional, sub-regional and country levels. In the absence of dependable indicators on the transport sector, it is difficult for policy makers to determine transport priorities, track progress on infrastructure and services development, benchmark performance against peers and evaluate the impact of past investments.

The importance of data collection and analysis relating to agreed targets and indicators should therefore be one of the top priorities of government agencies responsible for the transport sector. The collected data should be analysed, conclusions derived, and feedback made in policy and implementation processes for taking early corrective actions. That will require strengthening of the responsible institutions for M&E, focus on outcomes and implementing a robust information system. The data collection process should be contracted out to external consultants but capacity for its analysis should be built at the MININFRA, RCAA, RURA, RMF and RTDA. Engaging public universities in the exercise is also an option that can help to further build national capacity in research and development.

To ensure the sustainability of Rwanda's transport sector database, the National Institute of Statistics of Rwanda (NISR), working with the transport agencies, should continue mainstreaming the collection and compilation of transport statistics into its routine statistical data collection and compilation activities. This will enable Rwanda to acquire time series data on transport indicators to help in monitoring and evaluating key policy challenges.

7.3.2 Targets of 2013 - 2030

The actions and targets for each transport sub-sector in the short, medium, and long terms are contained in Tables 7.2–7.4.

Table 7.1: Monitoring framework for capacity building and studies

	Actions	Within
1	RURA should develop and start the implementation of strategy for integration of quality bus corridor service with other public transport modes	2 Years
2	RTDA should review the Road Traffic and Safety Act and develop and start implementation of National Road Safety Standards in line with a revised effective Road Safety Strategy	2 Years
3	MININFRA and MINALOC should develop and start implementation of Rural Road Management Programme	1 Year
4	The high level transport coordination committee should actively participate in regional trade and transport initiatives.	10 Years
5	RTDA should develop and implement a Road Management System (RMS) / Integrated Road Network Management System (IRNMS)	1 Year
6	RTDA should develop Rwanda Overload Control strategy that is aligned with the EAC vehicle axle load control act	2 Years
7	RTDA should develop and implement Rwanda Roads Classification System, including Road Design Specifications and a signage strategy	1 Year
8	RTDA should develop Technical Guidelines and Standards for planning and operation of transport infrastructure, including feasibility and funding approaches	2 Years
8	MININFRA should establish and empower a Transport Safety and Urban Planning Units in RTDA	3 Years
10	MININFRA should strengthen RURA to have capacity in regulating Water Transport and Public Transport planning	3 Years
11	Human Capacity Building Programme (10 years) for staff at transport agencies, including those in MININFRA, MINALOC, RTDA, RMF, RURA, and City of Kigali.	10 Years
12	Establish Trauma Centres at Provincial Towns	2 Years
13	Provide Rwanda Police with Transport Enforcement Equipment	2 Years

	Actions	Within
1	Strengthen legal and institutional capacity and improve service delivery system	5 years
2	Implementation of Performance Based Maintenance and Management of Roads (PMMR) Contracts (PPP)	5 years
3	An effective M&E system with objectively verifiable indicators in place	5 years
4	Restructuring of RTDA to undertake tactical functions for public transport	5 years
5	National Reference Laboratory for Road/airport Infrastructures created and operational	5 years
6	Laboratory Design and Establishment of Trauma centres in Rusizi and Rubavu	5 years
7	Operation of Trauma Centres	5 years
8	Establishment of an advanced Accident Investigation System and Accident Database for National Police in collaboration with RTDA;	5 years
9	Development of Safety Standards and Establishment of annual safety auditing system	5 years
10	Establishment of Transport Safety and Vehicle Fitness Investigation and Control Unit in RTDA under the proposed restructuring plan	5 years
11	Establishment of a separate emergency work management unit in RTDA	5 years
12	Allocation of at least 6% of funds from GoR for emergency work and disaster management	5 years
13	At least four regional vehicle inspection centres established under private sector ;	5 years
14	Study on reduction of fuel costs for motor vehicle in Rwanda	5 years

15	Study on alternative fuel and fuel efficient engine for motor vehicles in Rwanda	5 years
16	Categorization and registration of conductors on the basis of technical and financial capabilities	5 years
17	Technical teams of all District trained	5 years
18	Postgraduate research degrees in Transport introduced in KIST and NUR	5 years
19	100 transport sector professional trained at Master level;	5 years
20	50 technicians in transport sector provided on-job practical training	5 years
21	Training for 50 transport professionals and contractors on contract and project management;	5 years
22	400 roadside local communities to be trained on Labour Intensive Public Works (HIMO/LIPW) activities related to road construction and maintenance	5 years
23	Land use and Transport Plan for Kigali City	5 years
24	Develop strategy for integration of quality bus corridor service with other public transport modes	5 years
25	Develop National Road Safety Standards in line with Road Safety Strategy to be implemented by RTDA.	5 years
26	Review of Road Traffic and Safety Act to include Road Safety Strategy	5 years
27	Develop and Implement Rural Road Management Programme in association with ASSETIP	5 years
28	Rwanda participation in regional initiatives	5 years
29	Design and establish a Road Management System (RMS) / Integrated Road Network Management System (IRNMS)	5 years
30	Develop Rwanda OLC strategy (aligned with the EAC)	5 years
31	Develop and implement Rwanda Roads Classification System, including Road Design Specifications and a signage strategy	5 years
32	Develop Technical Guidelines and Standards for planning and operation of infrastructure of Rwanda, including feasibility and funding approaches (road, rail, pipeline and airports)	5 years
33	Establish and empower a Transport Safety and Urban Planning Units in RTDA	5 years
34	Strengthen RURA to have capacity in regulating Water Transport and Public Transport planning	5 years
35	Human Capacity Building Programme (10 years)	5 years
36	Provide Rwanda Police with Transport Enforcement Equipment	5 years
37	Preferential treatment and Incentive for companies employing women labourers and supervisors for road construction and maintenance	5 years
38	Campaign for companies employing women labourers and supervisors for road construction and maintenance	5 years
39	Encouragement of women to run transport companies by arranging special campaign and preferential treatment	5 years
40	Incentive for Bus/Taxi operators for ensuring access for disable and infirm passengers	5 years
41	Reserving parking facilities for disables in all parking lots	5 years
42	Special provisions in all tender documents for large capital projects incorporate HIV prevention activities, Gender equality and access to transport for disables and infirm	5 years
43	Regional initiatives to reduce transit time in sea ports	5 years
44	Regional initiatives to expand the capacity of sea ports	5 years
45	Regional initiatives for simplification of custom, scanning, tracking, clearing and forwarding of international freight	5 years
46	Integrated regional logistics service	5 years
47	Maintenance of Logistics centres	5 years
48	Development of Agro-logistics and Multi-Service Centres	5 years
49	Maintenance of Agro-logistics and Multi-Service Centres	5 years
50	Improved Communication in freight transport services	5 years

Table 7.2: Monitoring Framework for Sub-Sector Short-Term Targets (2013-2018)

I.1 Air Transport (Total Investment = US$ 254.3 million)	
1	Establishment of Aviation Training Organization
2	Route expansion by RwandAir
3	Fleet expansion by RwandAir
4	Enhanced Safety and Security to Air Service: ACC & Automation Set up
5	Mateo Automation upgrade: SADIS
6	Improved Airspace Safety
7	Acquisition of CNS equipment: (Comms, Nav, Surv & data broadcasting)
8	ICAO Compliance
9	Infrastructure Upgrade: Resurfacing Kamembe Airport, Rwanda
10	Apron and Taxiway expansion of KIA
11	KIA Terminal Building expansion
12	Expropriation of Kamembe and Rubavu
13	Rubavu and Kamembe runway extension
14	Development of a Fuel Hydrant KIA
15	Installation of Navaids and Airfield Lights at Kamembe and Rubavu
16	Construction of a terminal at Rubavu and Kamembe
17	Development of a fuel firm at Kamembe and Rubavu
18	Land Acquisition for the Construction of the New Bugesera International Airport
19	Construction of Air Cargo Centre (ACC) and Commercial Mall
20	New Air transport regulatory authority created separating from airport operation
21	Capacity Building for Air transport sector
22	Development of Business Plan for all airports
I.2 Road Infrastructure (Total Investment = US$1,729.0 million)	
1	National strategic roads (RN1 – RN10): Economic analyses and prioritisation for capacity and safety improvements complete
2	680 km of selected national unpaved roads upgraded to bitumen standards
3	Acquisition of 5,200 km of road reserve for all classified roads
4	Feasibility Study on the Development of low-cost Toll Roads: RN4 from Musanze to Rubavu (Rubavu)
5	150 km of selected District Class 1 roads upgraded to bitumen standards
6	150 km of selected District roads upgraded to gravel standards
7	Upgrading 2,550km of District Class 2 roads to gravel standards
I.3 Urban Transport and Multi-Modal Facilities (Total Investment = US$146.7 million)	
1	Development of a business model for bus operation under route franchising approach for rural bus service
2	A new public limited company is fully operational to provide improved bus services in 98 rural routes
3	Consolidated public limited companies or operators' cooperatives working in the Public Transport Sector for Bus Services
4	Full tax rebate for importation large standard bus for public transport (approximately 292)
5	Development of a public transport fare policy
6	Review of Public Transport Regulations
7	Designing and bundling routes

8	Publication of route operators
9	Study on Parking Management Strategies for Kigali City
10	Implementation of Recommended Parking Strategies for Kigali City
11	Feasibility study and preliminary design on the construction of 3 town bypass roads in Huye, Muhanga and Musanze
12	Feasibility study and preliminary design on the construction of Kigali City Ring road cum Expressway
13	Development of standard bus routes and schedules for Kigali City
14	Development of a Business model for bus operation under route franchising approach for Kigali City
15	Pilot project of standard scheduled bus service and integrated ticketing system under a route franchising approach in Kigali City
16	30 km of Dedicated Bus Lanes (DBLs) for exclusive use by Dedicated Right-of-Way Buses in bus routes with expropriation;
17	Detail Design Study for a BRT system for Kigali City
18	Improvement of 650 bus shelters in Kigali City
19	100 Automated smart fare collection system in bus shelter
20	Integrated Smart ticketing system with micro processing ability (1000,000 cards)
21	Intersection upgrade (Queue jumps at 6 numbers of signalized interactions)
22	Intersection upgrade (Queue jumps at 7 numbers of Intersections)
23	Establishment of a Public Transport Operation control centre
24	Development of a Central Intercity Bus Terminal;
25	Development of Bus Sleeping Ground by upgrading existing taxi park
26	Establishing a new sleeping ground for bus
27	100 km of High Quality footpath on both side of roads with shade tree at 10 m interval including wheel chair access facilities for disables
28	Improvements to pedestrian access ways/tracks (100 km)
29	100 number of pedestrian crosswalks with signal
30	Development of 3 Park-and-ride facility (open lot parking) peripheral area
31	Development of Bicycle parking at 25 sites
32	82 km of City of Kigali unpaved roads upgraded to paved road for bus routes
33	Construction of a Grade Separated Intersection at Nyabugogo
34	Development of a Business Model and Detailed Design of Quality Bus Corridor Service for Intercity bus service
35	Quality Bus Corridor Service Pilot Project
36	Implementation of Quality Bus Corridor Service in 11 routes
37	140 km of all main roads in major urban centres have basic facilities for NMT and pedestrians
38	Feasibility Study and Detailed Design for a four lane divided highway from Kigali to New Bugesera International Airport
39	Acquisition of land for a six lane divided highway from Kigali to New Bugesera International Airport
40	Construction of 4 lane Divided Highway from Kigali to New Bugesera International Airport
1.4 Border Posts and Weighbridges Action Plan and targets (Total Investment = US$ 134.6 million)	
1	Feasibility Study, detailed design and development of 5 One-Stop Border Posts, i.e. 3 at primary border posts of Kagitumba, Rusumo and Akanyaru Haut and 2 at secondary border posts of Rusizi/Cyangugu and Cyanika Border Posts
2	Feasibility study, detailed design and construction of 4 Truck Stops/Roadside Stations
3	Approval of axle load control policy and strategy
4	Installation of weigh bridges at Akanyaru, Cyangugu, Gatuna, Rubavu and Rusumo Border Posts
1.5 Pipeline, Rail and Water Transport Action Plan and Targets (Total Investment = US$ 8.07 million)	
1	Kampala-Kigali-Bujumbura products pipeline feasibility studies and design completed
2	Kigali-Muhanga-Rubavu and Huye-Rusizi Pipelines feasibility studies completed
3	Kigali-Rubavu railway line feasibility study and detailed design completed
4	Development and Implementation of Lake Kivu Inland Waterway Transport System and Service
5	Akagera River Project feasibility studies and design completed

Source: various sources and author calculation

Table 7.3: Monitoring Framework for Sub-Sector Medium-term Targets (2019-2024)

I.1 Air Transport (Total Investment = US$494.4 million)	
1	New BIA Feasibility Design Costs
2	New BIA Construction Costs
3	Aircraft Lease
4	Human Capital Development: Pilots/Technical/Management
5	Other Capital Expenditure
I.2 Road Infrastructure (Total Investment = US$2,322.6 million)	
1	About 2,621km of National roads paved and in good condition
2	About 60% of Class 2 roads in good condition
I.3 Urban Transport and Multi-Modal facilities (Total Investment = US$302.4 million)	
1	Construction of Kigali City Bypass/Ring Road
2	Construction of Muhanga Bypass
3	Construction of Huye Bypass
4	Construction of Musanze Bypass
5	Nyabugogo (Gatsatsa) Multi-Modal Facility (Kigali City North-Western Sector)
6	Free Zone freight Multi-Model Facility (Kigali City Eastern Sector)
7	Bugesera Airport Multi-Modal Facility (Kigali City South Sector)
8	Free Zone freight Multi-Model Facility (Kigali City Eastern Sector)
1.4 Institutional/Capacity Building (Total Investment = US$27 million)	
1	Develop strategy for integration of quality bus corridor service with other public transport modes
2	Develop National Road Safety Standards in line with Road Safety Strategy to be implemented by RTDA.
3	Review of Road Traffic and Safety Act to include Road Safety Strategy
4	Develop and Implement Rural Road Management Programme in association with ASSETIP
5	Rwanda participation in regional initiatives
6	Design and establish a Road Management System (RMS) / Integrated Road Network Management System (IRNMS)
7	Develop Rwanda OLC strategy (aligned with the EAC)
8	Develop and implement Rwanda Roads Classification System, including Road Design Specifications and a signage strategy
9	Develop Technical Guidelines and Standards for planning and operation of infrastructure of Rwanda, including feasibility and funding approaches (road, rail, inland waterways and airports)
10	Establish and empower a Transport Safety and Urban Planning Units in RTDA
11	Strengthen RURA to have capacity in regulating Water Transport and Public Transport planning
12	Human Capacity Building Programme (10 years)
13	Provide Rwanda Police with Transport Enforcement Equipment
1.5 Pipeline, Rail and Water Transport Action Plan and Targets (Total Investment = US$ 2,016.7 million)	
1	Development and Implementation of Lake Kivu Inland Waterway Transport System and Service
2	Akagera River port reserve at Kagitumba
3	Akagera River Project Development
4	Kigali-Rubavu Route alignment Railway Reserve
5	Upgrade/construction of the Dar es Salaam-Isaka-Kigali/Keza-Gitega-Musongati railway line
6	Kampala-Kigali-Bujumbura products line reserve and construction

Source: various sources and author calculation

Preparation of projects, including economic and social analyses and justification, should be completed well ahead of implementation to minimisefinancial and technical risks, especially for those already identified for private sector participation. As discussed in Chapter 2, there is need to build capacity of RTDA and RURA for these agencies to operate autonomously, with the Ministry's role being overall supervision and definition of their missions, broad objectives and budgetary allocations. Coordination and clarification of the roles of MININFRA, MINALOC and MINAGRI should also be enhanced for better delivery of the roads for which they are responsible.

7.4 Transport Indicators

The M&E indicators should be established at the national level to provide a global indication of transport sector performance and at the sector level to track implementation targets against the action plan. The M&E at the national level should be monitored by the Ministry of Finance and Economic Planning, and sector one by the Ministry of Infrastructure. The proposed indicators at the national and sector level are contained in Tables 7.5 and 7.6 respectively. Some baseline data on the above indicators may be available but there is need to collect and collate them in a manner and form that allows for rapid access and use.

For monitoring the progress of EDPRS 2, the targets in Tables 7.1 – 7.4 and the baseline data collected for the EDPRS 1 should be used. Data for benchmarking of the air and road transport sector performance in Rwanda can be obtained from the sources contained in Table 7.7.

Table 7.4: Monitoring Framework for Sub-Sector Long-term Targets (2025-2030)

I.1 Air Transport (Total Investment = US$294.8 million)	
1	New BIA Construction Costs
2	Aircraft Lease
3	Human Capital Development: Pilots/Technical/Management
4	Other Capital Expenditure
I.2 Road Infrastructure (Total Investment = US$2,961.0 million)	
1	About 2,867km of National roads paved and in good condition
2	100% of District roads class 1 in good condition
3	100% of District roads class 2 in good condition
I.3 Urban Transport and Multi-Modal facilities (Total Investment = US$22.8 million)	
1	Kicukiro Multi-Modal Facility (Kigali City Southern Sector)
1.4 Pipeline, Rail and Water Transport Action Plan and Targets (Total Investment = US$ 500 million)	
1	Additional Future Pipeline Reserve and Linkages from Lake Kivu onto Kampala (Kigali-Muhanga-Rubavu and Huye-Rusizi)

Source: various sources and author calculation

Table 7.5: National Level Transport Indicators

Indicator	Unit of measure	Frequency	Source
Passenger and freight transport costs along the Northern and Central Corridors, and within Rwanda	US$/km	Annually	Trade and Transport Coordination Authorities of the Northern and Central Corridors and RTDA
Density for paved and unpaved roads by District	km/km^2	Annually	RTDA
Number of persons employed in transport projects by category	No.	Monthly for every project	RTDA
Rural population living 5-10 km from all-weather roads (District roads)	No.	Annually	RTDA
Traffic volumes by category of traffic	No.	Biannually	RTDA, RCAA, RURA
Volume of passengers and freight	Available air/water/ rail/road passenger seats; Tonnes of freight	Biannually	RTDA, RCAA, RURA
Travel times on international and national roads, including delays at ports, weighbridges, police checks and border posts	Hour	Biannually	Trade and Transport Coordination Authorities of the Northern and Central Corridors and RTDA
User charges (fares, licences, fuel levy charges)	US$/unit	Biannually	RRA, RMF, RURA
Urban population living within 0.5 – 1 km to a serviced public transport stage	No.	Biannually	RURA
Condition of infrastructure (Good, Fair, Poor)	Percentage of total length/area	Annually	RTDA, RCAA

Table 7.6: Sector Level Transport Indicators

Indicator	Unit of measurement	Frequency	Data source
Unite rates for works, goods and services	US$/km; S$/unit	Annually	RTDA, RCAA, RURA
Length of airstrips, roads, ports, rehabilitated/ upgraded by category	Km/No.	Annually	RTDA, RCAA, RURA
Traffic accidents by category	No.	Annually	RTDA, RCAA, RURA, Rwanda Police
Congestion levels in urban areas (Queue lengths at major intersections)	m	Biannually	RTDA
Congestion levels in urban areas (congestion index from travel times)	%	Biannually	RTDA

Table 7.7: Transport Indicators Data Sources

Sub-sector	Variable	Source
Air	Access indicators (market share, Herfindhal Index, and connectivity	Dios SRS website: www.airlineplanning.com and Official Airline Guide (OAG)
	Usage (market size, growth and liberalisation)	
	Aviation tariffs	Travel agency websites e.g. www.opodo.com and www.expedia.com
	Aircraft capacity, accidents, runways	Diios SRS website: www.airlineplanning .com and Official Airline Guide (OAG), IATA, and ICAO
Roads	Road safety data, agencies and strategies	World Bank, World Health Organisation (WHO) websites
	Rural Accessibility Index	Household surveys on the World Bank website.
	Fuel consumption	International Energy Agency (IEA)
	Fuel prices	German Technical Cooperation Agency (GTZ) website
	Motorised Vehicle Fleet	World Health Organisation (WHO) website
	Roadwork unit costs (capital and maintenance)	World Bank Road Costs Knowledge System website
	Road user costs (value of time and vehicle operating costs)	World Bank Road User Costs Knowledge System website

Source: Handbook on Infrastructure Statistics, 2011, African Development Bank, the World Bank and Infrastructure Consortium for Africa (ICA)

CHAPTER 8: IMPLEMENTATION AND WAY FORWARD

8.1 Introduction

Implementation of the proposed transport sector investment plan will require participation by the Government of Rwanda, the private sector, and development partners. The GoR will be expected to provide leadership by initiating actions in all transport sub-sectors including roads, air, rail, water and pipeline. Policy reviews, capacity building and setting the right investment climate and legal framework will also be a preserve of the government. Implementation of the action plan is expected to be a joint effort between the government, the development partners, and the private sector.

8.2 Role of Government of Rwanda

The GoR will provide overall supervisory role as well as creation enabling environment for implementation of the investment plan. More specifically, the government should:

1. Launch the Action Plan;
2. Undertake advocacy activities and road show to popularisethe Action plan;
3. Institutionalise the Action Plan by creating an inter-ministerial implementation steering committee and create an Management Information System (MIS) platform for sharing of information;
4. Improve the methodology for implementation of the Action Plan by: (i) establishing sector and programme project targets and outcomes for monitoring and evaluation (ii) introducing cross-cutting themes into sector and programme/project plans promotion of cross-cutting objectives such as gender equality, respect for the environment and other MDGs, and allocation of funds for common needs such as capacity development will be effectively achieved because they will be built into the sector programmeand project plans. (Such an approach is normal practice for international financial institutions);
5. Use the Action Plan as an effective monitoring and management tool by developing and maintaining a current, accurate and accessible database and reporting on progress at least annually;
6. Harmoniselaws, regulations, and procedures to promote interconnections and economic integration;
7. Provide ongoing budgetary support as needed;
8. Undertake Investment Round Table for resource mobilisation with partners and donors;
9. Dedicate infrastructure staff to prepare projects and package them for financing;
10. Undertake direct investment in planning and implementing the proposed projects;
11. Review activities and outputs through (i) publishing and distributing regular progress updates; and (ii) Conducting a mid-point review of progress; and
12. Improve stakeholder communications through better information and support including (i) establishment of a statistical portal (ii) establishment of regular forums for dialogue with stakeholders(iii) strengthening civil society participation

8.3 Role of the Private Sector

Private sector investors should consider the opportunities found in engaging in Rwanda's transport sector. In particular, the private sector will seek to engage in:

1. Emerging PPP arrangements in which they will share investment opportunities with the government;
2. Mobilisationof resources for the emerging investment opportunities;
3. Continuous dialogue with the Government on policy, legal, and substantive implementation issues; and
4. Monitoring and evaluation of interventions

8.4 Role of Development Partners

The development partners will engage with the government and private sector in dialogue to ensure compliance with international best practices in the emerging transport sub-sectors. Development partners will also provide technical expertise and financial input where necessary.

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