The Republic of Kenya
Ministry of Transport, Infrastructure, Housing and Urban Development
The Republic of Uganda
Ministry of Works and Transport

Project for Master Plan on Logistics in Northern Economic Corridor

Final Report

March 2017

Japan International Cooperation Agency (JICA)

Nippon Koei Co., Ltd.
Eight-Japan Engineering Consultants Inc.
PADECO Co., Ltd.

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List of Abbreviations

ACA	Athi Catchment Area
AEO	Authorized Economic Operator
AFDB	Africa Development Bank
AFFA	Agriculture, Fisheries & Food Authority.
BIDCO	Business & Industrial Corporation
BL	Binary Logic
BLT	Build-Lease-and-Transfer
BOOT	Build-Own-Operate-Transfer
BPS	Budget Policy Statement
CBFT	Cubic Feet
CBM	Cross Border Market
CFS	Container Freight Station
CM	Common Market
CoK	Constitution of Kenya
COMESA	Common Market for Eastern and Southern Africa
CU	Custom Union
CY	Container Yard
D/O	Delivery Order
DFR	Draft Final Report
DOT	Develop-Operate-and-Transfer
DPC	Data Processing Centre
DRC	Democratic Republic of Congo
DRIMS	Dynamic Response Intelligence Monitoring System
DWP	Department of Water for Production
DWRM	Directorate of Water Resources Management
EA	Environment Auditor
EAC	East Africa Community
EAR&H	East African Railways and Harbors Corporation
EARNP	East Africa Road Network Project
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
ECTS	Electric Cargo Tracking System
EFC	Expected Further Clearance
EIA	Environment Impact Assessor
EITI	Extractive Industries Transparency Initiative
EL	Exploration License
ENNCA	Ewaso Ngiro North Catchment Area
EP	Environment Partner
EPZ	Export Processing Zone
EPZA	Export Processing Zone Authority
ERA	Electricity Regulatory Authority
ERB	Electricity Regulatory Board
ERC	Energy Regulatory Commission
ERP	Enterprise resource planning

EU	European Union
FCL	Full Container Load.
FDB	Facilities Database
FDI	Foreign Direct Investment
FLP	Freight Logistic Platform
FR	Final Report
FTA	Free Trade Area
GAP	Global Access Project
GDC	Geothermal Development Company
GDP	Gross Domestic Product
GIS	Geographical Information System
GOJ	Government of Japan
GOK	Government of Kenya
GOTS	Global Organic Textiles
GOU	Government of Uganda
GPS	Global Positioning System
HACCP	Hazard Analysis & Critical Control Points
HGV	Heavy Goods Vehicle
IAEA	International Atomic Energy Agency
ICT	Information & Technology
IFC	International Finance Corporation.
IMF	International Monetary Fund
IPPs	Independent Power Producers
IRI	International Roughness Index
IRWR	Internal Renewable Water Resources
ISO	International Standard of Organization
JICA	Japan International Cooperation Agency
JIT	Just In Time
KAA	Kenya Airports Authority
KCB	Kenya Commercial Bank
KCCL	Kasese Cobalt Company Ltd
KenGen	Kenya Electricity Generation Company
KETC	Kenya Electricity Transmission Company
KFC	Kenya Fluorspar Company
KFRI	Kenya Forest Research Institute
KFS	Kenya Forest Service
KIFWA	Kenya International Freight & Warehousing Association
KNBS	Kenya National Bureau of Statistics
KNEB	Kenya Nuclear Electricity Board
KOICA	Korea International Corporation Agency
KPA	Kenya Ports Authority.
KPC	Kenya Pipeline Company
KPLC	Kenya Power and Lighting Company
KRA	Kenya Revenue Authority
KRC	Kenya Railways Corporation
Ksh	Kenya Shilling
KTA	Kenya Truck Association
KWS	Kenya Wildlife Service

LAPSSET	Lamu Port-South Sudan-Ethiopia Transport
LCL	Less than Container Load.
LCPDP	Least Cost Power Development Plan
LGV	Light Goods Vehicle
LNG	Liquefied Natural Gas
LoS	Level of Service
LVNCA	Lake Victoria North Catchment Area
LVSCA	Lake Victoria South Catchment Area
MAAIF	Ministry Of Agriculture Animal Industry and Fisheries
MC	Management Contract
MEMD	Ministry of Energy and Mineral Development
MGV	Medieum Goods Vehicle
ML	Mining Lease
MoEP	Ministry of Energy and Petroleum
MOFPED	Ministry of Finance Planning Economic Development
MOIED	Ministry of Industrialization Enterprise Development
MOLG	Ministry of Local Government
MoLHUD	Ministry of Lands, Housing and Urban Development
MoTI	Ministry of Transport & Infrastructure
MoTWA	Ministry of Tourism, Wildlife and Antiquities
MoU	Memorandum of Understanding
MoWI	Ministry of Water and Irrigation
MoWT	Ministry of Works & Transport
MP	Master Plan
MTIC	Ministry of Trade, Industry and Cooperatives
MTP	Medium Term Plan
MV	Massive Vessel
MWE	Ministry of Water and Environment
NAADS	National Agriculture Advisory Services
NARO	National Agriculture Research Organization
NCIMP	Northern Corridor Infrastructure Master Plan
NCTIP	Northern Corridor Transport Improvement Project
NCTTCA	Northern Corridor Transit & Transport Coordination Authority
NDP	National Development Plan
NDP	National Development Policy
NEC	Northern Economic Corridor
NEMA	National Environment Management Authority
NEPAD	The New Partnership for Africa Development
NLC	National Land Commission
NOFBI	National Optic Fiber Backbone Infrastructure
NPA	National Planning Authority
NRW	Non-Revenue Water
NSP	National Spatial Plan
NUCAFE	National Union of Coffee Agribusinesses and Farm Enterprises
NUDP	National Urban Development Policy
NWSC	National Water and Sewerage Corporation
OD	Origin Destination
OPBC	Output Performance Based Contract

OSBP	One Stop Border Post
OVOP	One Village One Product
PCU	Passenger Car Unit
PIBID	Presidential Initiative for Banana Industry Development
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PSC	Product Sharing Contract
PSIP	Power Sector Investment Plan
REA	Rural Electrification Authority
REA	Rural Electrification Agency
REB	Rural Electrification Board
REE	Rare Earth Elements
REF	Rural Electrification Fund
RFQ	Request for Qualification
ROT	Rehabilitate-Operate-and-Transfer
RTD	Regional Transportation District
RVCA	Rift Valley Catchment Area
RVR	Rift Valley Railways
SADC	Southern African Development Cooperation
SCADA	Supervisory Control and Data Acquisition System
SCT	Single Customs Territory
SEZs	Special Economic Zones
SGR	Standard Gauge Railway
SME's	Small Medium Enterprises
SPV	Special Purpose Vehicle
SW	South West
SWOT	Strength Weakness Opportunity and Threats
TCA	Tana Catchment Area
TFTA	Tripartite Free Trade Area
TMP	Transport Master Plan
TMWDP	Thwake Multi-purpose Water Development Program
TOR	Terms of Reference
TWG	Technical Working Group
UAE	United Arab Emirates
UBOS	Uganda Bureau of Statistics
UDC	University of the District of Columbia
UEDCL	Uganda Electricity Distributing Company Ltd
UEGCL	Uganda Electricity Generating Company Ltd
UETCL	Uganda Electricity Transmission Company Ltd
UIA	Uganda Investment Authority
UMA	Uganda Manufactures Association
UNBS	Uganda National Bureau of Standards
UNRA	Uganda National Roads Authority
URA	Uganda Revenue Authority
URC	Uganda Railways Corporation
USD	US Dollar
Ush	Uganda Shilling
VAT	Value Added Tax

VCS	Value Chain Survey
WENRECO	West Nile Rural Electrification Company
WfP	Water for Production

CHAPTER 1 INTRODUCTION

1.1 Background and Objective

1.1.1 Background

The Northern Corridor is a multi-modal corridor, consisting of road, rail, pipeline, and inland waterways transport, and is recognized as a significant corridor for logistics in East Africa. The main road network runs from Mombasa Sea Port through Kenya and Uganda to Rwanda and Burundi and to Democratic Republic of Congo (DRC). The road network also links Kenya and Uganda to Juba in South Soudan. The importance of the Northern Corridor is increasing and the current combined transit and transhipment traffic through the Corridor has been growing at a rate of 20% annually.

However, there are some obstacles in Northern Corridor, such as inadequate infrastructure, poor interconnectivity of modes, long delays (stagnation) of cargo at the port and broad post, and lack of goods to transport for the return trip from the inland area to Mombasa port. These obstacles raise the transport cost within the Corridor, which accounts for about 30% of the value of the goods. The high transport cost is one of the major obstructive factors that hinder economic development of the region, especially inland area.

In this context, the Government of Uganda (GOU) requested Government of Japan (GOJ) to implement a project to formulate a master plan on logistics in Northern Corridor in order to promote regional development. Concurrently with this, the Government of Kenya (GOK) also requested GOJ for a project on Northern Corridor which shares same goal and outputs.

In response to the request of GOU and GOK, Japan International Cooperation Agency (JICA) dispatched “Detail Design Formulation Team for the project” in October and November, 2014. The team proposed to apply a project concept as Northern Economic Corridor, since the project should cover not only logistics but also the regional development along the Northern Corridor. The GOU and GOK agreed with the concept and signed the Record of Discussion with JICA for the implementation of the Project for Formulation of the Master Plan on Logistics in Northern Economic Corridor (hereafter the Project).

1.1.2 Objective

The objective of the Project is to formulate a Master Plan on Logistics for Northern Economic Corridor, along with integrated regional development strategy consistent with sub-regional development plans and national development plans.

1.2 Target Year

The target year of the Master Plan on Logistics for Northern Economic Corridor (hereafter MP) is 2030.

1.3 Target Area

The target areas for the MP will cover the following routes which are part of Northern Economic Corridor and its surrounding areas:

- Main route: Mombasa-Nairobi-Tororo-Kampala-Katuna-(Kigali/Rwanda);
- Sub-route: Eldoret - Nadapal – (Juba/South Sudan);
- Sub-route: Tororo - Gulu – Elegu – (Juba/South Sudan);
- Sub-route: Kampala- Gulu – Elegu – (Juba/South Sudan); and
- Sub-route: Mbarara- Mpondwe– (Kisangani/D.R.C).

The above routes are illustrated in the figure below.

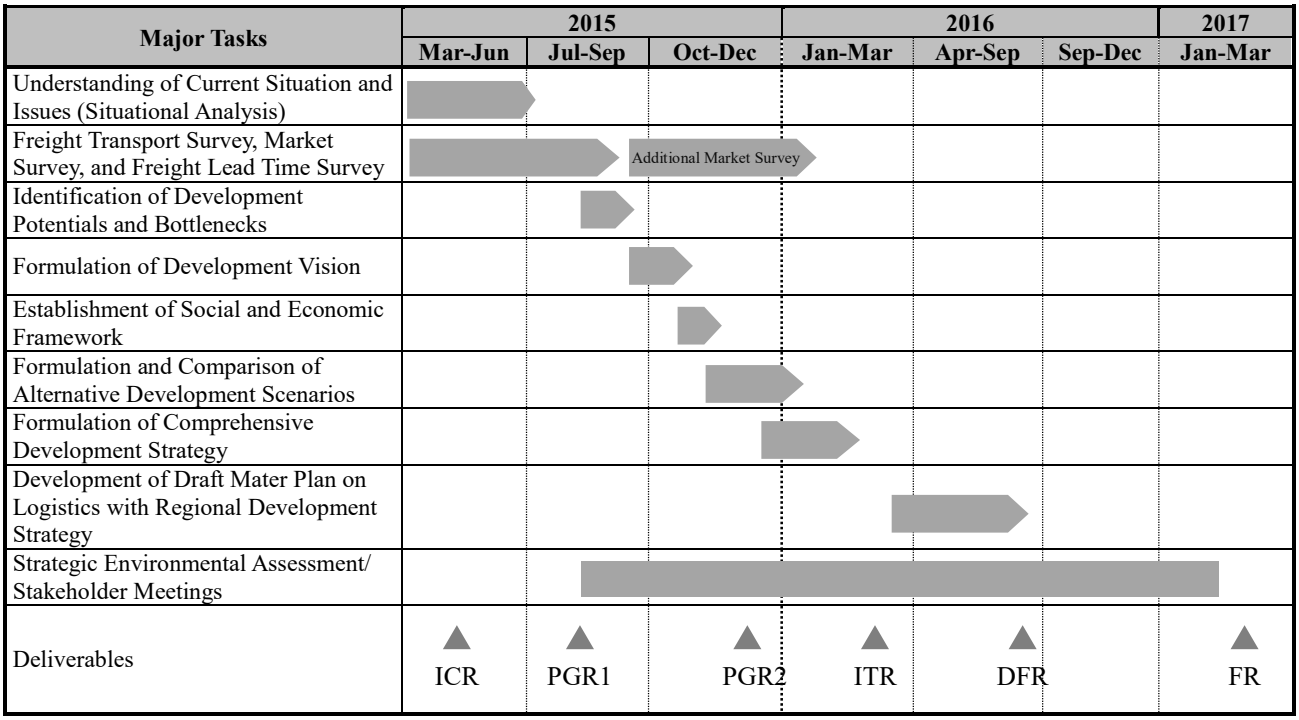
Source: JICA Study Team

Figure 1.3.1: Routes of Northern Economic Corridor Scope of Work and Work Progress

1.4 Overall Scope of Work

The project have to cover nine tasks, namely: 1) Understanding of Current Situation and Issues (situational analysis), 2) Freight Transport Survey, Market Survey, and Freight Lead Time Survey, 3) Identification of Development Potentials and Bottlenecks, 4) Formulation of Development Vision, 5) Establishment of Social and Economic Framework, 6) Formulation and Comparison of Alterative Development Scenarios, 7) Formulation of Comprehensive

Development Strategy, 8) Development of Draft Master Plan on Logistics with Regional Development Strategy, and 9) Technical Support to Strategic Environmental Assessment/Stakeholder Meetings. The main tasks and the schedule are shown below.



Source: JICA Study Team

Figure 1.4.1: Main Tasks and the Current Progress

The purpose of the Final Report is to show Final Logistics Master Plan with Regional Development Strategy for northern Economic Corridor. In addition, other reports listed in Table below will be or were prepared and submitted as the outputs of the Study.

Table 1.4.1: Key Deliverables

No	Report	Submission Month	Language	No. of Copies
1	Inception Report Plan and Deliverables	April 2015	English	25 copies Approved
2	Progress Report 1 Situation Analysis and Preliminary Assessment of Current Bottlenecks	August 2015	English	25 copies Approved
3	Progress Report 2 Bottleneck and Potential Assessment Framework of Regional Economy and Logistics Development	December 2015	English	25 copies Approved
4	Interim Report Comprehensive Development Strategy for Northern Economic Corridor	February 2016	English	25 copies Approved
5	Draft Final Report (DF/R) Draft Logistics Master Plan with Regional Development Strategy	September 2016	English	25 copies Approved
6	Final Report（F/R） Final Logistics Master Plan with Regional Development Strategy	March 2017	English	25 copies

Source: JICA Study Team

1.5 Work Done

The following works have been done so far.

Table 1.5.1: Works Done in Uganda

No	Activity	Date	Remarks
1	Commencement of Work	17 March 2015	
2	Arrangement of Office	March and April 2015	MoWT arranged office space and necessary equipment
3	Meeting with MoWT	25 March 2015	Explanation of Outline of the Study
4	Meeting with TWG	1 April 2015	Explanation of Inception Report for Comments
5	Tender and Contracting for Market and Value Chain Survey	24 March - 1 April 2015	Awarded Contractor is Management Innovations
6	Tender and Contracting for Good Movement and Traffic Survey	1-24 April 2015	Awarded Contractor is Steward Consultancy
7	Participation to Logistics Platform Workshop	13 April 2015	Organized by Trade Mark
8	Steering Committee Meeting for Draft Inception Report	30 April 2015	Inception Report was approved.
9	Workshop for Market and Value Chain Survey	19 June 2015	Sub-Group of TWG for Regional Development was participated.
10	Submission of Progress Report No.1 for Market and Value Chain Survey	26 June 2015	Main Content is Long list and Selection of 4 VCs.
11	Meeting with for Sub-Group of TWG for Logistics and Related Infrastructure	15 July 2015	Purpose is to present findings of JICA Team and discuss those in terms of logistic sector.
12	Submission of Progress Report No.2 for Market and Value Chain Survey	20 July 2015	Main content is End Market Analysis for 4 VCs.
13	Submission of Draft Progress Report 1 for TWG	18 August 2015	Presentation of the Progress Report 1
14	Submission of Draft Progress Report 1 for 2nd Steering Committee Meeting	25 August 2015	Presentation of the Progress Report 1
15	Workshop for Market and Value Chain Survey	4 September 2015	Sub-Group of TWG for Regional Development was participated.
15	Working Group Meeting for Socio Economic Framework and Vision Development	27 October 2015	Main content was to develop a socio-economic framework Development Vision for MP
16	Sub group meeting for Logistics and Related Infrastructure of TWG	4 November 2015	Main content was results of Goods Movement and Vehicle Traffic Survey.
17	Stake holder consultative meeting for Strategic Environment Assessment (SEA) of MP	16-20 November 2015	Main Content was to undertake a SEA of MP. Held in Kampala, Mbarara, Tororo
19	Meeting with TWG	10 December 2016	Presentation of Draft Progress Report No.2
20	Submission of Draft Final Report for Market and Value Chain Survey for Additional 3VCs	20 January 2016	Main context was results and recommendations from Market and Value Chain survey for additional 3 VCS
21	Meeting with SC	20 January 2016	Presentation of Draft Progress Report No.2
22	Workshop on Market and Value Chain Survey	22 January 2016	Presentation of Draft Survey Report on Additional 3VCs
23	Working Group Meeting for Vision Development and Spatial Structure Plan	29 January 2016	Main content was to revise Development Vision for NEC and to present Spatial Structure Plan
24	Submission of Final Report for Market and Value Chain Survey for Additional 3VCs	30 January 2016	Main context was results and recommendations from Market and Value Chain survey for additional 3 VCS
25	Training trip to Mozambique	9-13 February 2016	Benchmarking on Nacala Corridor development

No	Activity	Date	Remarks
26	Meeting with TWG	15 April 2016	Presentation of Draft Interim Report
27	Meeting with SC	18 April 2016	Presentation of Draft Interim Report
28	Second Round of Stake holder consultative meeting for Strategic Environment Assessment (SEA) of MP	16-20 April 2016	Main Content was to discuss the major findings of the SEA scoping exercise and progress of the SEA.
29	Meeting with Ministry of Trade, Industry and Cooperatives.	20 June 2016	Presentation of the Interim Report.
30	Meeting with Ministry of Lands, Housing and Urban Development	22 June 2016	Presentation of the Interim Report
31	Meeting with Ministry of Finance, Planning and Economic Development & Ministry of Energy and Mineral Resource Development	24 June 2016	Presentation of the Interim Report.
32	Study Trip to Japan	27 June -7 July 2016	To enhance understanding of logistics infrastructure and regional development through site visits and discussion with concerned agencies.
33	Meeting with TWG	27 July 2016	Presentation of Draft Final Report
34	Meeting with SC	29 July 2016	Presentation of Draft Final Report
35	Meeting with JSC	03 August 2016	Presentation of Draft Final Report
36	Validation Workshop for Strategic Environment Assessment (SEA) of MP	16-20 January 2017	The content of Final SEA report was confirmed by the participants.

Source: JICA Study Team

Table 1.5.2: Works Done So Far in Kenya

No	Activity	Date	Remarks
1	Commencement of Work	21 March 2015	
2	Arrangement of Office	March and April 2015	MOTI arranged office space and necessary equipment
3	Meeting with MOTI	25 March 2015	Explanation of Outline of the Study to Chief Engineer
4	Meeting with TWG	15 April 2015	Explanation of Inception Report for Comments
5	Tender and Contracting for Market and Value Chain Survey	16 March - April 2015	Awarded Contractor is PANAFCON Ltd
6	Tender and Contracting for Good Movement and Traffic Survey	1-28 April 2015	Awarded Contractor is ITEC Engineering Ltd
7	Participation to Road Side Station (RSS) Investors' Conference	28 April 2015	Organized by NCTTCA
8	Steering Committee Meeting for Draft Inception Report	29 April 2015	Inception report was approved.
9	Workshop for Market and Value Chain Survey	19 June 2015	Sub-Group of TWG for Regional Development was participated.
10	Submission of Progress Report No.1 for Market and Value Chain Survey	26 June 2015	Main content is Long list and Selection of 4 VCs.
11	Submission of Progress Report No.2 for Market and Value Chain Survey	20 July 2015	Main content is End Market Analysis for 4 VCs.
12	Meeting with for Sub-Group of TWG for Logistics and Related Infrastructure	23 July 2015	The purpose is to present findings of JICA Team and discuss those in terms of logistic sector.
13	Submission of Draft Progress Report 1 for TWG	21 August 2015	Presentation of the Progress Report 1
14	Submission of Draft Progress Report 1 for 2nd Steering Committee Meeting	26 August 2015	Presentation of the Progress Report 1
15	Sub group meeting for Logistics and Related Infrastructure of TWG	16 October 2015	Main content was results of Goods Movement and Vehicle Traffic Survey.
16	Working Group Meeting for Socio Economic Framework and Vision Development	6 November 2015	Main content was to develop a socio-economic framework Development Vision for MP
17	Stakeholder consultative meetings for	2-11 November 2015	Main Content was to undertake a

No	Activity	Date	Remarks
	Strategic Environment Assessment (SEA) of MP		SEA of MP. Held in Mombasa, Nakuru, Nairobi, Kisumu and Malaba
18	Workshop on Market and Value Chain Survey	11 December 2015	Presentation of Draft Survey Report on Additional 3VCs
19	Meeting with TWG	12 January 2016	Presentation of Draft Progress Report No.2
20	Meeting with SC	14 January 2016	Presentation of Draft Progress Report No.2
21	Submission of Draft Final Report for Market and Value Chain Survey for Additional 3VCs	20 January 2016	Main context was results and recommendations from Market and Value Chain survey for additional 3 VCS
22	Submission of Final Report for Market and Value Chain Survey for Additional 3VCs	30 January 2016	Main context was results and recommendations from Market and Value Chain survey for additional 3 VCS
23	Working Group Meeting for Socio Economic Framework and Vision Development	4 February 2016	Main content was to revise Development Vision for NEC and to present Spatial Structure Plan
24	Training trip to Mozambique	9-13 February 2016	Benchmarking on Nacala Corridor development
25	Submission of Progress Report No.2	23 February 2016	Circulation of Progress Report No. 2 to TWG & SC members
26	Meeting with TWG	13 April 2016	Presentation of Draft Interim Report
27	Meeting with SC	20 April 2016	Presentation of Draft Interim Report
28	Meeting with JSC (Kenya & Uganda)	26 April 2016	Discussion on Master Plan Approval and adoption by the two countries
29	Second Stakeholder consultative meetings for Strategic Environment Assessment (SEA) of MP	4-13 May 2016	Present Development Proposals of MP for comments by stakeholders. Held in Mombasa, Nakuru, Nairobi, Kisumu and Malaba
30	Training trip to Japan	27 June - 6 July 2016	Logistics and regional development training through site visits
31	Meeting with TWG	22 July 2016	Presentation of Draft Final Report
32	Meeting with SC	26 July 2016	Presentation of Draft Final Report
33	International Conference on Corridor Development Approach	28 November 2016	Corridor Development approaches including NEC were presented and discussed.
34	Validation Workshop for Strategic Environment Assessment (SEA) of MP	24 January 2017	The content of Final SEA report was confirmed by the participants.

Source: JICA Study Team

CHAPTER 2 DEVELOPMENT VISION AND FRAMEWORK

2.1 Overview of Northern Economic Corridor and EAC

2.1.1 Socio-Economy

East African Community (EAC) has a total area of 1.82 million km^2, with a total population of 145.5 million in 2014. The most populous country in EAC is Tanzania, accounting for 47.2 million in 2014, followed by Kenya (43.0 million) and Uganda (34.7 million). The average population growth in the region is estimated at 2.6% in 2014, and the highest growth rate is recorded in Uganda (3.0%) and Burundi (3.0%). The region's population density has grown modestly from 78.3/km2 to 84.7/km2 during the past 5 years, and the highest density is in Rwanda (434/km^2), followed by Burundi (373.5/km^2) and Uganda (173.0/km^2). The economy in EAC has grown steadily during the past 5 years, as shown in Table 2.1.2. The highest average GDP growth was recorded in Tanzania (8.7%), followed by Rwanda (7.0%) and Kenya (5.3%). In terms of per capita income, Kenya became a lower-middle income country in 2013, with per capita income of USD1, 055, followed by Tanzania (USD742.6) and Rwanda (USD709). Burundi is lowest in terms of per capita income, which accounts for USD294.2 in 2013.

Table 2.1.1: Population in EAC and NEC

(Unit: million persons)

Region/Country	2010	2011	2012	2013	2014
Burundi	8.6	8.9	9.1	9.4	9.7
Tanzania	43.9	44.5	44.9	46.2	47.2
Uganda	30.8	31.8	32.7	33.7	34.7
Kenya	38.5	39.5	40.7	41.8	43.0
Rwanda	10.0	10.2	10.5	10.7	10.9
EAC	131.8	134.9	138.0	141.8	145.5
DRC	62.2	63.9	65.7	67.5	69.4
South Sudan	9.9	10.4	10.8	11.3	11.7
NEC	161.0	165.8	170.9	176.1	179.4
Total	204.9	210.3	215.9	222.3	226.6

Source: EAC Facts and Figures 2015, EAC; World Population Prospect: The 2012 Revision, UN

Table 2.1.2: GDP Growth Rate in EAC and NEC

(Unit: %)

Region/Country	2010	2011	2012	2013	2014
Burundi	5.0	2.0	-9.0	-3.0	5.0
Tanzania	6.1	9.0	4.9	5.1	8.7
Uganda	9.7	4.4	3.3	4.6	4.9
Kenya	8.4	6.1	4.6	5.7	5.3
Rwanda	7.0	7.0	9.0	5.0	7.0
DRC	7.1	6.9	7.2	8.5	9.1
South Sudan	-	-	-46.8	24.2	5.5

Source: EAC Facts and Figures 2015, EAC; World Population Prospect: The 2012 Revision, UN

Along the Northern Economic Corridor (NEC), the Northern Corridor Transit and Transport Coordination Authority (NCTTCA) was established in 1985 by 5 member countries, which included Kenya, Uganda, Rwanda, Burundi, and DRC. The membership was increased to 6 countries when South Sudan joined in 2012. The total population in NEC countries stands at 179.4 million in 2014, and DRC is the most populous country among the member states, with 69.4 million. The highest population growth was recorded in South Sudan during the past 5 years, which accounts for 4.3% of the growth rate. DRC demonstrated strong macroeconomic performance during the past 5 years, and the economy has grown by the average annual growth of 7.8%. The performance of the economy of newly established South Sudan is still fluid due to the fluctuation in oil production and political instability. The shutdown of oil production in 2012

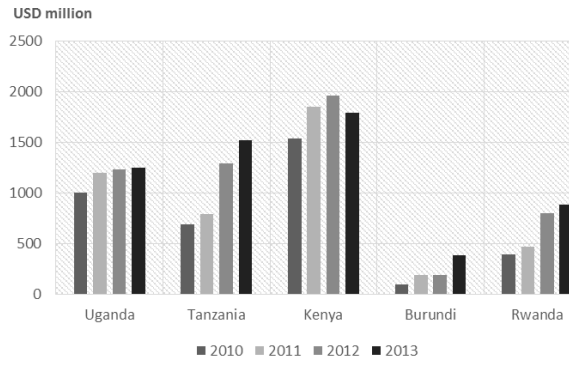
negatively affected the economy of South Sudan. Oil production resumed to more than 235,000 barrels per day by the end of 2013.

Source: Northern Corridor Transport Observatory Report, December 2014

Figure 2.1.1: NCTTCA Member States and Transport System

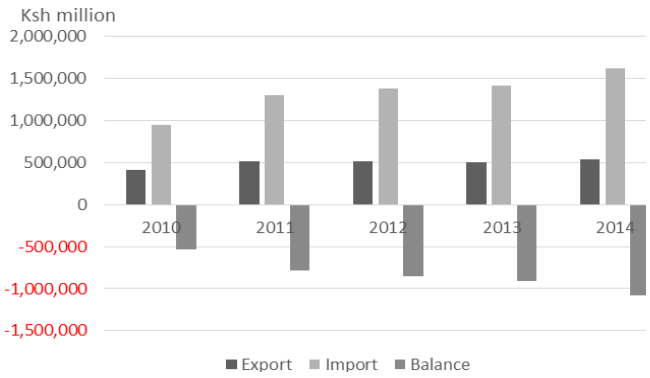
2.1.2 Trade

Regional trade within EAC has been growing significantly with the establishment of EAC Customs Union in 2004 and the EAC Common Market in 2010. The total intra-EAC trade was recorded at USD5, 806 million in 2013, and grown by 16.2 % during the 2010-2013 period.



Source: Northern Corridor Transport Observatory Report, December 2014

Figure 2.1.2: Total Intra-EAC Trade, 2010-2013

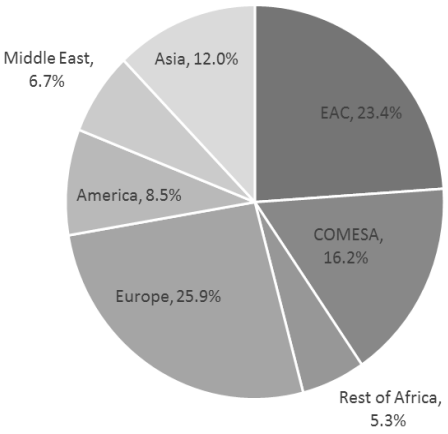


Source: Northern Corridor Transport Observatory Report, December 2014

Figure 2.1.3: Trade Balance in Kenya, 2010-2014

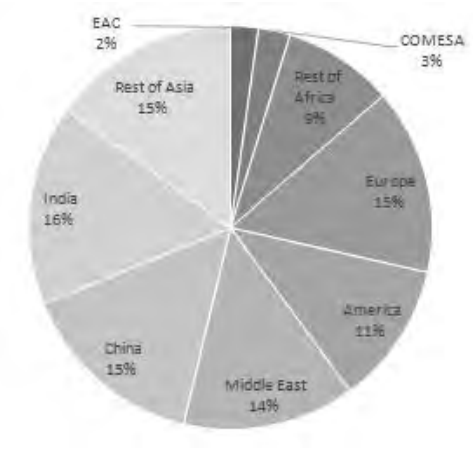
In Kenya, the trade balance has been deteriorating during the past 5 years, as shown in Figure 2.1.3. This was mainly attributed to the increasing imports such as machinery and transport equipment and the slower growth of exports. EAC is the biggest destination for export, comprising 23.4% of the total export in Kenya. Together with the rest of COMESA countries, around 40% of export is destined to the COMESA area. The largest export destination along the Northern Corridor was Uganda, which received Ksh60.8 billion of export from Kenya in 2014.

The main export item from Kenya to Uganda was Cement (Ksh4, 551 million), followed by iron and steel bars (Ksh2, 600 million) and oil products (Ksh2, 217 million).



Source: Economic Survey in 2014, KNBS

Figure 2.1.4: Export by Destination in 2014

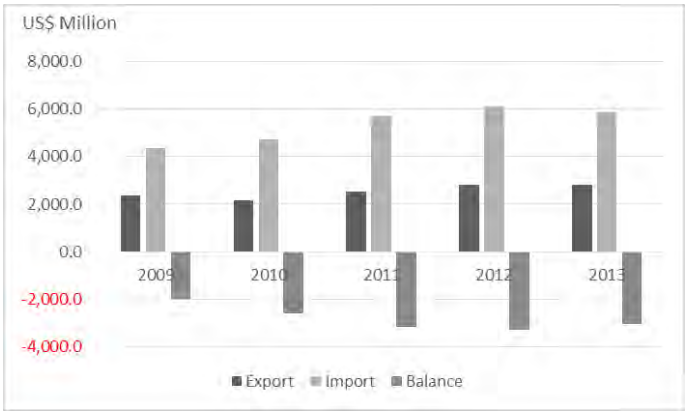


Source: Economic Survey in 2014, KNBS

Figure 2.1.5: Import by Destination in 2014

In terms of import, EAC and COMESA countries have a lower share, compared to Asian counties such as India (16%) and China (15%), as shown in Figure 2.1.5. Import from EAC countries increased significantly by 15.9% between 2010 and 2014, and import from COMESA increased by 7.7% during the same period. Overall, the growth of import exceeded that of export, which resulted in the increased deficit in current account by Ksh1, 081 billion in 2014.

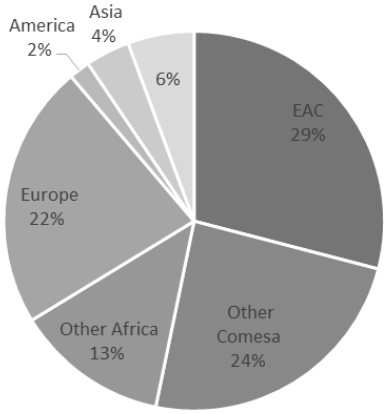
In Uganda, East African Community (EAC) is also the main export destination, accounting for USD 782 million or 29% of export in 2013. Figure 2.1.7 and Figure 2.1.8 show the destination of export and import to Uganda in 2014. Other COMESA countries were the 2nd largest export destination. The export to Africa comprises 63% of total export in 2013. Export to Kenya is the largest among the neighbouring countries, standing at 13.6% of the total export, followed by South Sudan (10.8%), DRC (9.5%) and Rwanda (8.6%). Export to Sudan declined from USD 633 million in 2009 to USD 546 million (together with South Sudan) in 2013. The instability in South Sudan affected the trade balance negatively in Uganda. The main export item from Uganda to Kenya in2011 was Tea (USD71.87 million), followed by dried vegetables (USD14.45 million) and maize (USD14.35 million).



Source: Economic Survey in 2014, KNBS

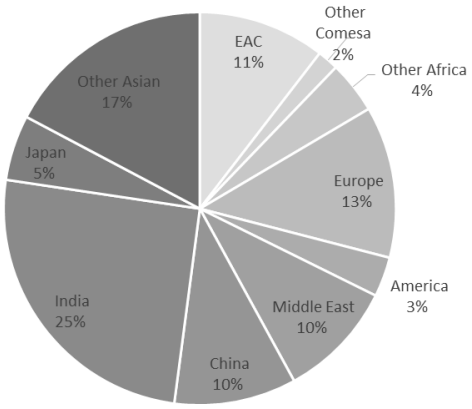
Figure 2.1.6: Trade Balance in Uganda

The largest import to Uganda was recorded from India, which accounted for 26% of the total import, followed by Europe (13%) and EAC (11%). Import from India increased rapidly by 31% annually between 2009 and 2013. Among the neighbouring countries, Kenya was the largest import supplier to Uganda, standing at 10% of import. Compared to export, import from African countries remains to be small, with 17.4% of the total value.



Source: JICA Study Team based on the data from Statistical Abstract 2014

Figure 2.1.7: Export by Country in 2013 (% of Total Trade)



Source: JICA Study Team based on the data from Statistical Abstract 2014

Figure 2.1.8: Import by Country in 2013 (% of Total Trade)

2.1.3 Regional Integration in East Africa

(1) East African Community

East African Community (EAC) is a regional international organization and was officially established under Article 2 of the Treaty for the Establishment of the EAC in 2000. The original member countries were Uganda, Kenya and Tanzania, which were then expanded to include Burundi and Rwanda, comprising 5 member countries. Currently, South Sudan is in the process of participating in EAC and is expected to be a member of EAC in February 2016. A Protocol for the establishment of Custom Union (CU) was signed in 2004 and its implementation started in January 2005. Another milestone was the establishment of the EAC Common Market (CM). The Protocol on the Establishment of the EAC CM entered into effective in 2010. The Partner States in EAC have currently negotiated with DRC and South Sudan for their participation in the Common Market in EAC.

In the transport sector, East African Transport Strategy and Regional Road Sector Development Program were prepared in 2011, in cooperation with the African Development Bank. The EAC Road Sector Development Program identified 10 road corridors, with the total network length of 14,460km, as shown in figure 2.1.9. Northern Corridor is linked to several corridors such as (1) Coastal corridor, (2) Namanga corridor, (3) Gulu Corridor, (4) Sirari corridor, (5) Tanga corridor, and (6) Central corridor. Further to the main corridor, EAC identified 24 feeder corridors. The

interview with the EAC Secretariat revealed that, in addition to NEC, Central Corridor and LAPSSET, the following corridors are considered as a priority for regional integration:

- Ring road around the Lake Victoria and Tanganyika
- Namanga Corridor (Moyale-Arusha-Dodoma)
- Gulu Corridor (Tororo- Gulu-Nimule/Pakwach)
- Coastal Corridor (Lamu-Mombasa-Dar es Salaam)

In addition to the linkage in EAC, the connection to Kisangani (DRC) and Juba (South Sudan) are increasingly crucial, and the link to Ethiopia through oil pipeline and power trade will be significant for regional integration.

In the railway sector, EAC provided the Railway Master Plan in 2009. The Master Plan considers that the railway sector and associated rail- marine services have the potential to play an important role in the future development of EAC, in particular, for long-distance freight and bulk transport, as well as urban transport and medium distance inter-city passenger transport. Based on the Master Plan, Railway Sector Enhancement Project has been carried out to prepare an investment package and a policy program in the railway sector.

Recently, EAC has launched the Regional Transport Intermodal Strategy and Action Plan, in cooperation with the World Bank. Inland waterway used to be a hub of regional trade, and EAC identified the importance of reviving and promoting inland waterway to facilitate regional trade. EAC produced a Strategy and Action Plan for Intermodal Development in 2015, which aims at implementing an efficient, rail-centric, inter-modal transport system along the Central and Northern Corridors in the EAC countries. The restoration of marine transport in Lake Victoria and Lake Tanganyika as well as rehabilitation programs, especially railways, are focused in Action Plan of this Strategy. During the Summit of EAC on December 2014, EAC endorsed a proposed 10 year investment strategy for priority infrastructure projects. The World Bank pledged USD1.2 billion towards intermodal transport infrastructure development for the next 10 years.

The establishment of East African Development Fund has been in progress, which aims at financing the preparatory stage of regional projects, but this fund could be autonomous under the East African Development Bank. For regional projects, EAC has been preparing a legal framework for PPP, which considers a risk-taking and safeguard issues for private sector's involvement.

(2) Northern Corridor Transit and Transport Coordination Authority (NCTTCA)

The Northern Corridor Transit and Transport Coordination Authority (NCTTCA) is a regional intergovernmental organization that is mandated to facilitate trade and transport in the Member State. The Northern Corridor Transit and Transport Agreement was signed in 1985 and ratified in

1986 by five member countries, which included Kenya, Uganda, Rwanda, Burundi, and DRC. The membership is increased to six countries to include South Sudan in 2012.

The NCTTCA formulated the Northern Corridor Infrastructure Master Plan in 2011, with the support from the African Development Bank. Each member state is to implement and finance the identified projects in the Master Plan. Monitoring of the Master Plan has been undertaken by the Permanent Secretariat, and the Northern Corridor Transport Observatory Portal is used to monitor and measure the performance along the corridor (http://top.ttcanc.org) with the support from Trade Mark East Africa. The Northern Corridor Spatial Development Program was prepared in 2012, with a support from New Partnership for Africa's Development (NEPAD). The Study identified several opportunities for regional development such as Anchor Investment Projects along the Northern Corridor, which includes (1) Kondo iron ore resources in DRC, (2) Oil and gas in Lake Albert in Uganda and DRC, (3) Tororo Phosphate, among others. A business plan for the identified projects is prepared in the Study and a supplementary study, was conducted in June 2015. The business investment profiles are provided by each member country and by sectors (agriculture, mining, industry and services).

(3) Northern Corridor Integration Project (NCIP)

NCIP is a new initiative, led by the Presidents of three countries, namely, Uganda, Rwanda, and Kenya. Three Presidents had a meeting at Entebbe on 2013 to discuss the cooperation and speed-up of development in the region, which was renamed from the Tripartite Infrastructure Initiative to the Northern Corridor Integration Projects (NCIP). South Sudan became a member of NCIP and each country established a special office to coordinate the initiative. Recently, DRC joined in the NCIP on October 2015. NCIP is to implement a fast-track project with the leadership from the Heads of the State. A vision of NCIP is a Northern Corridor that is fully integrated to facilitate the competitiveness of the region in the global market. While NCIP facilitates the fast-track projects, the NCTTCA works closely with NCIP in planning, monitoring, and evaluating transport, trade and other projects along the Northern Corridor.

The framework of NCIP promotes the following projects related the Northern Corridor:

- Single Custom Territory
- Crude Oil Pipeline Development
- Standard Gauge Railway

2.2 Development Vision for Northern Economic Corridor

2.2.1 Vision Formulation Procedure

Figure 2.2.1 shows procedures for formulating the Development Vision for Northern Economic Corridor. As shown in this figure, the following procedures were taken to formulate the Vision:

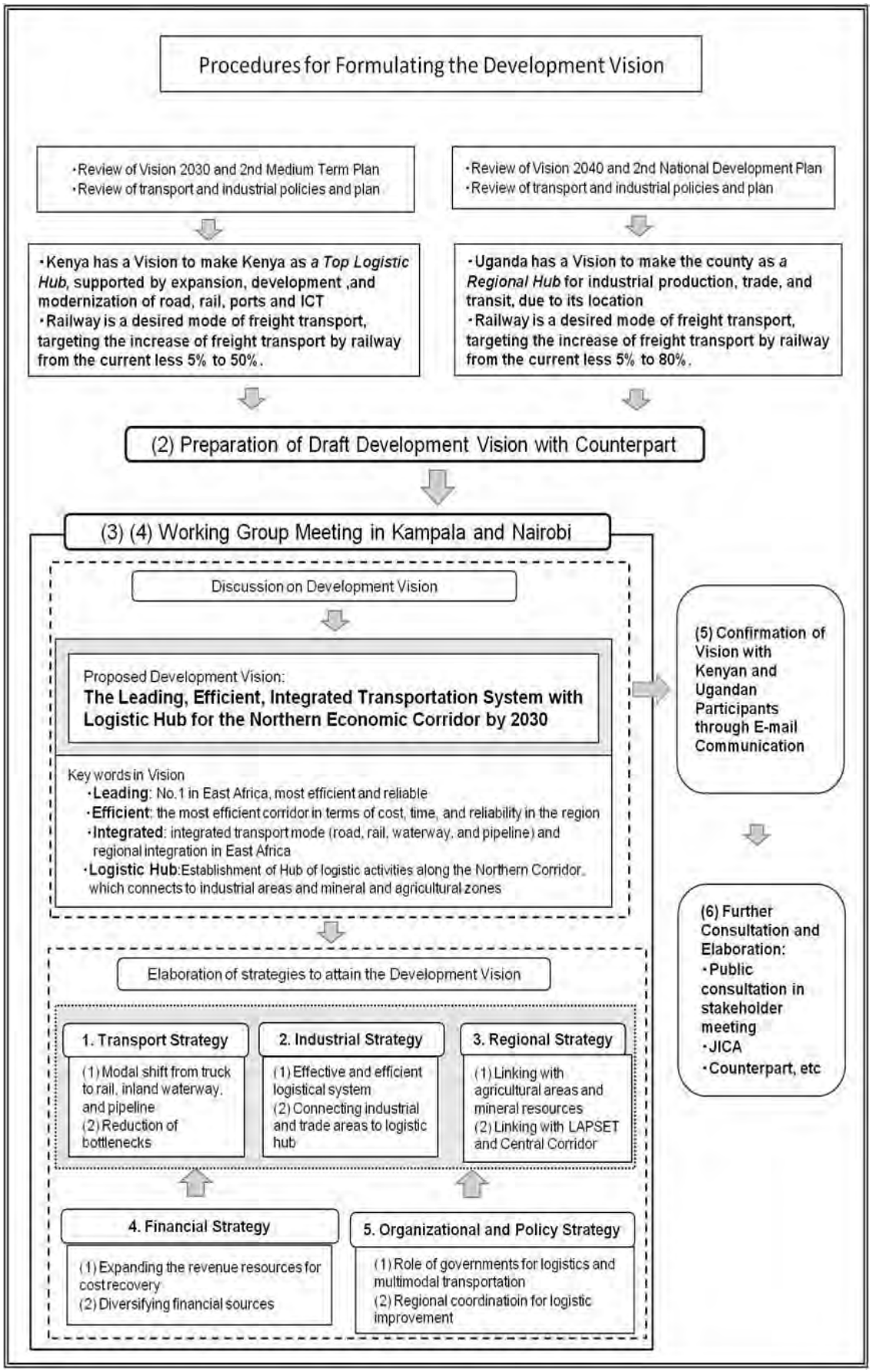
1) Review of the Vision, policies, and strategies in Kenya and Uganda

2) Preparation of a draft Development Vision in consultation with counterpart
3) Discussion and elaboration in sub-group Working Group Meeting on Development Vision in Kampala
4) Discussion and elaboration in sub-group Working Group Meeting on Development Vision in Nairobi
5) Confirmation of the proposed Development Vision with Kenyan and Ugandan participants through e-mail communication and discussion during the third country training
6) Public consultation in stakeholder meetings

First, the JICA Study Team reviewed the Kenya Vision 2030, Uganda Vision 2040, transport and industrial policies and strategies, in order to understand the development vision of the governments and national development plans. Then, a draft Development Vision was prepared through the consultation with counterpart in Uganda.

The sub-group Working Group Meeting (WGM) was held in Kampala on 27 October 2015 in order to discuss and elaborate the proposed Development Vision, in which eight representatives from Ministry of Work and Transport, one representative from Ministry of Finance, Planning, and Economic Cooperation, one representative from Uganda Bureau of Statistics, and two representatives from JICA Uganda Office participated. The revised and proposed Development Vision from this meeting was then consulted with Kenyan counterparts during the sub-group Working Group Meeting held in Nairobi on 6 November 2015. Two representatives from Ministry of Transport and Infrastructure, one representative from the National Treasury, one representative from NCTTCA participated in this meeting. Since there were several revisions in the Development Vision, e-mail-based consultation was made to Ugandan and Kenyan participants in order to confirm the proposed Vision and formulate one Development Vision for the Master Plan.

In response to a comment from JICA to consider regional development perspective in Development Vision, the second sub-group Working Group Meetings were held in Kampala and Nairobi in 29 January 2016 and 4 February 2016 respectively. Seven representatives from Ministry of Work and Transport, one representative from Ministry of Finance, Planning, and Economic Cooperation, one representative from Ministry of East African Affairs, one representative from Uganda Bureau of Statistics, one representative from Uganda Investment Authority participated in this WGM. In Kenya, two representatives from Ministry of Transport and Infrastructure, one representative from the National Treasury, one representative from Kenya Railway Corporation, one representative from NCTTCA, one representative from State Department of East African Community, one representative from Ministry of Industrialization and Enterprise Development, and two representatives from JICA participated in the WGM.



Source: JICA Study Team

Figure 2.2.1: Procedures for Formulating the Development Vision

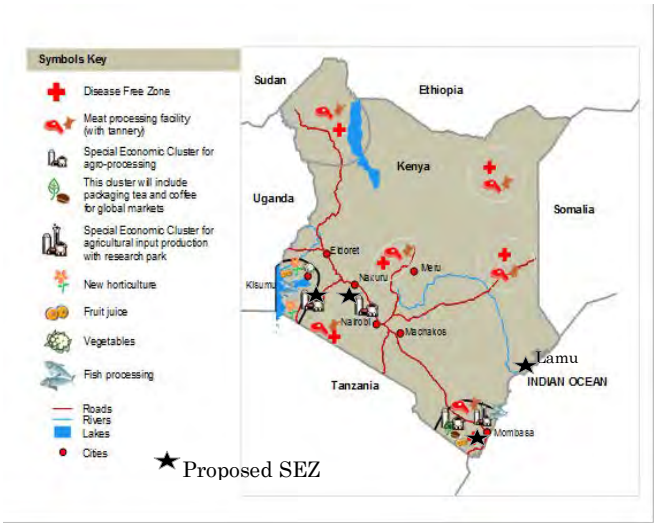
As a result of these meetings, two different Development Visions were proposed by Ugandan and Kenyan, as well as there was one Development Vision proposed by one participant from Uganda on 30 January 2016. These different Development Visions were shared among the participants from Uganda and Kenya by e-mail, and it was suggested to discuss among them and formulate one Development Vision through e-mail and during the third-country training in Mozambique where five representatives of Kenya and Uganda were joined.

Finally, public consultation with relevant stakeholder on the proposed Development Vision will be held at the later stage of the Master Plan.

2.2.2 Reviews of Development Visions in the Related Plans and Strategies

(1) Development Vision in Kenya

The Kenya Vision 2030 is a long-term development plan of the country, which aims to transform Kenya into "a newly-industrialized, middle income country providing a high quality of life by 2030". The Vision 2030 is planned to be achieved through the five-year Medium Term Plan (MTP), and currently Kenya has been implementing the 2nd MTP, which started from 2012 and will end by 2017.



Source: Based on Kenya Vision 2030

Figure 2.2.2: Potential Industrial Aras Identified by Vision 2030 and Proposed SEZs

The 2nd MTP outlines 16 priority areas, including, among others, infrastructure, industrialization, improved trade, investment to support growth, and competitiveness and rebalancing growth. In this period, the government focuses on increasing its trade share in the regional and other emerging market, and expanding infrastructure investment such as roads, railway, ports, and ICT in order to "make Kenya a top logistic hub".

The development of Lamu Port, South Sudan and Ethiopia Transport (LAPSSET) corridor and mineral resources sector as well as private sector investment in infrastructure are given a priority in the 2nd MTP. In the transport sector, railway is a desired mode of freight transport, and it is planned to increase cargo freight by railway from the current less 5% to 50%. The crude oil pipeline is planned to be constructed along the LAPSSET.

Source: Kenya's Industrial Transformation Program

Figure 2.2.3: Potential Industrial Park/Zone in Kenya

The MOIED identified the potential areas for the establishment of Special Economic Zones (SEZs) in (1) Mombasa, (2) Lamu, (3) Naivasha, and (4) Kisumu, three of which are located along the Northern Corridor. Furthermore, MOIED formulated the Industrial Transformation Program in 2015, in which potential industrial parks and zones were identified along the Northern Corridor and LAPSSET. As shown in Figure 2.2.3, Kisumu (potential SEZ, cotton, iron industry, etc), Nakuru (horticulture, etc.), Naivasha (potential SEZ, geo-thermal energy, horticulture, textile, etc), Nairobi/Athi River (leather, tannery, etc), Sultan Hamud, Voi (iron extraction, sisal, SME Park), Mombasa (Dongo Kundu SEZ, garment, etc) were identified as potential industrial park or SEZ along the Northern Corridor. Furthermore, Eldoret was identified as a potential SEZ, developing a textile industry and other agro-processing industries. A petro-chemical industrial cluster is planned to establish near Baringo.

With the construction of the Standard Gauge Railway (SGR) between Mombasa and Nairobi, industrial parks are planned to be established at the stations of SGR, which includes Nairobi, Kisumu, and Athi River. It is therefore considered that designing infrastructure around the

proposed industrial parks, regional trade, and transporting mineral resources are the key for infrastructure development in Kenya.

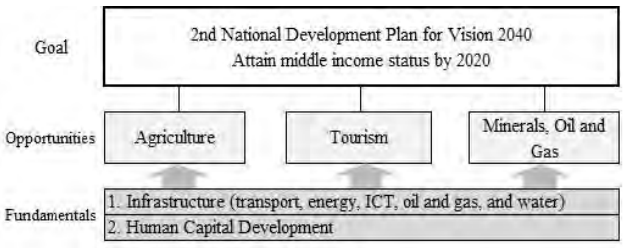
(2) Development Vision in Uganda

The Vision 2040 is to attain "a Transformed Ugandans Society from Peasant to a Modern and Prosperous County within 30 years". The Vision 2040 details a number of socioeconomic indicators and targets that are to be developed within 30 years. The Vision 2040 aims at transforming Uganda from a predominantly low income country with per capita income of USD 506 to a competitive middle income country with USD 9,500 per person by 2040. In the transport sector, the government aims at transforming the current coverage of paved road (4% of total) to 80% of total road network. In addition, a railway is a desired mode of freight transport and it is anticipated to increase cargo freight by railway from the current 3.5% to 80% within 30 years. The current level of urbanization (13% of population) is expected to increase to 60% of the total population within 30 years. To achieve the targets set up in the above, the Vision 2040 identified key opportunities, which are strengthened by the fundamentals. The strategic approach in the Vision 2040 is based on "harnessing opportunities by strengthening the fundamentals that facilitate maximum returns from the opportunities"

Table 2.2.1: Socio-Economic Indicators in Vision 2040

Socio-economic indicators	Baseline 2010	Target 2040
Per capita income	USD 506	USD 9,500
Sector composition of GDP		
Agriculture	22.4%	10.4%
Industry	26.4%	31.5%
Service	51.2%	58.2%
% of paved roads to total road network	4%	80%
% of cargo freight on rail to total freight	3.5%	80%
% of urbanization	13%	60%

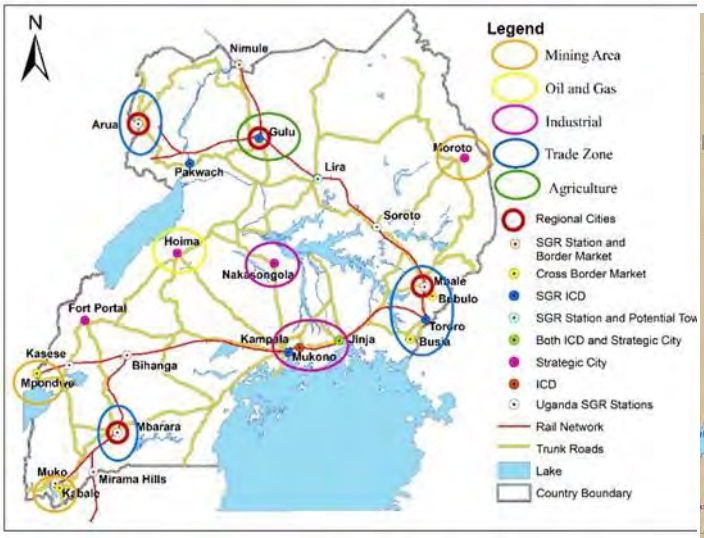
Source: Uganda Vision 2040



Source: JICA Study Team based on 2nd NDP (2015/16- 2019/20)

Figure 2.2.4: Strategy in NDP II

The 2nd NDP (2015/16 – 2019/20) was launched on June 2015, in which three opportunities, namely, (1) agriculture, (2) tourism, (3) minerals, oil, and gas, are identified as a priority. These are strengthened by two priority fundamentals, namely, (1) infrastructure and (2) human capital development (Figure 2.2.4).



Source: JICA Study Team based on Uganda Vision 2040

Figure 2.2.5: Proposed Economic Zones and Trade Area

Source: Uganda Vision 2040

Figure 2.2.6: Proposed Infrastructure for Mineral Resources

The key vision for infrastructure development is to design infrastructure around production zones and sites, which will underpin agricultural and mineral processing. The Vision 2040 sees an opportunity of Uganda's location to "make it a regional hub for industrial production, trade and transit, and air transport", by connecting the cities and strengthening cross border trade and establishing key strategic trade zones. Figure 2.2.5 demonstrates the proposed economic zones and trade areas in Vision 2040. The National Industrial Policy (2008) targets to increase the contribution of the manufacturing sector from the current 6.8% to 25% of total GDP within the 10 years. In addition, the establishment of Cross Border Market (Elegu, Kabale, Mpondwe, Busia, and Wrakhakha) has been planned in order to facilitate trade, light manufacturing, livestock industry, and warehouse with neighbouring countries.

The Standard Gauge Railway, several express ways near Kampala Metropolitan area, improvement of existing marine transport to reduce the cost of transport and increase connectivity, refinery, and crude oil pipeline from Hoima to Lamu in Kenya are among the core projects in the transport sector. The Vision 2040 identifies an opportunity to build a strong mining industry through infrastructure development, and considers that the railway shall be extended to areas where enormous deposits have been found. The proposed railway route to connect to the potential mineral industries is shown in Figure 2.2.6.

2.2.3 Proposed Vision for NEC

Based on the above procedure including reviews of the Development Vision, discussion during the WGM, e-mail communication and discussion during the third country training with Kenyan and Ugandan participants, the following Development Vision was proposed for Northern Economic Corridor:

"To be the Leading Economic Corridor with Integrated Transport and Logistics Systems in Africa"

[Key Words in Vision]

- **Leading**: to be the leading, most efficient and reliable corridor in Africa and the success of NEC can be disseminated to other African regions
- **Economic Corridor**: which stimulates regional economic development in the area surrounding the corridor through the development of transport infrastructure and logistic facilities and creating industries
- **Integrated**: integrated transport and logistics system, which offers diversified and multi-modal options (road, rail, waterway, and pipeline), facilitates regional integration in East Africa, and connects and promotes industrial areas

[Five Strategies to Support the Development Vision]

1. **Regional Strategy: Linking Production Center and Corridors**
   (1) Linking with agricultural productive areas and mineral resources
   (2) Linking with LAPSSET, Central Corridor, and Kampala-Juba-Addis Ababa-Djibouti Corridor

2. **Industrial Strategy: Effective and Efficient Logistical System for Industry and Trade**
   (1) Promotion of growth drivers to increase export, reduce import, and economic development
   (2) Connecting industrial areas to logistic hubs at strategic locations
   (3) Establishment of logistic hubs with ICD and Logistic Center

3. **Transport Strategy: Efficient and Integrated Multimodal Transportation System**
   (1) Modal shift from truck to rail, inland waterway, and pipeline
   (2) Reduction of bottlenecks of freight traffic and logistics
   (3) Enhancement of existing transport infrastructures

4. **Organizational and Policy Strategy: Appropriate Institutional Framework for Transport and Logistics**
   (1) Role of the governments for logistic and multimodal transportation
   (2) Regional coordination for logistical improvement

5. **Financial Strategy: Cost Recovery and Diversifying Financial Sources**
   (1) Diversifying the financial sources
   (2) Expanding the revenue sources of the governments for cost recovery

The proposed Development Vision will be attained by the implementation of five strategies. Three strategies (Transport, Industrial, and Regional) will be strengthened by financial strategy and organizational and policy strategy, as shown in Figure 2.2.1 above.

2.3 Socioeconomic Framework

2.3.1 Target Year for the Socioeconomic Framework

In this study, the target years for the planning horizon are set up as follows:

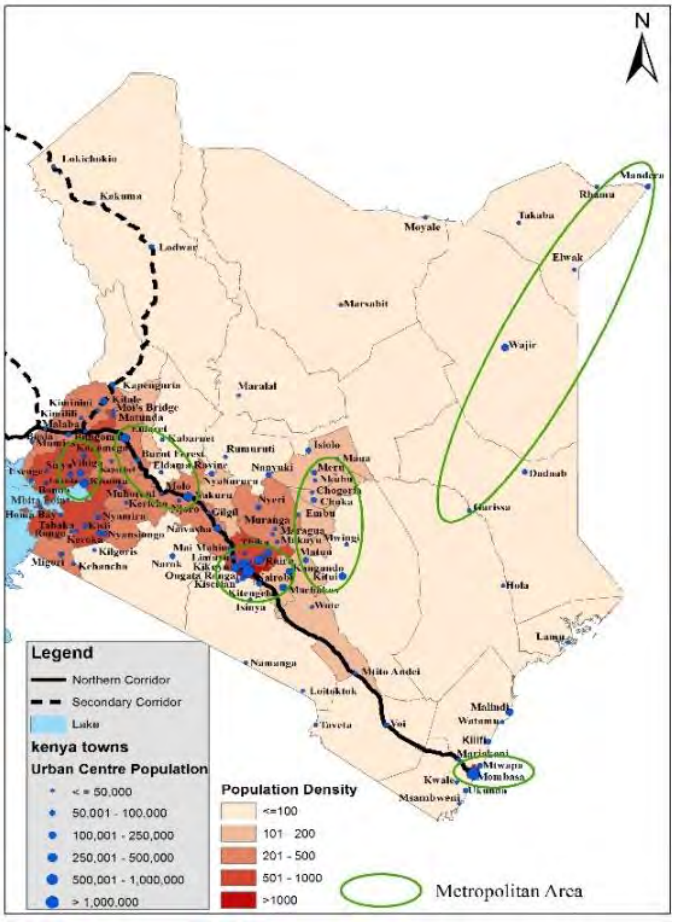
Year 2015: This is the base year of the Study
Year 2020: This is the target year for the first medium term plan
Year 2025: This is the target year for the second medium term plan
Year 2030: This is the target year for the long term plan

Six countries along the Northern Economic Corridor (Kenya, Uganda, Rwanda, Burundi, South Sudan, and DRC) and the member states of East African Community (Kenya, Uganda, Rwanda, Burundi and Tanzania) are analysed in the Socio-Economic Framework for this study. The governments of Kenya and Uganda are both the main implementing organizations for this Master Plan, and therefore, more detailed analysis on socio-economic framework is provided for these countries.

2.3.2 Population Framework for NEC and EAC

(1) Population in Kenya

Kenya has a total population of 38.6 million as of the 2009 Population and Housing Census, which has grown by 3.0% between 1999 -2009 periods. The average population density was calculated at 68/km2, and the population is concentrated in Nairobi, Mombasa, and Western Kenya. As shown in Figure 2.3.1, major urban centers are located along the Northern Corridor, which consists of 64% of its urban population. The population living in urban areas was 32.3% of the total population in 2009. The most populous county along the Northern Corridor in 2009 was Nairobi City, which has 3.1 million, followed by Kakamega county (1,660,651) and Kiambu County (1,623,282).



Source: JICA Study Team

Figure 2.3.1: Population Density by County in Kenya (2009)

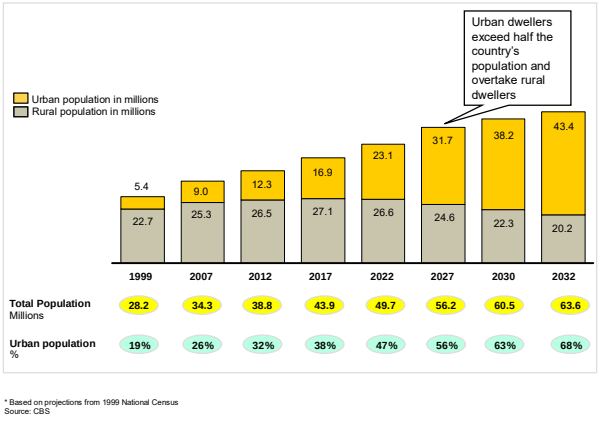
The Kenya Vision 2030 aims at developing six metropolitan regions as a key economic centre and regional development, of which four metropolitan areas, that are, (1) Nairobi, (2) Mombasa, (3) Nakuru, (4) Kisumu, are located along the NEC and important for urbanization in the country. It can be said that there is potential for accelerating the urbanization by developing transport infrastructure and connecting to metropolitan regions and potential areas.

(2) Population Projection in Kenya

The population distribution and urban-rural composition are required for formulating a traffic demand of the Master Plan. The latest Census was conducted in 2009, in which the population was distributed by the previous administrative division, that is, district. Under the New Constitution, 47 county governments were established in 2013. The population distribution by district was then redistributed to the counties, whose boundary will be used in this study.

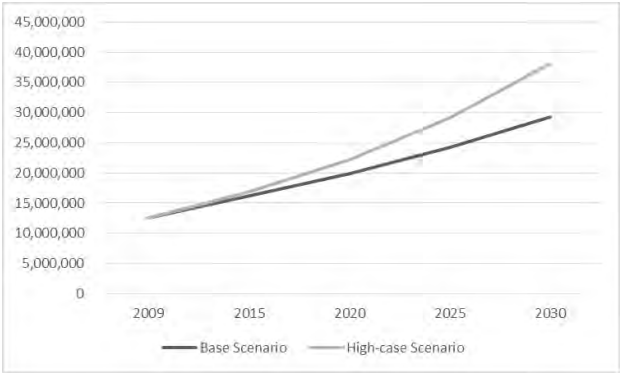
The population projection data at the county level are available in 2012, 2015, and 2017 years from the County Development Profile. These population data were based on the 2009 Census and sourced from Kenya National Bureau of Statistics (KNBS). This is the only available data at the county level and thus the study will be formulated based on these data and the 2009 Census.

The Kenya Vision 2030 provides the population projection at the national level and urban-rural composition, as shown in Figure 2.3.2. By 2030, the population is expected to reach to 60.5 million and the proportion of the population living in urban area is estimated to increase rapidly from 32.3% in the 2009 Census to 60.5% in 2030. The 2nd Medium Term Plan (MTP) of Vision 2030 projected the population to reach by 46.7 million in 2017, which increased the population projection by 2.8 million, compared to the Vision 2030 (43.9 million). It is considered that the residual difference is due to an underestimation of the Vision 2030 projection on family planning policies. Thus, at the national level, the study is based on the total population in the 2nd MTP.



Source: JICA Study Team

Figure 2.3.2: Population Projection in Vision 2030



Source: JICA Study Team

Figure 2.3.3: Projected Urban Population in Base Case and High Case

On the other hand, the population data from the County Development Profile provides the further increase of the total population, which is summed up by 48.6 million in 2017 or, around 2 million differences compared to 46.7 million of the 2nd MTP. Some population data from County Development Profile contracts with the 2009 Census and expected growth trend: for instance, the population in Bomet County has increased by 8.8% between the 1999 Census and the 2009 Census, but the population in 2015 was projected with a negative growth rate of -0.88% and then increased by 2.63% between 2015 and 2017. These irregularities were adjusted based on the 2009 Census results and expected growth trend. The population projection after 2017 at the County level is not available at the time of writing, so the study will be based on the projected growth rate provided by the United Nation[1].

With regards to the urban population, this study considers two scenarios, that is, (1) base scenario, using the medium fertility growth data from UN, and (2) high-case scenario, assuming that all plans envisaged in the Vision 2030 and Master Plan will be materialized.

The results of projected population are summarized in the following table. Table 2.3.1 shows that the population in Kenya is expected to reach at 64.9 million by 2030. The base scenario shows the gradual urbanization that increases the urban population to 29.2 million in 2030, while the high-case scenario projects an accelerated urbanization to increase to 38.1 million, based on the Vision 2030 and Master Plan.

Table 2.3.1: Population Projection up to 2030 in Kenya

	2009 Census	2015 (projection)	2020 (projection)	2025 (projection)	2030 (projection)
Population (million)	38.6	45.4	51.4	57.8	64.9
Growth Rate (%)	3.02%	2.77%	2.42%	2.10%	1.94%
Base Case Scenario					
Urban Population	12.5	16.2	19.9	24.2	29.2
Urbanization (%)	32.3%	35.7%	38.8%	41.9%	45.0%
High Case Scenario					
Urban Population	12.5	17.0	22.2	29.1	38.1
Urbanization (%)	32.3%	37.4%	43.2%	50.3%	58.7%

Source: JICA Study Team

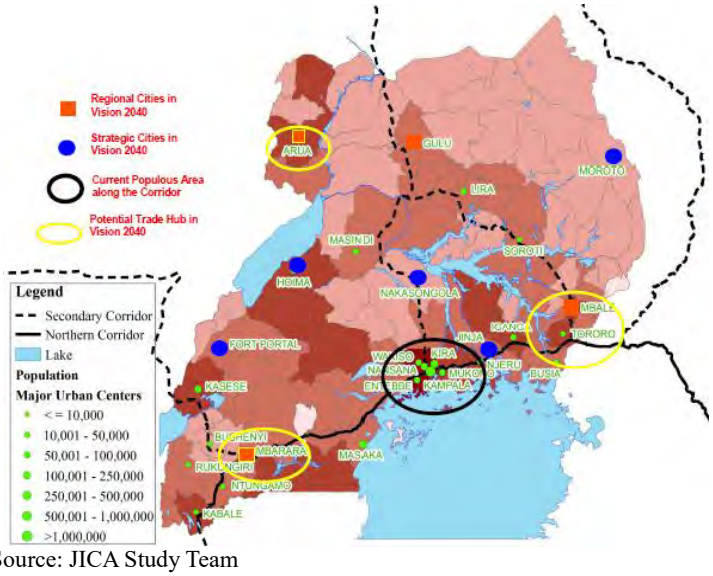
(3) Population in Uganda

Uganda has a total population of 34.9 million, according to the 2014 Census. The population growth in Uganda is highest among the East African countries, which accounts for 3.0% of the average annual growth rate between the 2002 Census and the 2014 Census. Figure 2.3.4 demonstrates the population distribution by district in 2015. As shown in this figure, the population is mainly concentrated in the Kampala Metropolitan area. The Kampala City accounts for 1.5 million and the surrounding Wakiso district is the most populous with 2.1 million, which resulted in stressing on land and transport system. The urban population consists of 18.4% of the

1 World Population Prospects: The 2012 Revision, United Nations, 2013

total population, and there are only 21 urban centres with a population more than 50,000 in Uganda.

The low level of urbanization and concentration of the population in the Kampala Metropolitan area led the government of Uganda to pursue an urban development vision for the establishment of four regional cities, namely, (1) Gulu, (2) Mbale, (3) Mbarara, and (4) Arua during the Vision 2040 period. In addition, 5 strategic cities are identified in the Vision 2040, which include Hoima (oil), Nakasongola (industrial), Fort Portal (tourism), Moroto (mineral) and Jinja (industrial).



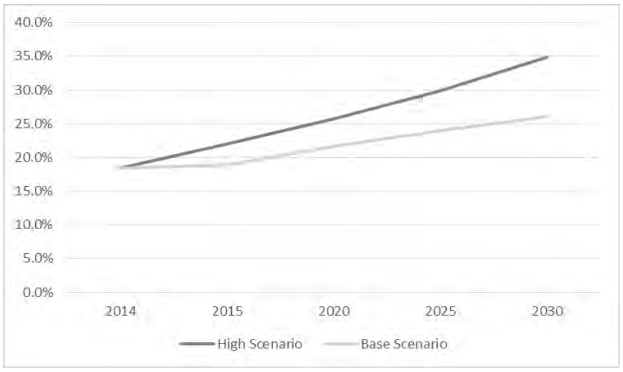
Source: JICA Study Team

Figure 2.3.4: Population Distribution and Regional and Strategic Cities in Uganda

The Uganda Vision 2040 aims at increasing the urban population from the current 18.4% to 60% by 2040. It can be considered that there is potential for accelerating the urbanization by developing transport infrastructure and connecting the regional and strategic cities with potential economic zones, as shown in Figure 2.3.4.

(4) Population Projection in Uganda

The population projection data at the district level are available for 2015, 2016, and 2017 at the time of writing, and the study will be based on these data and the 2014 Census in terms of population distribution by district. The population is projected to increase to 61.3 million by 2040, according to the Vision 2040, whereas the Uganda Bureau of Statistics (UBOS) projects the Ugandan population to increase to 40.4 million by 2020 and 46.7 million by 2025. These projected



Source: JICA Study Team

Figure 2.3.5: Projected Urbanization Rate in Uganda (%)

population data at the country level will be a basis for formulating the socio-economic framework in this study.

Regarding the future urban population, two scenarios for urbanization are considered, that is, (1) base scenario where the urban population is expected to grow with the medium fertility according to the UN's urbanization projection[2], and (2) high-case scenario where the accelerated urbanization is expected due to the increased connectivity between regional and strategic cities through transport development, based on the Vision 2040 and Master Plan. The results of projected population in Uganda are summarized in Table 2.3.2. The population in Uganda is expected to increase to 55.1 million by 2030.

Table 2.3.2: Population Projection up to 2030 in Uganda

	2014 Census	2015 (projection)	2020 (projection)	2025 (projection)	2030 (projection)
Population (million)	34.9	35.8	40.5	47.1	55.1
Growth Rate (%)	3.0%	2.6%	2.5%	2.9%	2.9%
Base Case Scenario					
Urban Population (million)	6.4	6.8	8.8	11.3	14.4
Urbanization (%)	18.4%	18.9%	21.7%	23.9%	26.1%
High Case Scenario					
Urban Population (million)	6.4	7.9	10.4	14.1	19.2
Urbanization (%)	18.4%	22.0%	25.7%	29.9%	34.9%

Source: JICA Study Team

(5) Population Projection for NEC and EAC countries

The population projection for other NEC and EAC countries are calculated at the country level, based on the national Census data and UN population data[3]. The study then estimates the population in 2015, 2020, 2025 and 2030 using the official projection data (Rwanda and Burundi), the projected population data from the UN (South Sudan, Tanzania and DRC).

The future population projected for EAC and NEC countries are shown in Table 2.3.3. The population in EAC countries is expected to increase from 154.5 in 2015 to 228.4 million in 2030, while the total population along the Northern Economic Corridor is projected to be 270.1 million by 2030. The most populous country in 2030 will be DRC (103.7 million), followed by Tanzania (79.4 million), Kenya (64.9 million) and Uganda (55.1 million). The total population in EAC/NEC area is projected to be 349.4 million, which is around 1.5 times more than the level in 2015.

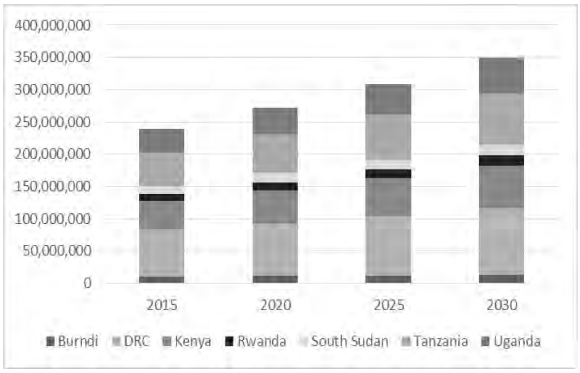
2 World Urbanization Prospects: The 2014 Revision, United Nations. The estimates of the urbanization in UN are based for the most part on national statistics such as the Census. Since the definition of urban population varies across the country, the study uses the estimated average annual rate of change of the urban population and the base data from the Census 2014, rather than the estimated number of urban population or urbanization rate from the UN data.

3 "Rapport des Projections Demographiques 2008-2030", Institut de Statistiques et D'etudes, Brundi; "Fourth Population and Housing Census, Rwanda, 2012", National Institute of Statistics in Rwanda; for South Sudan, "World Population Prospect: The 2012 Revision; "2012 Population and Housing Census", National Bureau of Statistics, Tanzania. There is no Census data in DRC for the past 30 years, so the study refers to the population data available from the internet and the data from UN.

Table 2.3.3: Population Projection in EAC NEC

Country	2015	2020	20,25	2030
Burundi	9.8	11.2	12.3	13.4
Rwanda	11.3	12.7	14.2	15.7
Tanzania	52.3	60.4	69.3	79.4
Kenya	45.4	51.4	57.8	64.9
Uganda	35.8	40.5	47.1	55.1
Total EAC	154.5	176.1	200.8	228.4
DRC	72.1	81.3	92.1	103.7
South Sudan	12.2	13.9	15.6	17.3
Total NEC	186.5	210.9	239.2	270.1
Grand Total	238.8	271.2	308.5	349.4

Source: JICA Study Team



Source: JICA Study Team

Figure 2.3.6: Projected Population in NEC and EAC between 2015 and 2030

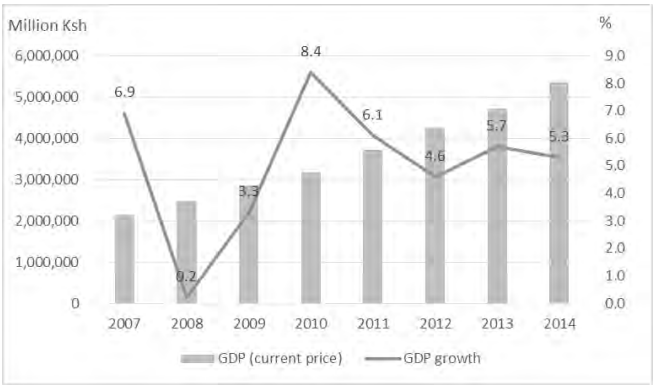
2.3.3 Economic Framework for NEC and EAC

(1) Economic Performance in Kenya

The economy in Kenya has grown by 6.0% during the past five years and registered 5.3% in 2014, as shown in Figure 2.3.7. The growth was supported by economic growth in mining and quarrying (15.0%), information and communication (13.5%), construction (10.7%), and electricity supply (9.4%) during the past 5 years. The tourism and manufacturing sectors were, among others, recorded a negative and slow growth between 2010 and 2014 (-3.0% and 4.0% respectively). The service sector contributed to around 55% of GDP, while the agriculture sector showed mixed performance, frequently affected by weather conditions. The industry sector has grown steadily to reach at 21% of the total GDP.

Inflation remains stable within single digit (6.5% in December 2015), but Kenyan Shilling declined by 15% this year to trade at 105 to one US dollar in September 2015. A significant decline in the tourism earning and a widening trade deficit worked against the shilling in 2015. Faced with the devaluation of shilling, the Central Bank Rate gradually increased from 8.5% in December 2014 to 11.5% in July 2015. This helped to tame the fall of Shilling, but pushed the commercial banks to raise the lending rate. The exchange rate became stable after increased foreign exchange inflows in the financial market. The debt to GDP ratio currently stands at 47%, which is below the threshold of 74% of public debt/GDP set by the Kenyan government[4].

4 Kenya is classified as *strong policy performer*, according to the World Bank's Country Policy and Institutional Assessment (CPIA). The debt burden threshold for strong policy performers is set at 50% of present value (PV) public debt/GDP, which is used for debt sustainability analysis. The Medium Term Debt Management Strategy 2015 prepared by the National Treasury in Kenya used the threshold of 74% of PV debt/GDP criteria.



Source: JICA Study Team

Figure 2.3.7: GDP (current price) and GDP Growth between 2007 and 2014 in Kenya

Table 2.3.4: GDP by Sectors in Kenya, 2006-2014 (Ksh million, constant price in 2009)

Sector	2006	2010	2014	2006 % of total	2014 % of total
Agriculture	686	736	845	28.8%	24.4%
Industry	488	584	729	20.5%	21.0%
Mining	14	24	35	0.6%	1.0%
Manufacturing	328	358	417	13.8%	12.0%
Services	1,208	1,521	1,895	50.7%	54.6%
Transport and Storage	174	216	252	7.3%	7.3%
Total GDP	2,588	3,104	3,834	100%	100%

Source: Data from Kenya National Bureau of Statistics, Prepared by JICA Study Team

(2) GDP Projection in Kenya

The 2nd Medium Term Plan (MTP 2013-2017) forecasts a gradual increase of GDP growth to 10.1% by 2017. The major drive for this high growth is anticipated from increased investments, especially from the recent discovery of oil, gas, rare earth minerals, and coal. In addition, a series of infrastructure investments are anticipated in the 2nd MTP, which includes the LAPSSET corridor project, modernization of the Port of Mombasa, Standard Gauge Railway, and power projects.

The National Treasury prepared the medium-term macroeconomic outlook in the 2015 Budget Policy Statement (BPS) and published a draft Budget Policy Statement 2016 at the time of writing. Real GDP is expected to expand from 5.3% in 2014 to 5.6% in 2015 and reach 7.0% by 2018. The main underpinning of this growth is expected from infrastructure investment such as Standard Gauge Railway, increased production in agriculture, expansion of building and construction and so on. The macroeconomic outlook in BPS was revised in Budget Review and Outlook Paper 2015, in which the economy is projected to grow by 5.8~6.0% in 2015 and 6.5% over the medium term.

Overall, Kenyan economy is projected to experience a solid growth of 6~7% in the medium term, provided planned infrastructure investments in transport and energy would reduce the cost of business environment, and irrigation and geothermal investments will be implemented to reduce the weather-related risks. The improved competitiveness in the manufacturing sector is also a key to expand the economy and export to the regional market. It is noted that the revenue from mineral resources such as oil and coal are not factored in the above macroeconomic forecast. With the current low price of mineral resources, it is quite difficult to project the schedule and revenue from mineral resources in the short-medium terms, but it is considered that the revenue from crude oil export would be available in the long term and needs to be factored in the projection for the long-term macroeconomic framework. In addition, the current devaluation of Shilling may tighten

the procurement and repayment in foreign currency, which may slowdown the growth of Kenyan economy in the medium term.

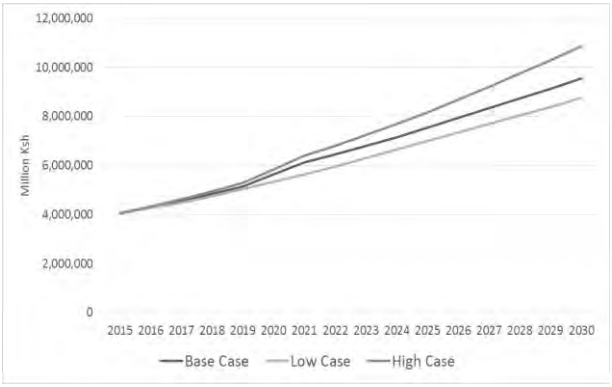
Based on the data from the National Treasury and the above assumptions, the economy of Kenya is expected to grow by 6.1% on average in the medium term. The agriculture sector is anticipated to grow steadily by the planned irrigation and fertilizer use in the medium term, and the industry sector is anticipated to benefit from the current infrastructure investments.

In terms of oil production, the following assumptions are used in the base scenario: crude oil export would start from around 2020, but it is expected to import refined oil products from Middle East or Uganda due to the current outlook of low oil price[5] and economic reasons. The impact of crude oil production may be more significant at the beginning of oil production, which is expected to attain 9% of growth in 2020, but then would diminish gradually as the size of economy grows. The oil production would change the composition of sectors, and the industry sector is expected to increase significantly. In the low case scenario, crude oil export is not materialized due to the low level of oil price and other factors. The results of macroeconomic outlook are summarized in Table 2.3.5.

Table 2.3.5: Future GDP Projection in Kenya 2015-2030

GDP Growth	2015	15~19	20~24	25~30
GDP (%, base case)	5.6%	6.1%	6.8%	4.9%
GDP (%, low case)	5.6%	5.6%	5.7%	4.7%
GDP (%, high case)	5.6%	6.6%	7.8%	5.9%
GDP/Sector (base case)	**2015**	**2020**	**2025**	**2030**
Agriculture (% of total)	24.0%	22.5%	20.9%	20.0%
Industry (% of total)	21.0%	24.2%	25.9%	25.4%
Service (% of total)	55.0%	53.3%	53.3%	54.6%

Source: JICA Study Team



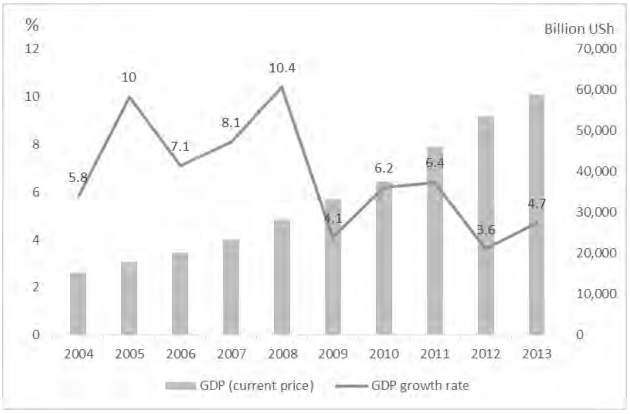
Source: JICA Study Team

Figure 2.3.8: Projected GDP by Base, Low, and High Cases, 2015-2030 (Constant Price in 2009)

5 US$37.0/bbl in 2016 to 58.1/bbl in 2020, Crude oil price forecast; *"Commodity Markets Outlook"*, January 2016, the World Bank

(3) Economic Performance in Uganda

The economy of Uganda grew rapidly by around four times larger than 10 years, as shown in Figure 2.3.9. The average GDP growth rate was 6.6% between 2002 and 2013, but the GDP growth has reduced gradually recently to the average 5.0% for the past 5 years. Figure 2.3.9 shows the GDP growth rate between 2004 and 2013. Uganda experienced a reduced growth rate recently, mainly due to political instability in neighbouring countries that caused the reduced trade and commercial activities, and the reduced growth in the manufacturing sector. The agricultural sector, especially food crop and cash crop, have been stagnated throughout the decade, as shown in Table 2.3.6. The growth of the agriculture during the past 5 years was 1.4% and its share of the total GDP declined from 16.6% in 2009 to 14.2% in 2013. The service sector contributed to around 50% of GDP, with moderate growth of 6.1% during the past 5 years. The industry sector has grown steadily to increase its share of GDP from 26.8% in 2005 to 28.4% in 2013. The growth of the manufacturing sector reduced recently from 7.2% (2005-2009) to 4.1% (2009-2013).



Source: JICA Study Team based on the data from Statistical Abstract 2010, 2014

Figure 2.3.9: GDP and Growth in Uganda (2004-13)

The Ugandan Shilling has been depreciated by 20-25 % since early 2015. Inflation has been stable by 5.2% in 2015, but the recent higher than expected depreciation of Shilling prompted the Bank of Uganda to raise the central bank rate to 17.0% in order to contain inflation pressure from the currency depreciation. The current public debt is estimated at 31.2% of GDP, which is expected to increase to 46% by 2019/20[6].

Table 2.3.6: GDP by Sector in Uganda, 2005-2013

GDP by Sector	2005 (billion Sh)	2009 (billion Sh)	2013 (billion Sh)	2005 (% of total)	2013 (% of total)
Agriculture	2,842	2,974	3,117	20.8%	14.2%
Cash crop	223	276	304	1.6%	1.4%
Livestock	234	263	298	1.7%	1.4%
Industry	3,658	4,883	6,259	26.8%	28.4%
Mining	47	59	94	0.3%	0.4%
Manufacturing	1,050	1,380	1,629	7.7%	7.4%
Services	7,170	10,017	12,626	52.5%	57.4%
Road, rail & water transport	377	476	565	2.8%	2.6%
Total	14,814	19,918	24,158	100%	100%

Source: JICA Study Team based on Statistical Abstract, 2010, 2014

(4) GDP Projection in Uganda

6 The Staff Report for the 2015 Article VI Consultation and Fourth Review, IMF, 2015.

The NDP II assumes that stable macroeconomic performance during the NDPII period will be driven by both public and private investment and increased export growth. GDP is expected to grow by 5.8% to 6.8% annually, and per capital GDP is anticipated to attain to the lower middle income of USD 1,039 by 2018/19. Key sources of growth are identified in each sector, namely, (1) processing of phosphates into fertilizer to boost agricultural productivity, (2) development of iron smelting plant in the mineral sector, which would contribute to 0.5% to GDP growth, (3) Karuma and Isimba dam, (4) oil refinery, (5) crude oil pipeline, (6) standard gauge railway, and (7) key roads in the infrastructure sector. The infrastructure expenditure during the NDP II will increase to 5.0% of GDP in 2016/17, mainly spent by Karuma and Isimba dam (USD 545 million) and Standard Gauge Railway (USD 570million). Around half of the infrastructure costs are planned to be financed by the private sector through the PPP arrangement, direct private sector investments and so on. The macroeconomic outlook in NDP II considers the phosphate and iron mineral development, but the revenue from oil is not factored in.

National Budget Framework Paper 2015/16 (NBFP) foresees a rebound of Ugandan economy driven by increased agricultural production and public investment for the medium term. The growth is expected to increase from 5.8% in 2015/16 to 6.8% in 2019/2020, which is aligned with the NDP II. Ministry of Finance, Planning and Economic Development revised the estimate for 2015/16 to 5.0%, and the medium term growth to around 6.0% recently.

Based on the above assumptions and reviews, economy in Uganda is expected to increase by 5-6% in the medium term, provided political and exchange rate stability are ensured and planned infrastructure and mineral resource development will be implemented. The planned investment in phosphate processing and iron smelling plants are expected to enhance a growth for agricultural production and the manufacturing sector in the medium term. The growth for the agriculture sector is projected to increase from the current 1.4% to around 3.0-3.5% for the medium term, given the planned fertilizer and irrigation projects will be materialized. The industry sector is expected to grow by around 6-7% during the medium term, which is driven by the planned infrastructure investments. It is certainly difficult to estimate the impact from oil production due to the variability of oil price and unpredictability of oil pipeline and other infrastructure construction, but it is assumed that oil production and refinery would commence from around 2020 in base case scenario, but crude oil export is not factored in the base scenario due to the recent low oil price forecast and uncertainty of oil pipeline through LAPSSET. In the high case scenario, both refined oil production and crude oil export are considered, which would increase the real GDP significantly at the beginning of oil production. Both the economic impact from oil production and imported fuel substitution are factored in this study.

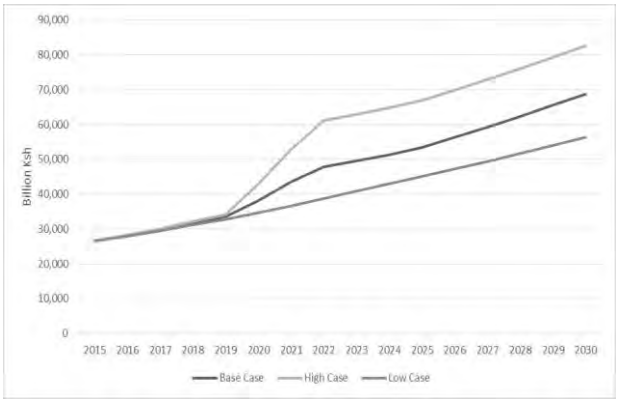
The results of GDP projection are summarized in Table 2.3.7. Due to the oil production factor and the size of economy, the GDP growth is expected to increase significantly at the beginning of oil production. The share of the industry sector is projected to expand to 39.9% of GDP by

2030, while the percentage of the agriculture and service sectors are projected to decline accordingly. The economic impact from oil production would be more significant at the beginning of oil production, which will be then reduced gradually as other oil producing countries.

Table 2.3.7: GDP Projection in Uganda 2015-2030

GDP Growth (%)	2015	15~19	20~24	25~30
GDP (base case)	5.0%	5.7%	9.0%	5.0%
GDP (low case)	5.0%	5.3%	5.6%	4.6%
GDP (high case)	5.0%	6.1%	14.1%	4.1%
GDP/Sector (base case)	**2015**	**2020**	**2025**	**2030**
Agriculture (% of total)	13.4%	10.9%	9.1%	8.2%
Industry (% of total)	28.6%	34.5%	39.3%	39.9%
Service (% of total)	58.0%	54.6%	51.6%	51.9%

Source: JICA Study Team



Source: JICA Study Team

Figure 2.3.10: Projected GDP by Base, Low, and High Cases, 2015-2030 (constant price in 2002)

(5) GDP Projection in NEC and EAC

The future macroeconomic framework for EAC and NEC countries are formulated to take into consideration of several factors such as the current economic performance, reviews of the existing macroeconomic outlook such as World Economic Outlook, African Economic Outlook, and IMF's Article IV report, and interviews with representatives and embassies of Burundi, DRC, South Sudan, and donors on future investment plans.

Recent economic performance in Burundi showed a mixed picture from a growth of 5.0% to negative growth of -9.0% during the past 5 years. According to EAC's report, real GDP growth was estimated at 5.0% in 2014. Agriculture is the main economic activities in Burundi, which consists of around 32% of GDP. The current political instability related to the 2015 election is the major risk for the medium term. The World Economic Outlook 2015 projects the real GDP growth of 4.8% in 2015, which would increase slightly to 5.5% by 2020. The Northern Corridor Infrastructure Master Plan (NCIMP, 2011) projects the average growth of 4.2% between 2016 and 2030. The potential industries are the tourism and the mining sector, and Burundi has the reserve of nickel, phosphates, and petrol. It is expected to transport mineral resources (nickel) through railway, and the current progress of SGR and Single Custom Territory along the Northern Corridor are of interest in Burundi. Based on the above reviews, Burundi is expected to grow moderately for the medium–long term, between 4.2-4.8% during the study period.

Rwanda attained the strong economic performance during the past 5 years, with the average 7.0% of real GDP growth. The major contribution to growth in 2014 were attributed to information and communication (16.9%) and mining sector (11.5%), but Rwanda is predominantly an agricultural

state, and the share of agriculture is around 26% of GDP. The World Economic Outlook 2015 foresees the strong economic growth for the medium term, from 7% in 2015 to 7.5% in 2020, while NCIMP 2011 provides rather conservative forecast of 4.7% for the 2016-2030 period. Rwanda adapted a development vision to be a regional hub for services by 2020, and several reforms for business environment have been undertaken. Rwanda is ranked at 62 in the World Bank's Doing Business 2016, which is the 2nd highest in Sub-Saharan Africa. Considering the current performance and business environment, economy in Rwanda is expected to grow strongly for the medium term, and decrease modestly to stabilize the economy and in proportion to the decline of population growth.

Economy of Tanzania remained robust with the average real GDP growth of 6.8% during the past 5 years. The GDP growth in 2014 was recorded at 8.7% in 2014, which was supported by strong performance in financial and insurance activities (20.4%), electricity and gas (20.3%), construction (16.8%), and forestry (15.9%). The medium term macroeconomic outlook is favorable with projected growth of 7.2% (2015) to 6.9% (2020), according to the World Economic Outlook 2015. The growth is expected to be supported by public infrastructure related to natural gas and gas pipeline from Mtwara to Dar-es Salaam. NCIMP 2011 projects a robust growth of 6.2% between 2016 and 2030. A lower price of natural gas affected the investment commitment to natural gas both for export and generating electricity. Based on the above, real GDP in Tanzania is expected to grow by 7.0-7.2% for the medium term, which is projected to be more stabilized to 6.0% by 2030.

Recent economic performance in DRC continued to be strong, with the average growth of 7.8% during the past 5 years. The GDP growth in2014 was estimated at 9.1%, driven by the strong performance in copper production, manufacturing industries, and the service sector. The estimated GDP growth in 2015 is 8.5%, which is declined from the previously projected growth of 9.2%, as a result of lower price of mineral resource in the world market. The completion of 44,000MW Inga Hydropower project has the potential to expand economic growth. DRC joined in the Northern Corridor Integrated Project, and it is anticipated to transport mineral resources from North Kivu Province through SGR connection. The economy is expected to remain strong for the medium term, with 8.4% in 2016, but political instability and security situation would crowd out the potential economic growth. NCIMP 2011 provides a modest outlook for the long term, growing the economy by 5.6% during the 2016-2030 period. With the uncertainty of political situation, the long term outlook is projected conservatively to grow by 5.4-5.5% during the 2020-2030 period.

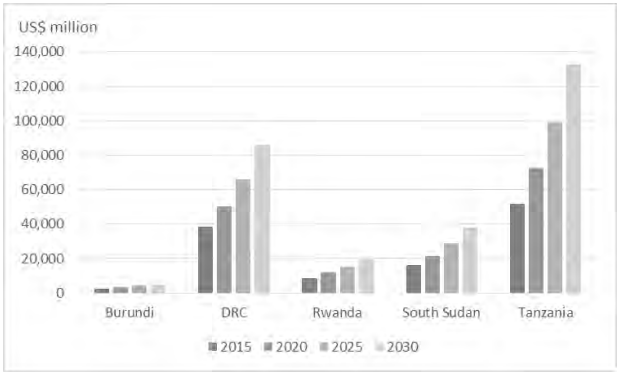
South Sudan experienced a huge fluctuation of economic performance, from GDP growth of -46.8% in 2012 to 24.2% in 2013, which is expected to slow down to 3.4% in 2015. This instability in economy is mainly attributed to the on-going political instability within the country and unstable oil production. The economy of South Sudan is highly dependent on oil production, and

around 75 % of the government revenue comes from oil production. Other than oil production, South Sudan has the reserves of copper, gold, uranium and other mineral resources. There are several on-going reconstruction and development plans, which include Nimule Hydropower Project (400MW), the reconstruction of Eldoret- Nadapal- Juba road and Gulu-Nimule-Juba road, and the construction of Keji Cement Plant. The planned pipeline through LAPSSET is yet to be implemented and it is expected to transport crude oil through Lamu Port in the medium-long term. It is also expected to transport mineral resources such as copper and cement through SGR for the long term. The World Economic Outlook 2015 projects a mixed macroeconomic performance from 20.7% in 2016 to 3.1% in 2020. Due to the on-going political instability, the economy of South Sudan is expected to grow moderately for the medium term, but with the reconstruction of infrastructure along the Northern Corridor and crude oil transportation through the LAPSSET, the long term outlook is projected to be favourable with real GDP growth of 6.0%-6.5%.

Table 2.3.8: GDP Projection in EAC and NEC Countries

Country	2015	2020	2025	2030
Burundi	4.8%	4.5%	4.5%	4.2%
Rwanda	7.0%	6.0%	5.5%	5.0%
Tanzania	7.2%	7.0%	6.5%	6.0%
Kenya	6.0%	8.6%	7.9%	5.7%
Uganda	5.0%	9.5%	10.8%	5.7%
DRC	8.5%	5.4%	5.5%	5.5%
South Sudan	3.4%	5.5%	6.5%	6.0%

Source: JICA Study Team



Source: JICA Study Team

Figure 2.3.11: Projected GDP, 2015-2030

CHAPTER 3 REGIONAL STRUCTURE PLAN

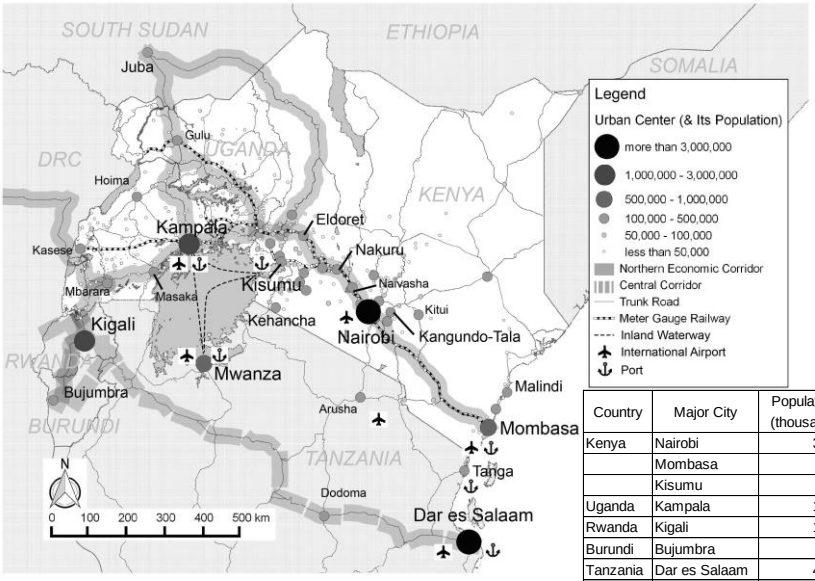
3.1 Overview of Regional Structure along Northern Economic Corridor

3.1.1 Spatial Structure

This section describes major features of current spatial structure of Northern Economic Corridor region by dividing the components into nodes and network.

(1) Node

Characteristics of distribution and scale of urban centres are reviewed. Figure 3.1.1 shows distribution of urban centres in both countries (Kenya and Uganda) and major cities in neighbouring countries by population level.



Country	Major City	Population (thousand)
Kenya	Nairobi	3,130
	Mombasa	938
	Kisumu	401
Uganda	Kampala	1,520
Rwanda	Kigali	1,140
Burundi	Bujumbra	497
Tanzania	Dar es Salaam	4,360
	Mwanza	706
	Arusha	416

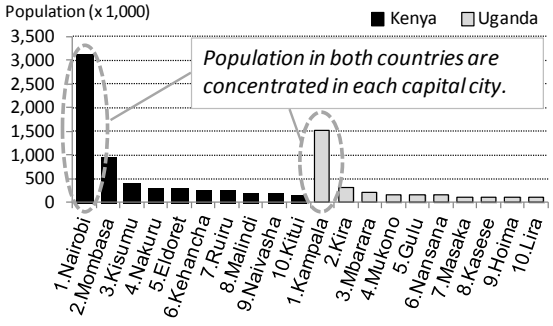
Source: JICA Study Team based on data from Censuses in Kenya (2009), Uganda (2014), Tanzania (2012), Rwanda (2012), Burundi (2008) and South Sudan (2008)

Figure 3.1.1: Current Major Cities and Existing Transportation

As for Kenya, there are three cities, Nairobi, Mombasa and Kisumu, which meet some criteria as "city" under Kenya Urban Areas and Cities Act. These cities have formulated integrated development plan and have enough capacity to supply urban services. Nairobi is by far the largest city; the population of Nairobi in 2009 was 3.1 million, which is much higher than Mombasa with 0.94 million and Kisumu with 0.41 million (Figure 3.1.2), and Nairobi alone accounts for 23% of urban population and over 55% of GDP in Kenya (data from Nairobi Integrated Urban Development Master Plan (NIUPLAN) 2030). Mombasa and Kisumu are larger than other municipalities and the major urban areas for the respective areas; Mombasa is located at the Indian Ocean coast and has a gateway function for Kenya and inland East African

countries. Kisumu is located at Lake Victoria shores and is the major urban centre in the Victoria basin.

In Uganda, Kampala is the only city, with major urban areas concentrating in the surrounding area. Kampala alone accounts for 29% of urban population, which is 1.5 million people. Major urban areas including second and fourth largest urban areas, Kira and Mukono respectively, are located within 50 km from Kampala and accounts for 37% of urban population. Though smaller compared to the Kampala area, the other major urban areas of Mbarara, Gulu, Masaka and Kasese are located in the western and northern areas of Uganda.



Source: JICA Study Team based on data from the 2009 Kenya Population and Housing Census and National Population and Housing Census 2014 in Uganda

Figure 3.1.2: Population of Ten Largest Cities in Kenya and Uganda

(2) Network

This section outlines current network of transport modes, and their details are mentioned in following Chapter 5. The existing network is illustrated in Figure 3.1.1 above.

1) Traffic Demand:

According to the result of goods movement and vehicle traffic survey conducted by JICA Study Team in 2015, both freight volume and traffic volume on roads are much concentrated on the road between Mombasa-Nairobi and Nairobi-Kampala. The route from Nairobi-Kampala branches from Nakuru into two routes through Eldoret and through Kisumu with dividing traffic volume almost equally, and merges into one after entering Uganda. The freight volume on the other roads was much less than either of the aforementioned roads.

2) Road Infrastructure:

The primary route of NEC region is the main route of NEC which connects the Mombasa port and four capitals, Nairobi, Kampala, Kigali and Bujumbura. In addition, there are other major routes including i) the three routes to Juba in South Sudan from three points on the primary route, Eldoret, Malaba and Kampala and ii) the route to Kisangani in DRC from Mbarara. Almost all those roads are two lanes except for urban areas. Feeder roads from the primary route in Kenya towards northern Kenya and Tanzania are still in poor condition, however they are being improved. Feeder roads from the primary route in Uganda to northern major cities such as Hoima are almost well connected and in good condition.

3) Railways Infrastructure:

Meter Gauge Railway line is operating in Kenya and Uganda. This includes the main line from Mombasa to Kampala passing through Nairobi, Nakuru and Eldoret. And there are branch lines from the main line including routes from Nakuru to Kisumu and Kampala to Port Bell on Lake Victoria. The branch line between Tororo to Pakwach through Gulu has been closed since 2006.

4) Airport Infrastructure:

JKIA International Airport and Entebbe International Airport are hub airports for NEC region; they handle much higher volumes of passenger and cargo than the other airport in Kenya and Uganda respectively.

5) Inland Waterway Infrastructure:

Port Bell, Mwanza and Kisumu are three major ports on shore of Lake Victoria. The major route was between Port Bell and Mwanza for cargo transport, however currently the number of operation is limited to once a week or several times a month because of some constraints like lack of boat due to breakdown or inadequate safety levels and old port facilities.

6) Linkage with nodes outside Kenya and Uganda:

According to the result of goods movement and vehicle traffic survey mentioned above, cargo traffic volumes between Uganda and neighboring countries, namely South Sudan, DRC, Rwanda and Burundi are much lower than the ones between Mombasa port and both countries.

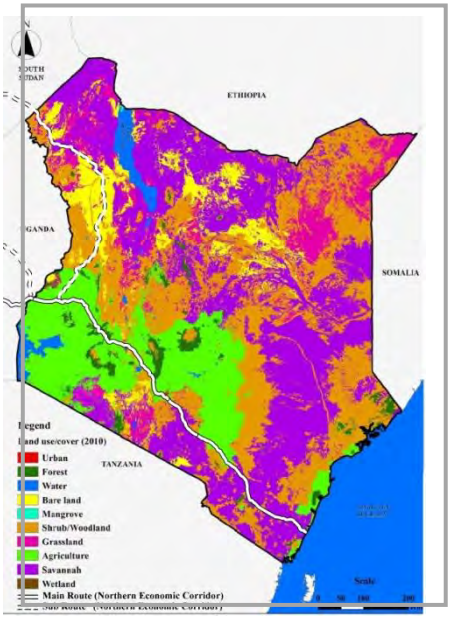
Currently the connection between NEC and Central Corridor is not well because of lack of improvement of routes including road to Arusha and waterway to Mwanza and other ports, however, some parts of the road is being improved and plans are underway to improve the remaining parts.

3.1.2 Land Use

(1) Present Land Use

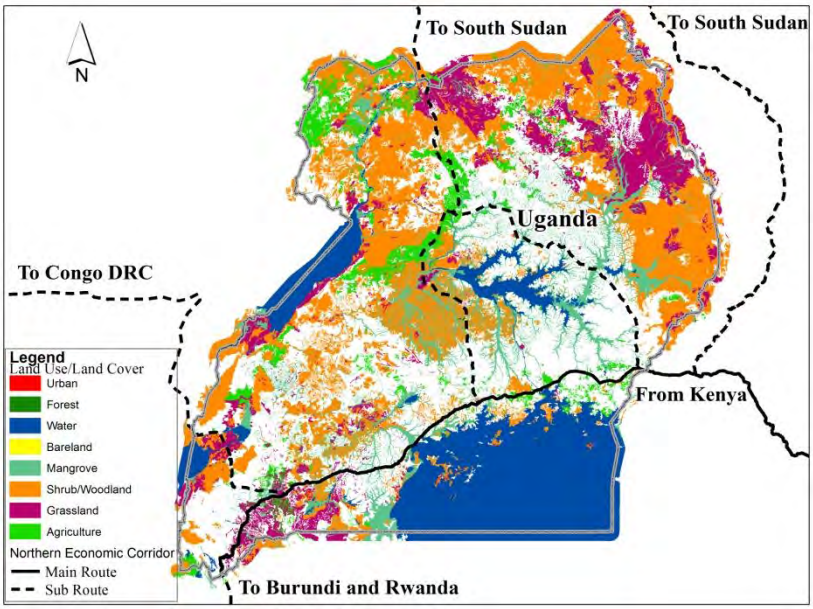
Figure 3.1.3 shows land use map of Kenya in 2010. The land around the Northern Economic Corridor varies from rich agricultural land to savannah, shrub/woodland, forest and bare land. Agricultural land which covers only 16% of the entire land of Kenya, is especially concentrated around the corridor. The area around Lake Victoria is in a humid climate. On the other hand, the northern portion of Kenya's land mainly consists of arid and semi-arid lands and the land is not utilized actively for agriculture.

Figure 3.1.4 shows a land use map of Uganda in 2000-2001. The land around the Northern Economic Corridor from Kenya to Kampala is used for agriculture, shrub/woodland and urban. And the land around the route from Kampala to the west is covered with mangrove, shrub/woodland, grassland and for agriculture. The land around the route from Kampala to the north is densely covered with shrub/woodland, grassland and agricultural land with mangrove scattered around watersides. Most of urban land in Uganda is located around main and sub route of the corridor.



Source: JICA Study Team based on data from the Project on the Development of the National Water Master Plan 2030 in the Republic of Kenya

Figure 3.1.3: Land Use Map of Kenya (2010)



Source: JICA Study Team based on data from Africover of Food and Agriculture Organization of the United Nations

Figure 3.1.4: Land Use Map of Uganda (2001)

(2) Land Use Plan

Land use planning is essential to efficient and sustainable utilization and management of land and land based resources, however there have been no integrated land use framework and plan in both Kenya and Uganda yet. On the other hand, both countries have policies related to land use, which points out necessity of national land use framework and plan.

Those policies have pointed out lack of information as well. Kenya and Uganda lack up-to-date land use data which is sufficiently classified and integrated for different land use.

Regarding land use for natural resources, Kenya Vision 2030 and Uganda Vision 2040 have set a national target respectively. Kenya intends to have achieved 10% forest cover by 2030, while the cover area in 2012 was 4.4% (Table 3.1.1 below). Uganda set her target of forest cover and wetland cover area as 24% of land area and 13% of total land area respectively. Current forest cover and wetland area of Uganda is 14% (2013) and 11% (2014) respectively.

Table 3.1.1: Target Cover Area by Visions

	Kenya		Uganda		
Forest Cover (% of land area)	2012	2030	2013	2020	2040
	4.4%	10%	14%	18%	24%
Wetland Cover (% of total land)			2014	2020	2040
			11%	12%	13%

Source: Kenya Vision 2030 and Uganda Vision 2040

3.1.3 Land Tenure

The Constitution of Kenya (promulgated in 2010) stipulates that all land in Kenya belongs to the people of Kenya and that land in Kenya is classified as public, community or private. Since independence Kenya has had two land tenure systems, namely customary and statutory land tenure systems. These Land systems operated under the following statutes: Land Act, 2012, Land Registration Act of 2012. (The Land (Group Representatives) Act (Cap 287), and Sectional Properties Act No.21 of 1987.)

In Uganda, The Land Act (Revised in 2010) regulates the issues of tenure, administration, procedure for acquisition and compensation. It has mentioned all land in Uganda belongs to the people of Uganda and that land in Uganda is classified as customary land, leasehold, freehold and Milo Land (land in the old Buganda country including Kampala, which is treated the same as freehold).

Both Kenya and Uganda face severe tenure insecurity due to overlapping rights. According to MOLUD of Uganda, about 80% of land is customary land, where no land survey has been carried out and therefore no land title has been established. In some cases, insecure land tenure systems have led to low investment in land improvement and productivity, for example, for farmland. And in many cases, this leads to delay in implementation of infrastructure projects.

3.1.4 Urbanization

Urbanization level is defined as the proportion of the population living in urban areas[1]. Figure 3.1.5 shows that the urbanization level of Kenya has been increasing and the rate in 2013 was 25%. On the other hand, Kenya Vision 2030 expects the proportion of urban population will be 63% by 2030. The expectation of this rapid urbanization is based on

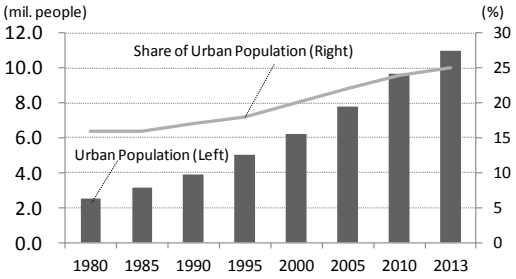
Table 3.1.2: Share of Population in the Urban Centres around Northern Economic Corridor in Kenya

	Share of Total	
	Population in the Urban Centers	Number of Urban Centers
Area within 50km both sides from the NEC	68%	48%
Area within 50km both sides from main route of the NEC	66%	47%
Area within 50km radius from Nairobi	33%	8%

Note: NEC stands for "Northern Economic Corridor".
Source: JICA Study Team based on data from the 2009 Kenya population and Housing Census

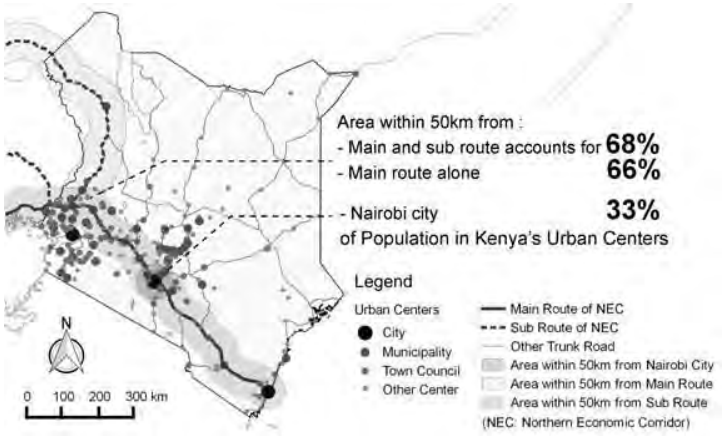
1 According to the definition of the Census 2009 in Kenya, urban area is defined as the area having a population of 2,000 and above. In this definition, urban areas include the followings: Cities, Municipalities, Town Councils and Urban Councils.

the belief that with the right urban-planning strategy, it will be possible to change the lives of millions of Kenyans for the better. And the Vision will guide the realization by programs in urbanization and affordable housing. Figure 3.1.6 shows distribution of the urban centres in Kenya. The population in the urban centres is concentrated around the Northern Economic Corridor as shown in the Figure 3.1.6 and Table 3.1.2.



Note: Urban population refers to people living in urban areas as defined Kenya National Bureau of Statistics.
Source: JICA Study Team based on data from World Bank

Figure 3.1.5: Trends of Urban Population and its Proportion of Total Population in Kenya



Source: JICA Study Team based on data from the 2009 Kenya population and Housing Census

Figure 3.1.6: Distribution of Urban Centres in Kenya

Figure 3.1.7 shows that the urbanization level in Uganda is also steadily increasing and the rate in 2014 was 18%. On the other hand, the Uganda Vision 2040 expects the proportion of urban population will be 60% in 2040. The expectation of this rapid urbanization is based on the same belief as mentioned in the part of Kenya.

Table 3.1.3: Share of Population in the Urban Centres around Northern Economic Corridor in Uganda

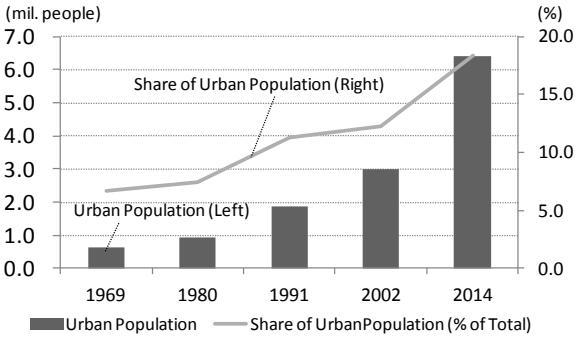
	Share of Total	
	Population in the Urban Centers	Number of Urban Centers
Area within 50km both sides from the NEC	83%	68%
Area within 50km both sides from main route of the NEC	66%	41%
Area within 50km radius from Kampala	33%	7%

Note: NEC stands for "Northern Economic Corridor".
Source: JICA Study Team based on data from National Population and Housing Census 2014 in Uganda

Figure 3.1.8 shows distribution of urban centres in Uganda. Although the urban centres are distributed throughout the entire country, the size of the urban centres varied widely. The population in the urban centres is concentrated around the Northern Economic Corridor as shown in the Figure 3.1.8 and Table 3.1.3.

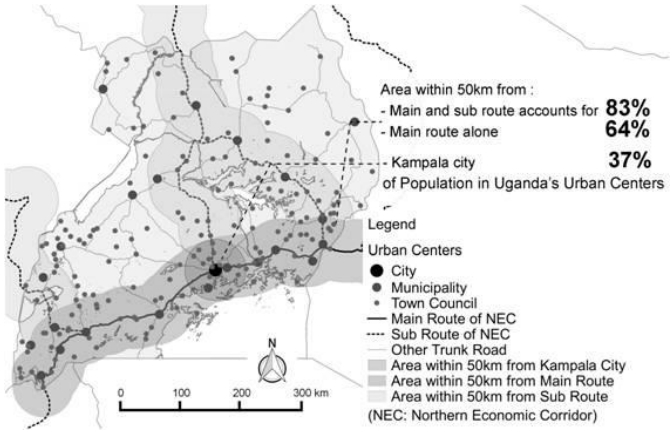
In general, the growth of urbanization is likely to happen around existing urban areas, because it's easier to expand existing infrastructures to cover the additional population than developing a

new city. Therefore, the future urbanization estimated from the trend shown in Figure 3.1.5 and Figure 3.1.7 will mainly happen around the Northern Economic Corridor.



Source: JICA Study Team based on data from Uganda Bureau of Statistics

Figure 3.1.7: Trends of Urban Population and its Proportion of Total Population in Uganda

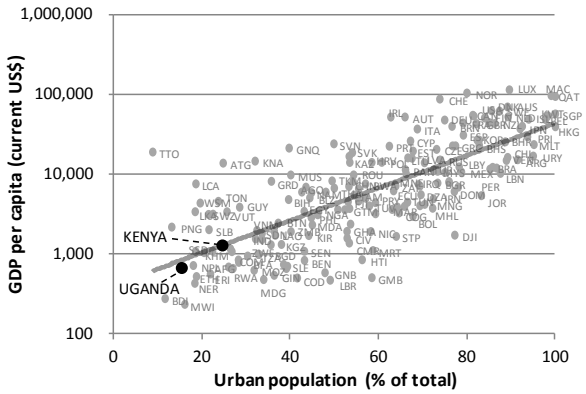


Source: JICA Study Team based on data from National Population and Housing Census 2014 in Uganda

Figure 3.1.8: Distribution of Urban Centers in Uganda (2014)

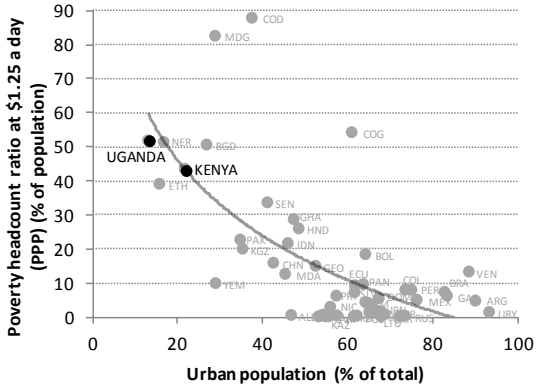
If urbanization is managed well, it can offer great benefits to residents; there is a positive correlation between urbanization and prosperity. This relationship can be explained by two main ways; through the benefits of agglomeration, cities potentially generate higher living standards for all their residents and reduce urban poverty, and through the benefits of economies of scale, public services can be provided in urban areas at a lower fixed unit cost.

Figure 3.1.9 shows the comparison of the level and GDP per capita with other countries, and Figure 3.1.10 shows the comparison of poverty ratio. These figures suggest the urbanization levels of the both countries were categorized as very low and they should promote urbanization to increase GDP and decrease poverty.



n=183
Source: JICA Study Team based on data from World Bank (2013)

Figure 3.1.9: Comparison of Urbanization Level and GDP per Capita of Countries



n=51
Note: PPP=Purchasing Power Parity
Source: JICA Study Team based on data from World Bank (2005)

Figure 3.1.10: Comparison of Urbanization Level and Poverty Ratio of Countries

Major cities have advantage to boost urbanization and to get more population because they have development plans and existing infrastructure. To promote urbanization of both countries more efficiently, existing major cities should be prioritized to be developed.

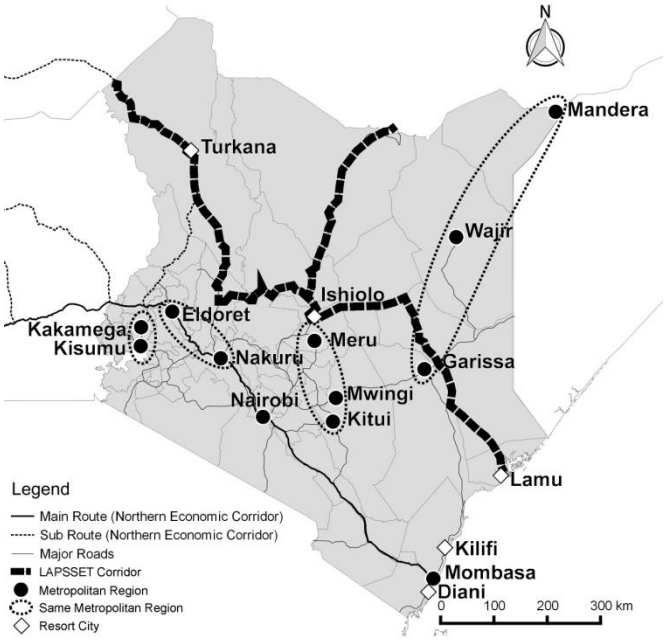
However, regarding current distribution of urbanization of both countries, the concentration is around the Northern Economic Corridor as mentioned above, and too much concentration to the corridor may bring serious problems including regional gap between urban and rural area in terms of income levels and infrastructure development. It has been widely established since the late 1980s that sustainable growth can be realized based on balance of economic affluence, social impartiality and environmental conservation. This indicates importance of balanced development. One of the most effective countermeasures against the imbalanced development is to make a formation of multi-axial national land structure. To take Japan as an example, a main axis which penetrate centre of Japan including three biggest cities (Tokyo, Nagoya and Osaka) had most of industrial area in the country and the area on the axis has been mainly developed since around 1950 to catch up more advanced countries. Japan is currently suffering regional gap widening between urban and rural area and it's said that the structure of only one axis is one of the biggest cause of the regional gap in the country. Therefore, Japan reviewed the structure and currently has been developing four axes to reorganize the structure and to correct regional gap. This example tells importance of developing not only one main route but also other sub routes.

3.1.5 Existing Urban and Regional Plans

(1) Plans in Kenya

Some programs and projects related to urban and regional development have been implemented based on Kenya Vision 2030. The following figure shows the locations and the following table lists the projects.

The cities and urban areas in the six metropolitan regions (Nairobi, Mombasa, Kisumu-Kakamega, Nakuru-Eldoret, Wajir-Garissa-Mandera, Kitui-Mwingi-Meru) have been prioritized to develop and they play the roles of economic centres in each of the regions. The Northern



Source: JICA Study Team based on Kenya Vision 2030

Figure 3.1.11: Urban and Regional Development Projects by Kenya Vision 2030

Economic Corridor will still be the most important corridor for five metropolitan regions except for Wajir-Garissa-Mandera which will be more influenced by the development of Lapsset Corridor. The LAPSSET (Lamu Port - South Sudan - Ethiopia Transport) Corridor project components consist of developments including; Lamu port, railway line, highway, crude oil pipeline and product pipeline, oil refinery, resort cities and airport. The construction and improvement works of some parts of Lamu port, highways and airport has already been launched. Transportation network throughout Kenya will be enhanced by connecting the LAPSSET corridor and the Northern Economic Corridor.

Table 3.1.4: Urban and Regional Development Programs and Projects by Kenya Vision 2030

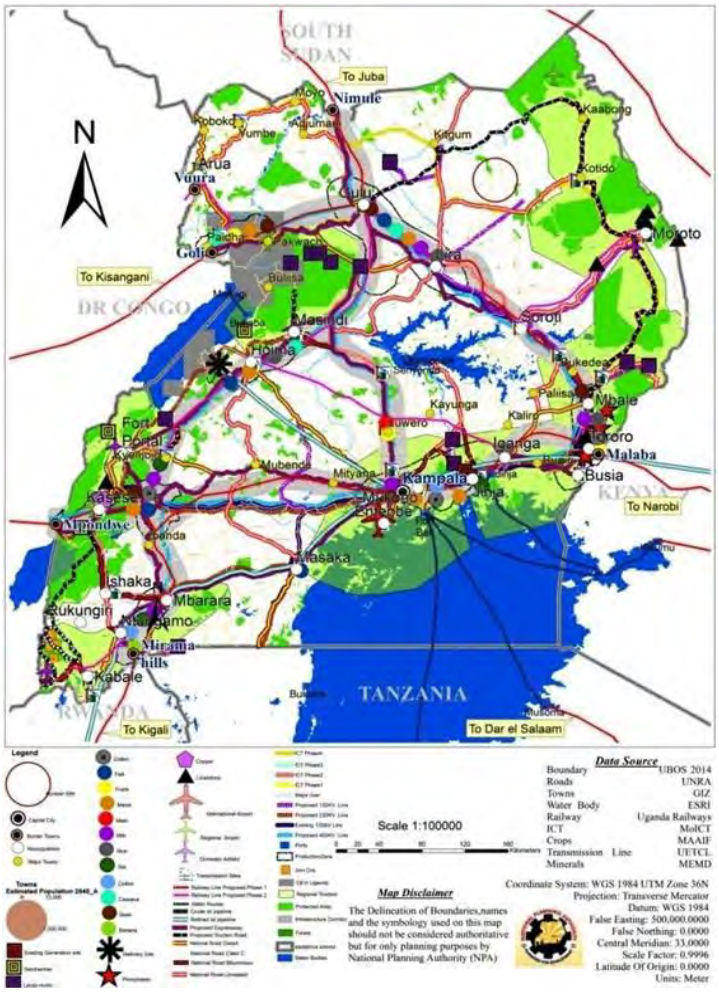
Program and Project	Location
Preparation and implementation of strategic development and investment plans in six metropolitan regions and their respective spatial plans	Nairobi, Mombasa, Kisumu-Kakamega, Nakuru-Eldoret, Wajir-Garissa-Mandera, Kitui-Mwingi-Meru
Lamu Port, Southern Sudan and Ethiopia Transport (LAPSSET) Corridor Development	Route from Lamu through Garissa, Isiolo, Mararal, Lodwar and Lokichoggio to branch at Isiolo to Ethiopia and Southern Sudan
Finalization and implementation of Physical Development Plans for Resort Cities	Lamu, Turkana, Isiolo, Kilifi and Diani

Source: JICA Study Team based on Kenya Vision 2030

(2) Plans in Uganda

Some key core projects were identified in Uganda vision 2040. The core projects include development plan of the identified areas as follows; the Greater Kampala Metropolitan Area (Kampala city, Mpigi, Wakiso, Entebbe Municipality, Mukono Municipality and Jinja Municipality), four regional cities (Gulu, Mbale, Mbarara, and Arua), five strategic cities (Hoima (oil), Nakasongola (industry), Fortportal (tourism), Moroto (mining), and Jinja (industry)), Phosphate industry in Tororo and Iron ore industry in Muko, Kabale.

The Second National Development Plan (2015-2019) prepared a Spatial Framework



Source: Second National Development Plan in Republic of Uganda (Draft, 2015)

Figure 3.1.12: Spatial Framework for Uganda Vision 2040

for the Uganda Vision 2040) which includes development projects of the area above and network of railway, international expressways, 400KV electricity transmission and fiber optic cable between the main cities.

With respect to area developments along the Northern Economic Corridor, Kampala area will promote agriculture including cotton, maize, milk, coffee and fishery. Clusters of Industrial towns in Malaba area will have Mbale, Tororo and Busia. The industries will include milk processing, rice milling and phosphorus processing. Kampala and Malaba area will promote regional tourism by utilizing its lakeside location. The area around Gulu and Lira has variety resources to promote various industrial developments including fishery, coffee, maize, milk and rice. Mbarara area will mainly promote milk, tea, coffee and banana, alongside providing regional tourism.

In addition to road network connecting these areas, standard gauge railway line is proposed, the line from Kenya will go through Malaba, Kampala, Bihanga, to DRC and to Rwanda. The standard gauge railway line will connect Malaba, Soroti, Lira, Gulu to South Sudan.

3.2 Future Spatial Structure Plan

Although there are a lot of existing plans and projects by country and by sector related to spatial structure of NEC region, there is no integrated direction for future spatial structure of NEC. On the other hand, this NEC MP will integrate several sectors and to make it a comprehensive one and to propose future direction, this section considers a direction for the future appropriate spatial structure. To make it easy and effective to consider the future spatial structure, some alternatives are set. And to make it easy and effective to compare the alternatives, current issues related to spatial structure NEC is facing are based. The function of the spatial structure will be the basic concept of spatial priority for development and investment.

3.2.1 Current Issues

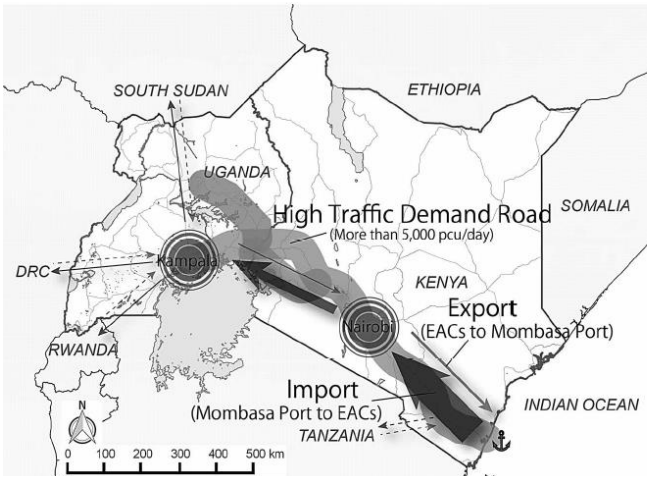
Based on analysis by JICA Study Team, the significant issues about the current spatial structure are excess of import and concentration of functions on capitals.

(1) Excess of Import

According to results of OD and Traffic Survey by JICA Study Team in 2015, cargo traffic volume from Mombasa Port to EAC countries accounted for 92% of total cargo traffic volume between EAC countries and Mombasa Port. This shows that the rate of import and export of EAC countries are 92% and 8% respectively and much income is outflowing to outside the region.

(2) Concentration of Functions on Capitals

Nairobi and Kampala have attracted too many functions including life, business, economy and traffic. As mentioned above, the area within 50km radius from Nairobi and Kampala accounts for 33% and 37% of the population in the urban centres in each country and Nairobi earns over 55% of GDP in Kenya. And high traffic volume (more than 5,000 pcu/day) is concentrated on the route of Mombasa-Nairobi –Kampala, according to results of OD and Traffic Survey by JICA Study Team in 2015. The trend of concentration will lead imbalanced development in the region.



< Current Significant Issues >
1) Excess of Import:
- Import: Export = 92%:8%*1

⇒ **Outflow of income from the region**

2) Concentration of Functions on Capitals:
- Population in Urban Centres:
  : Nairobi Area*2:33%
  : Kampala Area*2: 37%
- GDP in Country
  : Nairobi : Over 55%
- Traffic Demand
  : High traffic demand on the route of Mombasa- Nairobi-Kampala

⇒ **Imbalanced Development**

*1: Cargo traffic volume between EACs and Mombasa (Source: OD and Traffic Survey in 2015 by JICA Study Team)
*2: Area within 50km radius from capital cities (Source: Census 2009 in Kenya and Census 2014 in Uganda)
Source: JICA Study Team

Figure 3.2.1: Current Significant Issues about Spatial Structure of Northern Economic Corridor

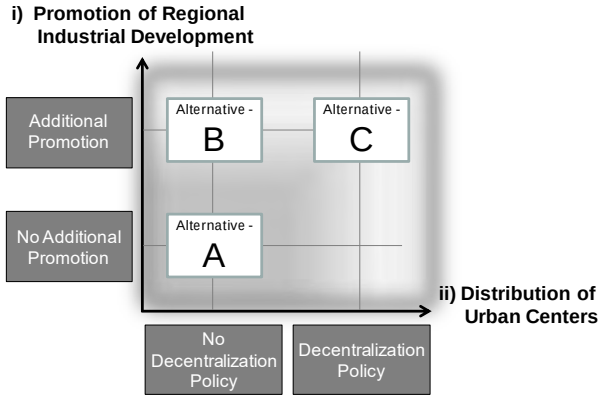
3.2.2 Future Spatial Structure Plan

(1) Setting Alternatives

It shall be required for NEC to strengthen economic functions of the region, particularly commercial, industries and logistics, and to improve its living environment at the same time, under high population growth in the future. In this section, three alternative spatial structures are examined. In this consideration, operation of the two coming projects which has large impact on the future spatial structure plan of NEC, namely Standard Gauge Railway (SGR) and LAPSSET Corridor are assumed. SGR has impacts to capacity and allocation of cargo and passenger volume in NEC region. LAPSSET Corridor has impacts to transportation flow, and link road between Nairobi and Isiolo are assumed here based on the road transport strategy presented by MoLHU, Department of Physical Planning in Kenya to JICA Study Team.

The following three key parameters are taken into account for setting the alternatives;

- Parameter i) Regional Industrial Development: Promoting regional industrial development or not?
- Parameter ii) Urban centres of the region: Centralizing urban functions or decentralizing?
- Parameter iii) Transport Network: Which linkage should be strengthened?



Source: JICA Study Team

Figure 3.2.2: Matrix to Set Alternatives

The parameter i) and ii) include countermeasures for the significant issues of excess of import and concentration of functions on capitals respectively from a view of spatial structure. The alternatives are plotted in the matrix with those parameters as shown in Figure 3.2.2. And the parameter iii) is varied according to the parameter i) and ii) to cater for the transportation demand.

Through this consideration process, the following alternatives are set;

- Alternative-A: "Super Double-Core Type"
  - for concentrating investments on capitals as usual -
- Alternative-B: "Double-core with Regional Industrial Promotion Type"
  - for expanding export with industrial promotion -
- Alternative-C: "Multi-core with Regional Industrial Development Type"
  - for expanding export with industrial promotion and balanced development -

To illustrate compositions of the alternative spatial structure, this consideration adapts some symbols for nodes and transport network. The role of these nodes and networks are distinguished by their characters including function, capacity, and type as shown in Table 3.2.1.

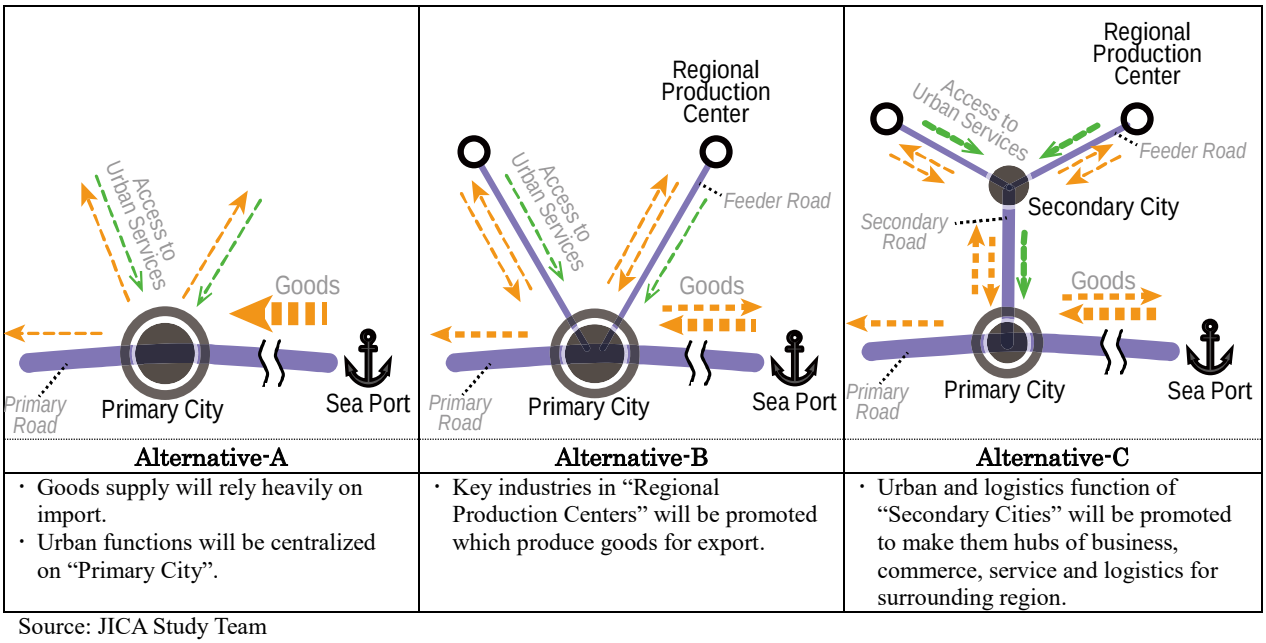
Table 3.2.1: Role of Node, Network and Logistics Function

Symbol		Role
Node	Primary City	- Main supply source of urban services including business, commerce, health and education for country level - Large consumption point - Highly populated city with high density - International functions
	Secondary City	- Main supply source of urban services including business, commerce, health and education for regional level. - Medium consumption point - Medium populated city with high density - National and regional functions
	Regional Production Center	- Supply source of products: this node supplies products to outside the node with promoting key industry for the region including industry, agriculture, mining resources and tourism resources.
Transport	Primary Road Linkage	- Road linkage to transport high volume of goods and passengers

Symbol		Role
Network		- It requires logistics efficiency for mass transportation and crossing border
	Secondary Road Linkage	- Road linkage to transport medium volume of goods and passengers
	Feeder Road Linkage	- Road linkage to transport low volume of goods and passengers
	Standard Gauge Railway	- Standard Gauge Railway network: it will share some extent of cargo and passenger almost all of which are transported by road traffic in current.
	Inland Waterway	- Waterway network in Lake Victoria

Source: JICA Study Team

Concept images of each alternative are described as Figure 3.2.3 with the symbols mentioned above.



Alternative-A	Alternative-B	Alternative-C
・ Goods supply will rely heavily on import. ・ Urban functions will be centralized on "Primary City".	・ Key industries in "Regional Production Centers" will be promoted which produce goods for export.	・ Urban and logistics function of "Secondary Cities" will be promoted to make them hubs of business, commerce, service and logistics for surrounding region.

Source: JICA Study Team

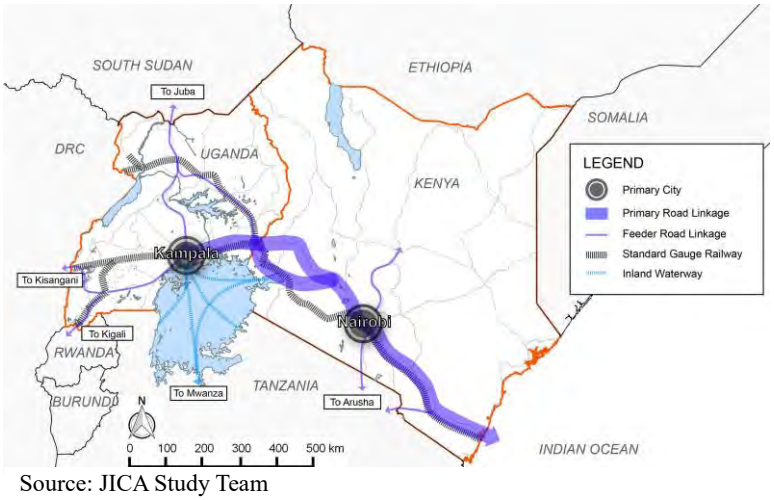
Figure 3.2.3: Basic Concepts of Alternative Spatial Structures

Considering those above, three alternatives for spatial structure concept are examined as follows;

(2) Alternatives for Spatial Structure Plan

1) Alternative-A: "Super Double-Core Type" - for concentrating investments on capitals as usual.

This spatial structure follows current market demands and concentrates investment especially in Nairobi and Kampala ("Primary Cities"). Urban area of those two cities will expand to outside to accommodate increased population and business



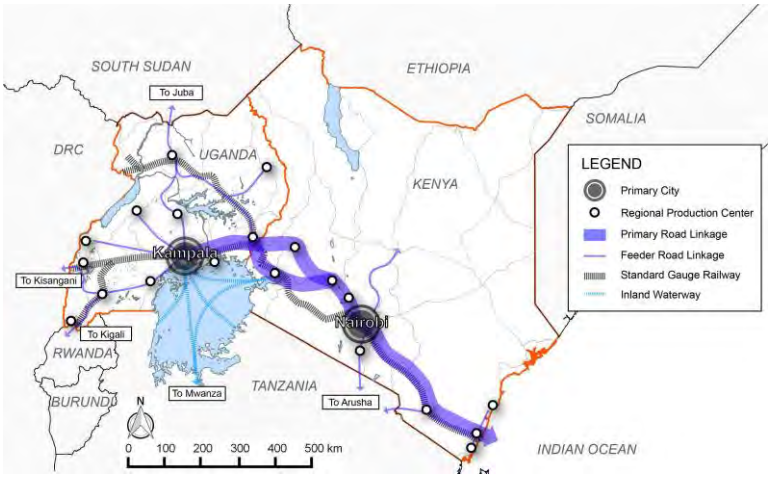
Source: JICA Study Team

Figure 3.2.4: Spatial Structure Plan (Alternative-A)

activities. Goods supply will rely heavily on import from Mombasa Port. Traffic demand is estimated to be concentrated mainly on the route from Mombasa to Nairobi and Nairobi to Kampala as before. Primary Cities will become the regional logistic hub and will transport import goods to rural areas. The initial cost to realize this structure plan will be lesser than the other alternatives because the area to be newly developed is smaller.

2) Alternative-B: "Double-core with Regional Industrial Promotion Type" - for expanding export with industrial promotion.

This spatial structure plan aims for developing "Regional Production Center" with promoting their regional potential products including industry, agriculture, mining resources and tourism resources. The two Primary Cities still have almost all function as urban area, which is the same as the Alternative-A. Main market end of the regional products will be the Primary Cities and out of NEC region. The traffic demand between a Primary City and Regional Production Centers will increase and necessary improvement of transport infrastructure including logistic hub which contributes to efficient delivery and collection should be considered. Export of the regional products will be expected to make transportation cost to Mombasa port decrease with improving the problem of empty return cargo.

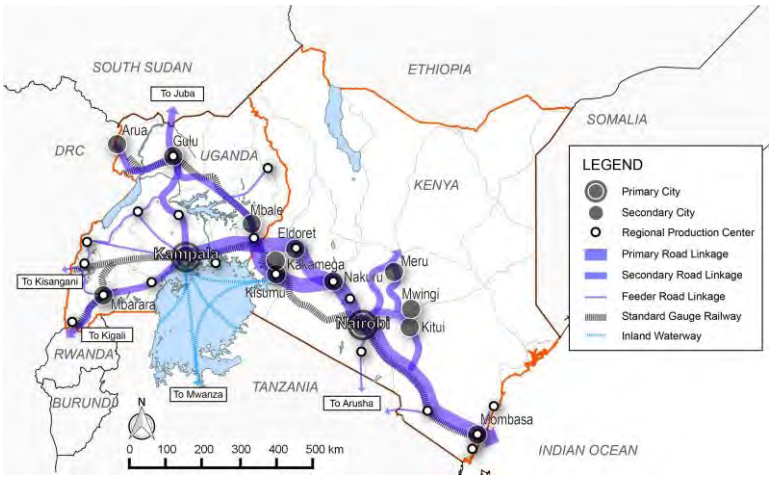


Source: JICA Study Team

Figure 3.2.5: Spatial Structure Plan (Alternative-B)

3) Alternative-C: "Multi-core with Regional Industrial Development Type" - for expanding export with industrial promotion and balanced development.

This alternative aims for balanced growth and efficient logistics in the NEC region with promoting urban functions of "Secondary Cities". It promotes



Source: JICA Study Team

Figure 3.2.6: Spatial Structure Plan (Alternative-C)

decentralizing urban functions to Secondary Cities, urbanization of them and concentration of population on them from surrounding region. It aims for promoting Regional Production Centers also as same with Alternative-B, because demand for commercial and services in urban area which results from surrounding regional area will promote the demand of Secondary Cities. In addition, Secondary Cities will serve as regional logistic hubs and they will contribute to efficient connection between regional cities and consumption areas, especially Primary Cities and out of NEC region. The initial cost to realize this structure plan will be higher than the other alternatives because the area to be newly developed is larger. And this structure plan needs more public management capacity for urban management and development control to avoid unnecessary development in a planned manner.

The following tables show a comparison among the alternatives in terms of the three key factors and development characteristics. The urban structure of the Alternative-A is a less policy system with minimum public interventions, while Alternative-B and Alternative-C will need more public interventions to realize, but it may lead to a more functional corridor.

Table 3.2.2: Spatial Characteristics of the Alternatives

Key Parameter	Alternative-A: "Super Double-Core Type"	Alternative-B: "Double-core with Regional Industrial Promotion Type"	Alternative-C: "Multi-core with Regional Industrial Development Type"
i). Regional Industrial Development: Promoting regional development or not	· No special promotion of regional industrial development	· Promoting potential regional products including industry, agriculture and natural resources	· Promoting potential regional products including industry, agriculture and natural resources
ii). Urban centers of the region: Centralizing urban functions or decentralizing	· Centralizing urban functions to two Primary Cities, namely Nairobi and Kampala. · Expanding urban areas of the Primary Cities to accommodate increasing population	· Centralizing urban functions to two Primary Cities, namely Nairobi and Kampala. · Expanding urban areas of the Primary Cities to accommodate increasing population	· Distributing urban functions to Secondary Cities · Expanding urban areas of the Secondary Cities to accommodate population in the region
iii). Transport Network: Which linkage should be strengthened	· The traffic demand on the route between Mombasa-Nairobi and Nairobi-Kampala will get much higher. · The freight volume from Mombasa will get much larger than the volume to Mombasa. · Primary Cities will become regional logistic hubs and will transport import goods to rural areas.	· The traffic demand and regional linkage between a Primary City and Regional Production Centers will get higher. · Transport infrastructures will be developed to strengthen the linkage between a Primary City and Regional Production Centers (ICD, logistics center and road) · The freight volume to Mombasa will get larger from Regional Production Centers.	· The traffic demand and regional linkage between Primary and Secondary Cities will get higher. · Transport infrastructures will be developed to strengthen the linkage between Primary /Secondary cities and Regional Production Centers (ICD, Logistic center and road) · The freight volume to Mombasa will get larger from Regional Production Centers.

Source: JICA Study Team

Table 3.2.3: Development Characteristics of the Alternatives

Factor	Alternative-A: "Super Double-Core Type"	Alternative-B: "Double-core with Regional Industrial Promotion Type"	Alternative-C: "Multi-core with Regional Industrial Development Type"
a). Main Development Area	- Primary Cities - Transport network of Mombasa-Nairobi and Nairobi-Kampala	- Primary Cities - Regional Production Centers - Transport network of Mombasa-Nairobi and Nairobi-Kampala - Transport network between a Primary City and Regional Production Centers	- Secondary Cities - Regional Production Centers - Transport network of Mombasa-Nairobi and Nairobi-Kampala - Transport network between a Primary City and Secondary Cities - Transport network between a Primary /Secondary cities and Regional Production Centers
b). Development Speed	- According to increase rate of infrastructure demand in the development area, necessary infrastructure shall be developed.	- Industries of Regional Production Centers shall be promoted at an earlier stage. - According to increase rate of infrastructure demand in the development area, necessary infrastructure shall be developed.	- Industries of Regional Production Centers shall be promoted at an earlier stage. - According to increase rate of infrastructure demand in Secondary Cities, necessary infrastructure shall be developed. - According to increase rate of infrastructure demand in the other development area, necessary infrastructure shall be developed.
c). Main Development Player	- National Government - Private sector	- National Government - Local Government - Private sector	- National Government - Local Government - Private sector
d). Development Approach	- Proceeding with measures that have been planned	- Government will select potential areas or industries and necessary infrastructures for production or marketing network will be developed.	- Government will select potential areas or industries and necessary infrastructures for production or marketing network will be developed. - National Government will transfer the business functions to Secondary Cities so that they will be the main urban center in each area.

Source: JICA Study Team

(3) Estimation of Expected Effect

To select the best spatial structure of NEC region, three alternatives are compared considering five indicators, namely i) efficiency of logistics, ii) regional equitability, iii) living condition and environmental consideration, iv) cost for realization and v) public management capacity. The indicator i)-iii) are about public benefit and indicator iv) and v) are about public intervention. It has been widely established since the late 1980s that the concept of sustainability indicates the realization of balance of economic affluence, social equitability and environmental conservation. The indicator i)-iii) are selected from the one of the indicators of sustainability related to NEC region. The following table shows the comparison.

Table 3.2.4: Estimation of Expected Effect of Alternatives

Indicator		Alternative-A: "Super Double-Core Type"	Alternative-B: "Double-core with Regional Industrial Promotion Type"	Alternative-C: "Multi-core with Regional Industrial Development Type"
Public Benefit	i) Efficiency of logistics	**NOT GOOD** - The imbalance of freight volume from and to Mombasa is worst.	**GOOD (with condition)** - The imbalance of freight volume from and to Mombasa is better. - Condition: Transport infrastructures such as ICD and logistics center are to be developed to support regional logistics.	**GOOD (with condition)** - The imbalance of freight volume from and to Mombasa is better. - Condition: Transport infrastructures such as ICD and logistics center are to be developed to support regional logistics.
	ii) Regional equitability	**NOT GOOD** - Benefit of NEC is concentrated to the region along the route of Mombasa-Nairobi-Kampala.	**GOOD** - Benefits of NEC including income, employment and urban services are distributed to regions.	**VERY GOOD** - Benefits of NEC including income, employment and urban services are distributed to wider regions.
	iii) Living condition and environmental consideration	**NOT GOOD** - Living condition is worse for primary cities and rural areas. Primary Cities will suffer traffic congestion and shortage of affordable housing caused by overcrowding, and rural areas will suffer lack of urban services. - Although natural environment in rural region will have less risk to be developed, one around primary cities have risk due to urban sprawl.	**NOT GOOD** - Living condition is worse especially for Primary Cities due to overcrowding. Rural regions still have less urban services near them. - Although natural environment in rural region will have less risk to be developed, one around primary cities have risk due to urban sprawl.	**GOOD (with condition)** - Living condition is better for both Primary Cities and rural areas. The problems of overcrowding and lack of services will be mitigated. - Development of natural environment shall be controlled to reduce to minimum extent. - Condition: Public management capacity for appropriate urban management and development control are necessary
Public Intervention	iv) Cost for realization	**NEEDED LITTLE** - The initial cost to realize this structure plan will be lesser than the other alternatives because the area to be newly developed is smaller.	**NEEDED** - Initial investment cost shall be necessary to develop transport infrastructures for the route between a Primary City and Regional Cities.	**NEEDED MUCH** - Initial investment cost shall be necessary to develop transport infrastructures for the route between Primary/Secondary Cities and Regional Cities and to facilitate urban infrastructures in Secondary Cities.
	v) Public management capacity	**NEEDED LITTLE** - Additional improvement of urban management capacity and legal system shall not be necessary.	**NEEDED** - To achieve this structure, more urban management capacity and legal system shall be necessary than with the current conditions.	**NEEDED MUCH** - To achieve this structure, much more urban management capacity and legal system shall be necessary than with the current conditions.

Note: ICD: Inland Container Depot
Source: JICA Study Team

(4) Spatial Structure Plan for Northern Economic Corridor

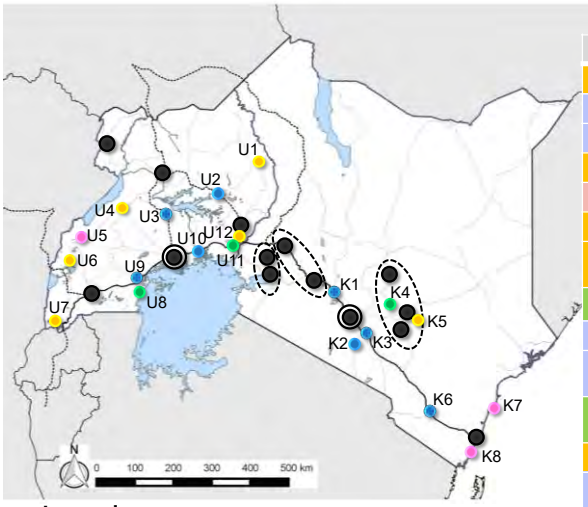
During the Steering Committee meetings in Kenya on 14 January 2016 and in Uganda on 20 January 2016, Technical Working Groups in Uganda on 29 January 2016 and in Kenya on 4 February 2016, the future spatial structure was discussed with features and expected effects of the alternatives. Similarly, it was explained in Stakeholder Meetings in Kisumu, Malaba, Mombasa, Nakuru, Nairobi, Kampala, Mbarara and Tororo held in May 2016.

In those meetings, the idea of Alternative-C which aims for industrial promotion and balanced development was basically more acceptable to the chairmen and other participants. However, there were some important comments on the alternative as followings; "Other areas may have

potential to be selected as Regional Production Centres.", "Key industries of the Regional Production Centres should be mentioned." and "Expected features of each secondary city should be clarified.". Based on the comments, the JICA Study Team re-examined the spatial structure in detail.

The Regional Production Centres were slightly increased based on their industrial potential and regional balance which was surveyed by JICA Study Team with expectation that they will boost economy of Northern Economic Corridor at much faster pace together with growth drivers. However, it should be noted that other potential industries in both countries should be considered within regional levels to promote regional economy with a diversity of products.

Based on the plans and surveys, industry and key products of the Regional Production Centres, labelled number eight and 12 in Kenya and Uganda respectively, are summarized in Figure 3.2.7.

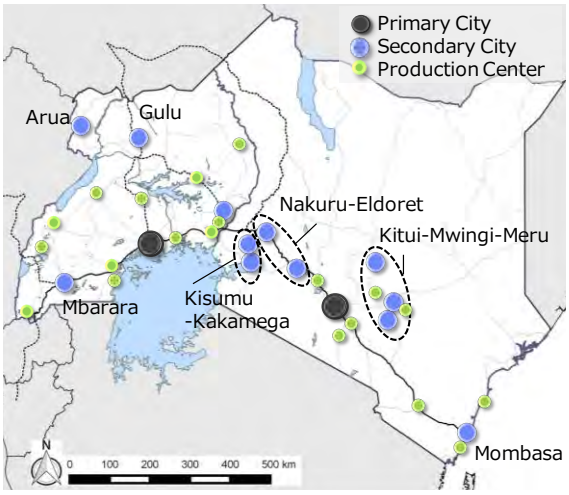


No.	Place	Industry	Key Product
U1	Moroto	Mining	Limestone
U2	Soroti	Manufacture	Agro-and food processing
U3	Nakasongola	Manufacture	Agro-and food processing
U4	Hoima	Oil	Crude Oil and Natural Gas
U5	Fort Portal	Tourism	Wildlife
U6	Kasese	Mining	Limestone, Copper, Cobalt, Gold
U7	Kabale	Mining	Gold, Columbite /Tantalite, Wolfram (Tungsten), Tin, Hematite
U8	Kalangala	Agriculture	Livestock, Oil Palm
U9	Masaka	Manufacture	Agro-and food processing
U10	Jinja	Manufacture	Construction materials, agro- and food processing, consumer goods
U11	Eastern Uganda	Agriculture	Rice
U12	Tororo	Mining	Limestone, Phosphate, Rare Earth
K1	Naivasha	Manufacture	Agro- and food processing, agricultural inputs, construction materials
K2	Kajiado	Manufacture	Garment, consumer products, leather industries, construction materials, agro- and food processing
K3	Machakos	Manufacture	Garment, consumer products, leather industries, construction materials, agro- and food processing
K4	Mwea	Agriculture	Rice
K5	Mui	Mining	Coal
K6	Voi	Manufacture	Agro-processing, construction materials, livestock-related industries
K7	Malindi	Tourism	Beach
K8	Diani	Tourism	Beach

Source: JICA Study Team

Figure 3.2.7: Proposed Regional Production Centers

Location and expected functions of Primary and Secondary Cities are summarized in Table 3.2.5. The cities are chosen based on Kenya Vision and Uganda Vision. According to Kenya Vision, some cities are integrated as metropolitan regions and this MP respects the regional integration.



Source: JICA Study Team

Figure 3.2.8: Proposed Primary and Secondary Cities

All the cities are working as urban centres and regional hubs for their surrounding areas. Employment opportunities and social amenities are pulling mass migration into these cities. As a result, the cities are facing challenges of lack of infrastructure, inadequate provision of basic urban services and increasing informal settlements. To establish the cities as functional international or regional hubs and mitigate these challenges, formulation of appropriate urban development plan and implementation of the plan will play a key role.

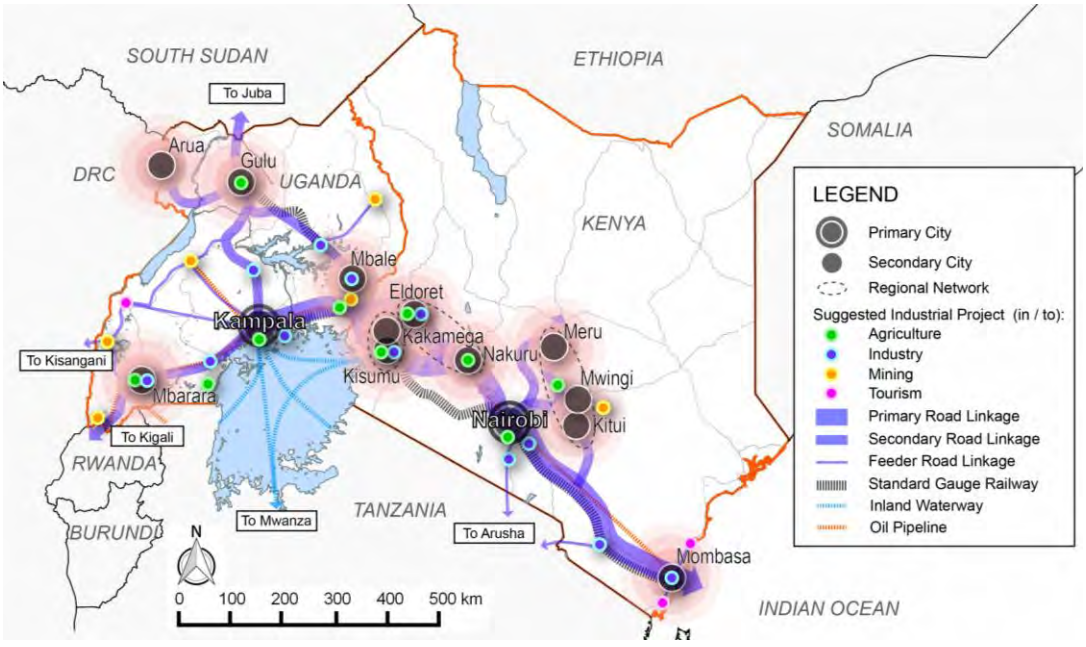
Table 3.2.5: Expected Functions of Primary and Secondary Cities

	Place	Regional Context	Expected Function
Kenya	Nairobi	· Nairobi is the largest commercial and industrial hub not only for Kenya but also for East African region linking the region with other global markets.	· International hub for all sectors
	Mombasa	· Mombasa acts as the gateway port for Northern Economic Corridor. · It is also a multi-functional center for the coast region including administration, transport, industry, tourism, communication and social services.	· Regional hub for the coast region and an international hub especially for its port function · Especially, functions of logistic hub, manufacturing production center and urban service center
	Kisumu - Kakamega	· Kisumu is one of the key transit nodes in the Northern Economic Corridor, encompassing road, rail, pipeline and inland waterways. Kisumu works as capital of Lake Victoria basin regional block. · Kakamega is a regional hub of the larger Kakamega region with fertile land, and it is one of regions with the highest population density in Kenya. Some parts of Kakamega's function are dependent on Kisumu, including airports, industries and major banking facilities, and therefore appropriate regional communication should be arranged.	· Regional hub for the Lake Victoria basin region and the greater Kakamega region. · Especially, functions of logistic hub, manufacturing production center and urban service center
	Nakuru - Eldolet	· Currently Nakuru and Eldoret are the with 4th and 5th largest urban areas in Kenya respectively in terms of population, and they are the two biggest regional hubs in Midwestern Kenya located on the Northern Economic Corridor. · The area surrounding the two cities is known for its vast agricultural potential with numerous small farms and also vast agricultural enterprises	· Regional hubs for the Midwestern Kenya region. · Especially, functions of manufacturing production center, agricultural production center and urban service center
	Kitui-Mwingi-Meru	· Kitui is now the headquarters of Kitui County, due to constitutional changes in the political governance structures. Consequence, the city has been expanded as a meeting point for politicians and businessmen. And Kitui is a suitable resting place on the way from Mount Kenya to Mombasa. · Mwingi is a relatively small town, with an urban population of 15,970 according to 2009 census. However, it is situated on an important location along the A3 Road between Nairobi and	· Kitui and Meru: Regional hubs for the greater Kitui region and the greater Meru region. · Mwingi: Middle regional hubs for the greater Mwingi region. · Especially, functions of urban service center

	Place	Regional Context	Expected Function
		Garissa. · Meru town is the commercial capital of Northern and Eastern Kenya and it hosts Central Bank of Kenya's Currency Centre serving the the North Eastern Half of Kenya, where small towns, villages, rural farms and forest are surrounded.	
Uganda	Kampala	· Kampala plays a number of essential roles and functions for Uganda including engine of growth, transportation, destination and hub for tourists	· International hub for all sectors
	Gulu	· Gulu is the economic capital of northern Uganda, where a civil war lasted for 20 years from 1980's. · Gulu is also an important multi-modal transportation hub including trunk road, railway (although Meter Gauge Railway has closed, SGR is planned to go through) and airport. · And the urban area has large urban service facilities including university, tertiary teaching and research institution, hospitals.	· Regional hubs for the northern region of Uganda · Especially, functions of agricultural production center and urban service center
	Mbale	· Mbale has developed as a commercial center for eastern region. Mbale Town is also fairly well connected in terms of transport with Kenya, South Sudan and Tanzania. · Mbale is the nodal center for the Mbale- Kampala highway via Tororo Town through Tirinyi road. It also connects this region of Uganda via the Soroti highway.	· Regional hubs for the western region of Uganda · Especially, functions of logistic hub in Tororo, and urban service center
	Mbarara	· Mbarara town is the regional focus of the south-western region of Uganda which is agriculturally productive and cattle keeping area. This is further enhanced by its location along the Kampala-Kabale, and Kampala-Kasese-Fort Portal highways.	· Regional hubs for the south-western region of Uganda · Especially, functions of logistic hub, agricultural production center and urban service center
	Arua	· Arua municipality is located near the Congo and South Sudan borders. The area is also located within the Albertine Graben region which is earmarked for Petroleum exploitation and Development. · Arua municipality is the largest commercial/business hub, transportation and social coordinating point in the Albertine Graben region. This makes it the busiest commercial center in the region.	· Regional hubs for the Albertine Grabben region · Especially, functions of urban service center

Source: JICA Study Team

Based on above, proposed future spatial structure is illustrated as Figure 3.2.9.



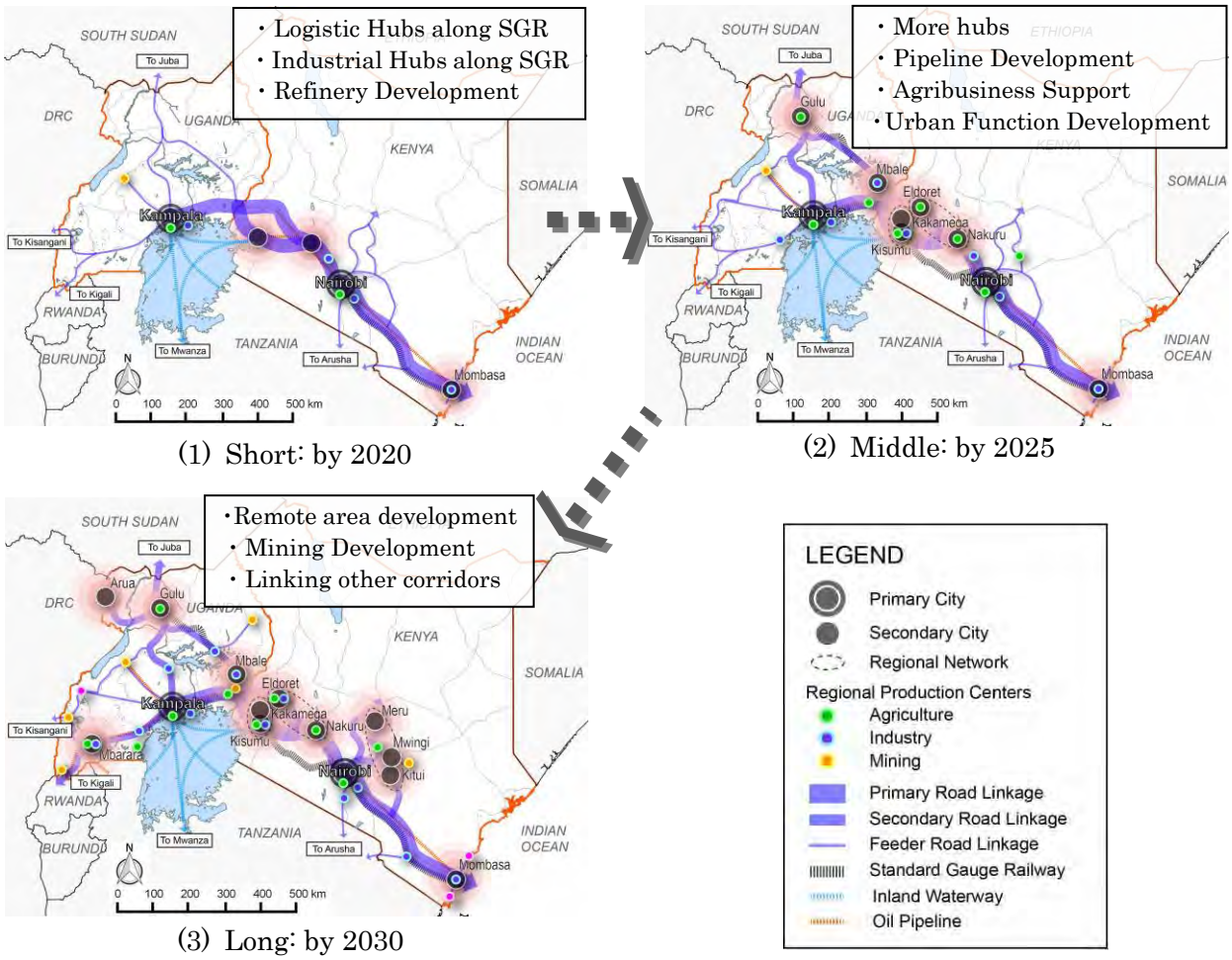
Source: JICA Study Team

Figure 3.2.9: Future Spatial Structure Plan

(5) Phase of Spatial Structure Development

Figure 3.2.10 shows the phased spatial plans for 2020, 2025 and 2030 which based on the current demand and future infrastructure plan. In particular, because the impact of new SGR logistics route will be quite large, development is expected to occur mainly along the SGR route.

By 2020, based on the estimated schedule that SGR will be established between Mombasa and Nairobi and refineries will be built in Hoima, development of hub functions and facilities around these areas will be prioritized. According to the schedule that SGR and pipeline will be extended to Uganda from Mombasa by 2025, more logistics and industrial hubs will be established along this route. Emphasis of development will be shifted to remote regional cities away from the capitals by 2030 and connection with other corridors will be strengthened.



Source: JICA Study Team

Figure 3.2.10: Phase of Spatial Structure Development

3.3 Suggested Projects / Programs and Implementation Plan

3.3.1 Development Strategy

Based on the consideration above, major issues and development strategies from a view of regional structure, land use and urbanization are summarized in the following table.

Table 3.3.1: Major Issues and Development Strategies

View	Issue	Development Strategy
- Regional Structure	- Outflow of income due to excess of import	- To promote regional industrial development
	- Imbalanced development due to concentration of functions on the capitals	- To decentralize and develop urban functions in other major cities
- Land Use	- Lack of adequate land use information	- To make land use database on a regular basis which is categorized sufficiently and effectively
	- Lack of integrated land use framework and plan	- To prepare integrated land use framework and plan at national, regional and local level
	- Difficulty to achieve target land use cover of forest and wetland due to infrastructure development	- To make zoning of forest and wetland areas to protect them from further degradation - To encourage infrastructure alignment (road, rail, pipe and power line) to minimize forest degradation even outside the protected area
- Land Tenure	- Insecure land tenure system	- To establish secure land tenure system. - To establish efficient system of land delivery with preparation and maintenance of cadastral information indicating not merely who owns what interest in land, but other details such as land capability, uses, size, distribution and topographical characteristics.
- Urbanization	- Rapid urbanization and lack of urban planning	- To prepare urban plan in major cities which includes land use plan, infrastructure plan and development control measure

Source: JICA Study Team

3.3.2 Land Use Framework

As mentioned above, land use planning is essential to efficient and sustainable utilization and management of land and land based resources. And land use framework, which sets out a target rate of each land use, is a crucial factor to set out and manage land use plan. Because integrated land use framework and plan have not yet been formulated in both Kenya and Uganda, it's required to prepare for collection of necessary land data and management structure.

On the other hand, both countries prepared future framework for forest by Kenya Vision 2030 and forest and wetland by Uganda Vision 2040 as mentioned in Table 3.1.1. Based on them, NEC MP proposes the development framework for each term, short, medium and long term, in the table below.

Table 3.3.2: Development Land Use Framework for Forest and Wetland

		Baseline	Short Term (2020)	Medium Term (2025)	Long Term (2030)
Kenya	Forest Cover (% of land area)	4.4% (2012)	6%	8%	10%
Uganda	Forest Cover (% of land area)	14% (2013)	18%	20%	22%
	Wetland Cover (% of total land)	11% (2014)	12%	12.5%	13%

Source: JICA Study Team

3.3.3 Suggested Projects / Programs and Implementation Plan in Kenya

(1) Suggested Urban and Regional Development Projects

Based on the strategies above and existing projects in Kenya, the suggested urban and regional development projects are summarized in the table below.

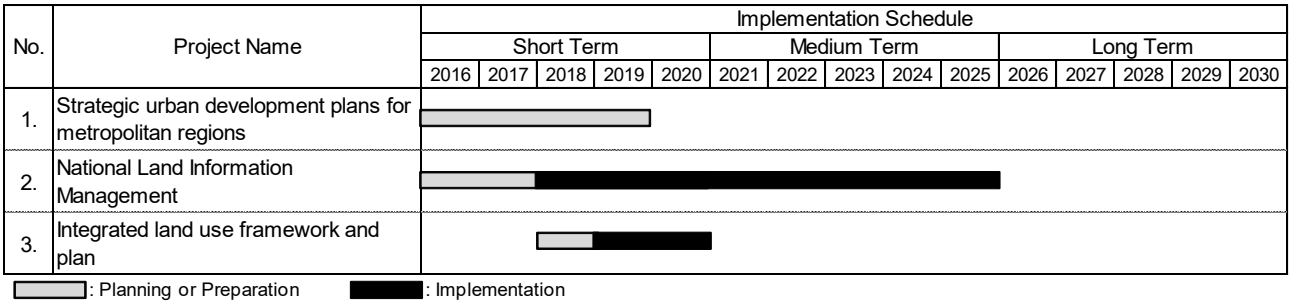
Table 3.3.3: Suggested Urban and Regional Development Projects in Kenya

No.	Name of Project	Ministry/ Agency responsible	Objective	Output	Status	Cost (USD mil.)
1	Preparation of strategic urban development plans for metropolitan regions	MoLHUD, MoDP, NLC, County Government	To promote regional development, improve living condition and make sustainable management by County Governments	Strategic urban development plans for metropolitan regions (Kisumu - Kakamega, Nakuru - Eldoret, and Kitui - Mwingi - Meru) which are near NEC with capacity development for County Governments	Ongoing	10
2	National Land Information Management	MoLHUD, NLC	・ To make land information including land tenure clear, especially about candidate land for infrastructure and industrial development and land in urban area ・ To develop a GIS based National Land Information Management System	<Project Component> ・ Land survey ・ Formulation and record of land title ・ Digitization and management of land information <Output> ・ Development and implementation of a GIS based National Land Information Management System (NLIMS) ・ Digitization of land paper records ・ Deployment of the electronic land records management system ・ Development and implementation of a cadastral database system	Ongoing	230
3	Preparation and implementation of integrated land use framework and plan	MoLHUD, NLC, County Government	To ensure efficient and sustainable utilization and management of land and land based resources in a planned manner	Integrated land use framework and plan and management structure at national and county level	Proposed by NEC MP	5
Total			-	-	-	245

Note: The cost includes only preparation stage. Cost of implementation stage is to be estimated.
MoLHUD – Ministry of Lands Housing and Urban Development
MoDP- Ministry of Devolution and Planning
NLC- National Land Commission
Source: JICA Study Team

(2) Implementation Plan of Suggested Projects

In consideration of the current status of the suggested projects, the implementation plan for them is prepared as illustrated in the Figure below.



Source: JICA Study Team

Figure 3.3.1: Implementation Plan of Suggested Urban and Regional Development Projects for NEC in Kenya

3.3.4 Suggested Projects / Programs and Implementation Plan in Uganda

(1) Suggested Urban and Regional Development Projects

Based on the strategies above and existing projects in Uganda, the suggested urban and regional development projects are summarized in Table 3.3.4.

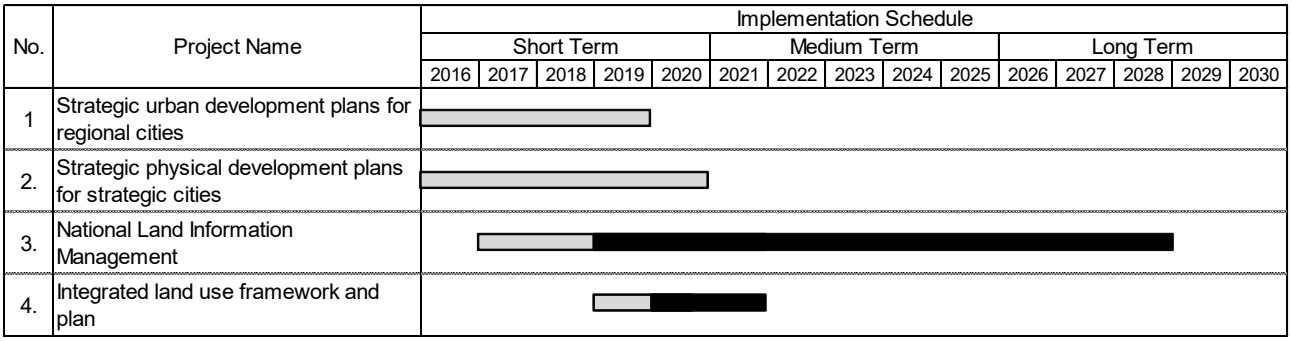
Table 3.3.4: Suggested Urban and Regional Development Projects in Uganda

No.	Name of Project	Ministry/Agency responsible	Objective	Output	Status	Cost (USD mil.)
1	Preparation of strategic urban development plans for regional cities	MOLHUD, Local Council	To promote regional development, improve living condition and make sustainable management by local government	Strategic urban development plans for regional cities (Gulu, Mbale, Mbarara and Arua) with capacity development for local government (District Councils and Municipal Councils)	Ongoing	6
2	Preparation of strategic physical development plans for strategic cities	MOLHUD, Local Council	To promote regional development, improve living condition and make sustainable management by local government	Strategic physical development plans for strategic cities (Hoima, Nakasongola, Fort Portal, Moroto and Jinja) with capacity development for local government (District Councils and Municipal Councils)	Ongoing	5
3	National Land Information Management	MOLHUD	・ To make land information including land tenure clear, especially about candidate land for infrastructure and industrial development and land in urban area ・ To develop a GIS based National Land Information Management System	<Project Component> ・ Land survey ・ Formulation and record of land title ・ Digitization and management of land information <Output> ・ Development and implementation of a GIS based National Land Information Management System (NLIMS) ・ Digitization of land paper records ・ Deployment of the electronic land records management system ・ Development and implementation of a cadastral database system	Proposed by NEC MP	240
4	Preparation and implementation of integrated land use framework and plan	MOLHUD, Local Council	To ensure efficient and sustainable utilization and management of land and land based resources in a planned manner	Integrated land use framework and plan and management structure at national, and district level	Proposed by NEC MP	5
Total			-	-	-	256

Note: The cost includes only preparation stage. Cost of implementation stage is to be estimated.
MoLHUD – Ministry of Lands Housing and Urban Development
Source: JICA Study Team

(2) Implementation Plan of Suggested Projects

In consideration of the current status of the suggested projects, the implementation plan of them is prepared as illustrated in Figure 3.3.2 below.



Source: JICA Study Team

Figure 3.3.2: Implementation Plan of Suggested Urban and Regional Development Projects for NEC in Uganda

CHAPTER 4 INDUSTRIAL DEVELOPMENT

4.1 Marketing and Value Chain Survey in Kenya

4.1.1 Outline of the Survey

The objectives of conducting the Marketing and Value Chain Survey (hereinafter referred to as "the Survey") were as listed below:

- To identify key commodities which are expected to grow as major export commodities of the areas along the corridors. The commodities should be export-oriented with the potentials of higher value addition in Kenya along the area of the corridor.
- To estimate the size of export markets of selected commodities produced in Kenya.
- To identify critical issues regarding logistics and development of the production and trade

The Survey comprised the following components: development of the long-list of commodities; selection of seven commodities for VC analysis; end-market analysis; and detailed VC survey and analysis.

4.1.2 Survey Results

(1) Developing the long-list

The list of the products produced in the area along the NEC was developed using the HS 2-digit categorization. The products were evaluated according to the criteria listed below:

- Current production amount
- Trend of export
- Potential for the contribution to the industrial development in the area along NEC

Based on the analysis, 32 commodities were selected.

(2) Stakeholder Workshop for reviewing the long-list

The long-list was shared with the stakeholders, both from GOK and the public sectors and consulted in order to check the adequacy of the list in terms of its consistency with various policies and private sector's views. The workshop was held on 8th May in 2015 in Nairobi. As a result, the list was enlarged with six more products added into the original proposal. The participants also reviewed the criteria for selecting seven VCs for the further detailed survey.

Table 4.1.1: Value Chain Selection Criteria and the Weighting

Criteria	Weight
Trend and availability of export market	20%
Possible range of value addition	20%
Sustainability and social responsibility	10%
Enable legal and policy framework for investment	10%
Investment demand	10%
Technical feasibility for production for export	10%
Availability of already existing VC studies	10%
Traffic volume created by the corridor	10%

Source: JICA Study Team

(3) Selection of Seven VCs for the Survey

The long-listed products are scored and evaluated based on the criteria above. The result is as shown in the Table.

Table 4.1.2: Result of Evaluation of Long-Listed Products

Selecting the 4VCs										
No.	Commodity	Sufficient demand for commodity in world export market	Commodity's range of value added products and services	Scope for sustainable and socially responsible local production	Enabling legal/policy framework for investment in the commodity	Demand for investment in producing the commodity	Production complexity and local ability to develop products for exporters	Available information and studies on the commodity's VC	Ability to generate high volume of traffic along the corridor	TOTAL
		1	2	3	4	5	6	7	8	
		20%	20%	10%	10%	10%	10%	10%	10%	100%
24	Milled Maize	17	16	8	8	9	8	7	8	**81**
38	Niobium	18	18	5	5	9	5	8	9	**77**
28	Coffee	17	14	5	8	8	8	8	8	**76**
29	Titanium	18	18	5	5	8	5	8	8	**75**
2	Flowers and plantings	15	13	8	8	8	9	5	8	**74**
22	Processed milk products	14	17	6	7	8	8	6	8	**74**
31	Gold	18	18	5	5	9	8	5	6	**74**
36	Veterinary products	15	15	6	8	8	8	6	8	**74**
37	Assembly of motorcycles	15	14	6	8	9	8	6	8	**74**
4	Edible pulses	18	12	8	8	8	8	5	6	**73**
8	Processed fruits	16	14	8	8	8	8	5	6	**73**
15	Aluminium articles	15	16	5	8	8	7	8	6	**73**
35	Pharmaceuticals	17	15	5	7	8	7	6	8	**73**
5	Sewed apparel of textiles	14	14	8	8	8	7	7	6	**72**
10	Steel products	14	16	6	6	8	6	8	8	**72**
19	Fertilizers	15	15	6	6	8	6	8	8	**72**
23	Wood and planned articles	15	14	6	6	8	7	8	8	**72**
6	Knitted apparel	14	12	8	8	8	8	7	6	**71**
7	Cement and lime products	17	13	4	6	9	8	5	9	**71**
20	Glass and glassware	15	14	6	8	8	6	8	6	**71**
25	Metal tools, implements and cutlery	15	16	7	7	7	7	6	6	**71**
3	Mineral fuels and oils	15	15	6	6	8	6	5	9	**70**
12	Animal, vegetable fats and oils	15	14	6	8	8	8	5	6	**70**
33	Fluorspar	16	16	5	5	8	5	6	9	**70**
1	Tea (principally purple tea)	15	10	8	7	8	8	5	8	**69**
11	Processed fish	17	13	6	6	8	8	5	6	**69**
21	Wooden furniture	14	14	6	6	8	7	6	8	**69**
17	Woven fabric	16	12	5	8	8	8	5	6	**68**
30	Soda ash	15	15	5	5	8	5	6	9	**68**
34	Coal	13	16	4	4	9	4	8	9	**67**
13	Beer	15	12	6	6	8	6	5	8	**66**
16	Sugar and sugar confectionery	14	14	6	6	6	7	5	8	**66**
9	Processed leather products	15	14	5	6	6	8	5	6	**65**
32	Carbon dioxide	14	14	5	5	8	5	5	8	**64**
18	Footwear and Gaiters	14	12	5	6	6	8	5	6	**62**
26	Lead and articles thereof	14	15	6	4	5	6	5	6	**61**
27	Zinc and articles thereof	14	14	5	5	5	6	5	6	**60**
14	Alcoholic spirits	14	10	4	5	8	6	5	6	**58**

Source: JICA Study Team/Panafcon

Based on the result above as well as further analysis explained below, seven VCs were selected for the detailed survey, namely:

- Flower and plantings
- Titanium
- Processed fruits
- Iron and steel products
- Textile and garment
- Meat and meat products
- Packaging

The following points were considered to select the VCs for further survey. First, the VCs with abundant literature were avoided as existing reports may be able to provide necessary information

for further analysis. Second, the variety of types of industries were taken into consideration: while primary commodities tend to exhibit competitiveness, heavy and light manufacturing industries as well as industries which are difficult to capture under the types of statistical records as the custom data and industrial productions.

As a result of the review based on the above-mentioned first aspect, Milled Maize, Coffee, and Processed Milk were dropped from the selection. Milled Maize was also dropped regarding the objectives of the Survey which prefers exportable products whereas Kenya is a net importer of Maize.

On the other hand, packaging industry was included in the Survey. Despite the importance of packaging for various products, it is difficult to capture into the statistics as a single category. The flow of materials and the process of value addition have not been well recorded. The Survey encompassed various types of packaging materials and attempted to analyse the structure.

From the second aspect mentioned above, Niobium and Titanium were reviewed. Both are minerals from the Coast. Titanium was selected as its extraction has been in operation with some lessons which may be applied to other mineral resources. As part of the consideration of the diversity in the industrial mix of the Survey, the candidate VCs were further reviewed based on whether it is fit for the value-chain analysis and the direction of trade i.e., whether it is for export outside of EAC market. For example, fertilizer, pharmaceuticals and veterinary products imports raw materials and mix them in Kenya for distribution. The products are mainly marketed within EAC region if not the domestic market. On the other hand, light industries targeting outside of EAC market and heavy industries were selected, namely, textile and garment and iron and steel industries respectively. Iron and steel industry was also selected considering the nature of the products which is naturally heavy and bulky and therefore would somehow influence on the regional transportation network.

4.1.3 Analysis of Results

(1) Titanium

Titanium is used in various industrial products and the world demand shows an upward trend. Although major producing countries are Australia, South Africa, and China, the exporters of titanium are Mozambique which dominates at 54.9% of the world export followed by South Africa and India at 2.8% and 2.1% respectively. Kenya just started production in 2014 with an export of 219,574 MT representing only 0.2% of the world export market.

Currently, titanium in Kwale is mined and exported only by a single company, Base Titanium Ltd (BT). The company started production in the last quarter of 2014 with three mineral components namely illmenite, rutile, and zircon. Titanium can be utilized in various ways as listed below.

Table 4.1.3: Use of the Titanium Products

Type of Product	Major Uses
Ilmenite	Base pigment in paint, paper, plastics, ink, rubber, textiles, cosmetics, leather, ceramics and refractive industry
Rutile	Same usages as Ilmenite, Manufacture of refractive ceramics Used in aircraft and spacecraft as light, strong, corrosion-resistant metal, for motor vehicles, desalination and in surgical plants, fiberglass Chemical coating for welding rods
Zircon	Foundry as sand moulds and cores and as metal chills Precision investment castings a prime coat slurry, Back-up slurry and stucco and as Shell moulds, refractory/ceramic industry (including refractory bricks, etc., ladle brick, coatings, mortars and linings; ladle nozzle fill; ceramic: glass/glazes, sanitary ware, dinner ware, electrical porcelain, glazed bricks and industrial tiles Welding rods High performance refractory Art work Zirconium metal industries Production of metal alloys

Source: Panafcon Ltd. /JICA Study Team

Despite the wide range of down-stream industries which utilizes these minerals, the products are solely exported from Mombasa: BT's view is that the current volume and technical level of Kenya's domestic manufacturing sector cannot maintain the demand for the products. On the other hand, the various areas with growth prospect further explained in the next section further shows the export potentials of the product.

(2) Flower and Plantings

Currently, 60% of the world export of flowers and plantings are to the European market which influences the entire trend of the flower market in the world. The largest share in Europe is handled by the Dutch market. The European market further re-exports the products to the world. After a drop in 2010, the total value of world flowers and plantings export amounted USD 18 billion and USD 19 billion after 2012. While the demand is increasing, competition among producers, mostly developing countries, is gradually becoming tougher.

Kenya has been maintaining the exported value at over Ksh 50 billion after 2011. Floriculture is leading export industry which employs 90,000 directly on the farms and 500,000 indirectly. While cut flower is Kenya's major export product, a new move may be found in the industry: first, as many flower farms have been operating in Africa, Europe-based companies started endeavoring into the propagation. It was also found that some degree of research and development activities has been moved into Kenya for propagating new varieties of flowers. Another change overtime is the entry of supermarkets into the outlets of cut flowers who by sourcing the products directly from importers, do not have to go through the auctions.

Table 4.1.4: Value of Global and EU Import of Cut Flower and Plantings

(USD '000)

	2010	2011	2012	2013	2014
World	15,811,318	19,628,231	18,010,041	18,684,197	19,001,575
Top 10 EU country (promotion to the world)	9,466,732 (59.9%)	10,163,298 (51.8%)	9,269,488 (51.5%)	9,618,945 (51.5%)	9,907,854 (52.1%)
Total EU 28 countries	11,785,739	12,671,066	11,564,871	12,071,819	12,304,683
Of which flower import	4,855,609	5,162,455	4,657,315	4,954,570	5,273,310
Of which planting import	6,930,130	7,508,611	6,907,556	7,063,249	7,031,373

Source: Panafcon Ltd. cited from ITC (2015)

EU remains the major importer of cut flowers with the large share: EU top 10 countries import more than 50% of global flower import (see Table above).

(3) Fruits Processing

Value of fruits produced in Kenya only account for 6% of the total value produced by horticultural sector also including floriculture and vegetable (Ksh 28 billion in 2014). Pineapples, bananas, and mangos were sampled for the analysis. The production volumes of these products are 465,000 MT for Pineapple, 1.5 million MT for Banana and 60,000MT for Mango.

Table 4.1.5: Share of Revenue per Function along Value Chains

	Production	Collection	Retailing
Pineapple Juice	8.9%	36.1%	55%
Banana Chips	3.4%	34.1%	51.1%
Mango Pulp	1.70%	45.0%	53.3%

Source: Various sources cited by Panafcon Ltd

Pineapple is typically processed with a higher degree of value addition (about 80% of commercially handled products are for processing). On the other hand, the value addition of Banana and Mango are limited. Kenya's export of processed fruit products is predominantly pineapple juice while banana and Mango are mainly consumed locally.

Fruits processing in general found that the most value addition is done at the level of processing and exporting (retail) (see table on the right). On the other hand, collecting fruits is also critical to operate optimally maintaining high quality standards. For pineapple industry, it is done by commercial processors who also have plantations. Bananas and mangos are mainly collected from producers by collectors. The spoilage of banana during the handing by collector seems to be problematic as it spoils 30% of the handled products.

(4) Iron and Steel

In the global market of iron and steel products, China supplies more than 50% of the traded volume. On the other hand, its own economic slow-down induces fall of the market price of iron products. Kenya's iron and steel export grew from USD 104 million in 2009 to USD 151 million. Major destinations are Uganda, DRC, Tanzania, Rwanda, and Burundi and as far as Zambia and Malawi.

In East Africa, there is no blast furnace. Kenya's steel industry heavily relies on imported materials. While some deposit of iron ore and coal have been identified, the actual plan with a

new policy framework for development is yet to be established. Securing quality and economical input is, therefore, one of the major factors which affect Kenya's iron and steel industry. The interviewees often mentioned the high cost of input. This is attributed to the high cost of transportation: 31% of the input costs are borne by the transportation cost. Taxation especially customs is another issue which takes 27% of the cost of the inputs. Based on the Common External Tariff scheme, semi-processed materials are charged the same rate as other semi-processed goods despite their nature of being raw material. Due to the heavy nature of the products, transportation is a critical factor for not only for procurement of raw materials but also marketing and distribution.

(5) Textile and Garment

The chains of textile and garment can be discussed separately. The textile chain starts from cotton production, ginning and the textile manufacturing.

Although global demand for cotton has been on the increase since the end 1990s, Kenya's cotton production did not follow the trend mainly due to problems in productions (e.g., predominance of small-scale farming, rain-fed production, and inadequate quality of seeds). There 24 registered ginneries with installed capacity of approximately 140,000 bales annually. However, only 20,000 bales are utilized from 24 Ginneries are owned either by cooperatives or private operators. Some were once owned by the Cotton Board of Kenya but later sold to the private sector while others are currently leased from the cooperatives to the private operators.

Textile production is less than 12 million square meters annually which is estimated to be only 7% of the potential domestic demand. Kenyan products do not have price competitiveness due to the high cost of production. There are 52 textile mills in Kenya out of which only 15 are in operation. However, even the ones operating utilize significantly outdated technology with low capacity. The production of cotton is limited due to problems in production and postharvest handling[1]. A few semi-integrated mills exist covering from spinning, knitting, dyeing and finishing. Others are however, either doing knitting or weaving[2].

Garment manufacturing consists of the export-oriented firms typically located in Export Processing Zones and numerous non-EPZ firms. Those in EPZs include accessory producers in addition to sewing companies. The material used in EPZ are mostly imported from Asian countries (about 93% of the all material used) such as China, Hong Kong, Taiwan, India and Pakistan.

1 GOK (2015)
2 Ibid.

(6) Meat and Meat Product

The livestock sector is the primary source of income for 6.5 million pastoralists contributing about 6% to GDP[3]. Kenyan consumes 700,000MT (about 15 to 16 kg per person) annually. 20 to 25% of Kenyan consumption is supplemented by the imported meat from neighboring countries such as Uganda, Ethiopia, Somalia and Tanzania[4]. Only very limited amount of meat is exported consisting of 0.2 to 0.3% of the export earnings.

80 to 90% of red meat consumed domestically is supplied by pastoralists. Transportation through trekking and trucking takes up a large share of cost in the final sales margin: Whereas average price of cattle ranged from Ksh 30,000 to 40,000 per head in Nairobi auctions, trucking and trekking costs from North Eastern to Nairobi amount to Ksh 12,600 and Ksh 11,500, respectively. Very limited profits are borne to pastoralists and wholesalers, while traders' share in the profit is large. The major destination is UAE and Middle East as well as neighboring Tanzania and Somalia.

In Kenya, production of livestock faces difficulties to ensure stable supply and quality. First, the conditions of raising cattle are threatened by climate changes and frequent droughts. Veterinary services available in pastoralist areas (typically ASAL areas) are also limited. Despite gradual improvement, only 10 abattoirs are certified for export.

In terms of poultry, the production is only partially commercialized. 23.8% of the production are from commercialized producers. The large commercial producers own vertically integrated supply chains from production to processing. The majority is bought at the markets and slaughtered at farms, markets, or at home of the purchasers. Limited number of pork is processed at commercial facilities owned by a large-scale producer. The rest may be processed on-farm with poorly equipped facilities.

Domestic market is growing leaving more rooms with deficit. Export market requires high quality with certified processing facilities despite the growing potentials.

(7) Packaging materials

Packaging materials comprise a wide range of materials including plastic, paper and paper boards, glass, gunny and sisal, iron and steel, and aluminium. Packaging industries naturally locate themselves in the proximity of major users. Therefore, Nairobi, Athi River, and Mombasa are the major locations of packaging firms in Kenya.

Fast Moving Consumer Goods (FMCG) are distributed by retailers. This category of products induces the large increase in utilization of packaging materials. Africa in general, the types of

3 KNBS (2015)
4 KNBS (2015)

retailing business as well as FMCG is still not yet fully introduced. Raw material is the largest cost factor for any type of packaging, regardless of whether plastics, metal, sisal or paper: About 50% of the cost is borne by the raw materials. Transport cost is also burdensome for such packaging as sisal and paper (accounting for 20% and 25% of the total cost respectively). Labor cost also contributes some large share especially for plastic and metal accounting for 20% and 25% respectively.

Kenya has been exporting packaging with the largest portion being plastic packaging which accounts for 51% of the total packaging materials export in 2014. This is followed by paper/paperboard and glass, at 23% and 14%, respectively. Total value of export in 2014 was USD 103.2 million, a significant drop from USD 163.5 million in 2013.

Among various types of packing, Kenya has 300,000 MT of "conversion" or printing works done for paper despite the low utilization (about 45%) of installed capacity.

4.1.4 Export Potential and Key Bottlenecks

(1) Titanium

Due to wide range of the utilization, the demand for titanium may be expected to expand: global market demand for power sector including solar power would be expected to lead the demand for titanium. A few examples of the areas which lead the demand of titanium products are power generation, desalination process, technical sector and oil and gas sector. Airline industry also utilizes titanium product heavily.

The bottleneck can be found in the legal framework: the mining laws developed in 1960 should be replaced with a new act. While concentrating in the export market, the sustainability and ways to maximize the local society should also be considered. Currently, mining royalty is under discussion awaiting the new Mining Act. However, while the adequate rate of the royalty payment should be indicated through the legal system, the extent to which mining companies are burdened by multiple fees and levies both at the national and regional level should also be considered in respect to their cost competitiveness in the global market.

(2) Cut Flowers and Planting

While the European market is not growing, competition between "Southern" growers in Africa and South America may become severer. Naturally, large markets such as North America and Japan would import flower during their off-season time from nearby production areas: for the North America, Columbia and Ecuador are the major source, whereas Japan increasingly procures from Malaysia, China, Thailand and Vietnam in addition to Columbia.

The growing concern of carbon foot print and other environmental consideration may also pose some questions on the transportation methods for African flowers which heavily relies on air

freight. While some trials have been attempted on the utilization of sea freight, it may be further sought in mid- to long-term in order to maintain Kenya's strength in the market.

Other concerns may be found in the cumbersome administrative procedures as well as burdensome administrative fees and levies. There are a number of taxes and levies borne by importers. For example, levies by the national entities upon export include export levy paid to HCDA and phytosanitary certificate levy by KEPHIS, water levy, and levy by NEMA for composting organic matter. Apart from these, local market levy and land tax are also charged by the local authorities. On the other hand, VAT refund for imported materials as an export promotion incentive often delay affecting the grower's cash flow.

(3) Fruits Processing

Products such as sugar preserved fruits, nuts and jams are exported largely to such countries as UK, Japan, US, and Germany. For instance, the US share in the global juice import stood at 12% in 2014. While the US and European market consumes more processed fruits, demand from the emerging markets is also expected to grow. In Europe, although the volume of import is large, it should be noted that trade among the member countries takes a large share (e.g., 65% of jams are traded between member countries.) A large part of the market is controlled by giant manufacturing and retail companies through mergers and acquisition. This causes more pressure on the price and value addition to the producers. Japan for instance, is one of the major importers of processed fruits in the world. The major exporters are US, Brazil and China which account for 50% of Japan's import. Demand in Japan fluctuates due to economic situation and in the long-run by aging population. US on the other hand consumes processed foods, but value addition is rather stagnated compared to other markets. As such therefore, growth opportunities are rather limited. Such value added products as organic and fair-trade products, are however recording some increased demand. Although much smaller as compared to other areas, the EAC market shows more opportunities for Kenyan products due to increasing demands.

As seen in the case of pineapples, commercial farming and processing is successful partly because of the private expertise controlling production: Availability and quality control of the fruits is a key issue for the growth of the sector. Consequently, encouraging moving into commercial farming may be desirable.

(4) Iron and Steel

World demand has been on the decline due to the economic slow-down of China, a manufacturing and market leader. On the other hand, EAC market has recorded larger growth in demand especially with backlogs in the housing and construction sectors. Input supply also remains a major issue for Kenyan producers. The availability and price of the input is negatively influenced

by the weight of the raw materials and the fact that the sector heavily relies on imports. Transportation cost accounting for 31% of input cost, remains

Although raw material deposits have been identified, the current absence of commercial mining in the country may not support a blast furnace. Building an integrated mill may also encounter problems of large energy demands and require mobilization of finance from outside the country.

(5) Textile and Garment

The total value of imported textile and apparel products has been growing. The total value of cotton and synthetic yarns and fabrics, knitted and woven fabrics imported globally reached USD 670.3 billion in 2014 a rise from USD 541.7 billion in 2010 (about 6% growth per annum). The forecasted annual growth of the apparel sector up to 2020 is 4%. However, the growth rate markets in developed countries such as Japan, EU and US is expected to slow down to 2%, whereas those of Brazil, China and India is projected at 8%[5].

The bottlenecks in the production in cotton textile in Kenya start from production of the seed cotton which cannot maintain the installed capacity of ginning and milling facilities.

On the other hand, the garment sector which is almost detached from the chain from seed cotton to the textile faces weak price competitiveness stemmed from high labor cost (despite the low productivity) as well as energy cost. The share of labor cost in total cost for garment in Nairobi and EPZs is 40% and 30%, respectively. However, it is noted, that 50% of the cost for garment in Mombasa is borne by the raw materials. Possible solutions to overcome the situation may be in the modernization of the equipment to increase productivity. Due to the high dependency on imported material, it is also important to reduce the cost of transport which currently constitutes 10% of the cost.

(6) Meat and Meat Product

The major producers such as US have expanded their production bases with larger herds. In terms of frozen beef, India became the largest supplier surpassing Brazil. Similarly, though not drastic, global export of pork also increased with a growth rate of 1~2% in recent years.

Kenya's meat production and export is very limited constituting only 0.2~0.3% of the export earnings. Due to the availability of domestic demand, it may be possible first to exploit the domestic market by developing production and processing system. In addition, Gulf States and regional market presents some potential. Kenya's share in Gulf countries imported meat products is still limited: the share is only 1% in most of the countries. On the other hand, goat meat from Kenya supplies 10% of Oman market and despite the smallness of volume, the export of fresh or chilled goat meat to Quarter largely increased by 15% between 2009 and 2010.

5 GOK (2015)

Bottlenecks may in the production system as well as the unfair trading structure. Therefore, it is advisable to first develop a strong production basis with good support facilities and supply chain for the domestic market. For export outside of the region, the negative image of Kenyan traders and processors in Middle East, for example, may be a hindrance for further access to the market despite compliance to the quality requirement by the respective markets.

(7) Packaging materials

Africa's share in packaging import is only 5% as at 2014 amounting to USD 958 million and 0.5 million MT. The current largest importers in Africa are concentrated in North Africa. However, in the era of FMCG, the demand for packaging is expected to increase not only in Kenya but also in the neighboring countries in future. The products rely heavily on imported material and therefore it is necessary to reduce various burdens which affect the cost of procurement such as transport cost, duty on imported raw materials, all of which cumulatively affect profitability of the products.

4.2 Marketing and Value Chain Survey in Uganda

4.2.1 Outline of the Survey

The objectives of conducting the Marketing and Value Chain Survey were as listed below:

- To identify key commodities which are expected to grow as major export commodities of the areas along the corridors. The commodities should be export-oriented with potentials of higher value addition in Uganda along the corridor.
- To estimate the size of export markets of selected commodities produced in Uganda.
- To identify critical issues regarding logistics and development of the production and trade

The Survey comprised of the following components: development of a long-list of commodities; selection of the seven commodities for VC analysis; end-market analysis; and detailed VC survey and analysis.

4.2.2 Survey Results

(1) Developing the long-list

Using the 4-digit HS Code, products were sorted based on the evaluation of the following points:

Table 4.2.1: Criteria for Long-List

Criteria	Notes
Currently available production capacity in Uganda and its estimated level of feasible expansion	-
Market availability of products in the regional and global market	Export performance in EU, Middle East, Southeast Asia, East Asia and US market. The results were rated according to the three categories, namely champion (growth rate of Ugandan export exceeds that of the overseas market), underachiever (growth rate of Ugandan products is positive, but under the degree of the growth of overseas market), and losers.
Accordance with Uganda's economic development policy	Checked the accordance with the priority of the National Development Policy and National Export Strategy.

Source: JICA Study Team

The export trend of goods was analysed based on data obtained from UBOS, the Customs (URA), and data of informal border trade from the Bank of Uganda and UBOS. The result is as shown in the Table below. Comparing with the growth of exported value and the import markets of Uganda's major export destinations, the products were categorized as a champion (Uganda's growth rate is higher than the market growth which shows growth), underachiever (market growth is higher than Uganda's export growth rate), achiever (Uganda's export growth is positive, but overall import market is declining), and loser (both Uganda's export and market are declining). The number of champions and underachievers in six major markets were summed and ranked and 16 commodities selected.

Table 4.2.2: Selection of Long-Listed Products

Supply Capacity Rank	Commodity Description	Performance Category in the Six Markets						Champion / Under-achiever	Gov't priority	Selection Rank
		(1)	(2)	(3)	(4)	(5)	(6)			
		Northern Corridor	North South Corridor	EU	Gulf Countries	South East Asia	USA	Market rank (X/6)	Y/N	
1	Coffee	Under-achiever	-	Champion	Champion	Champion	Champion	5	Yes	1
3	Fish	-	-	Achiever	Under-achiever	Under-achiever	Under-achiever	3	Yes	2
11	Dried Leguminous Vegetables	Under-achiever	Achiever	-	Achiever	Champion	Under-achiever	3	Yes	3
13	Leather of \bovine or equine	Under-achiever	-	Champion	Loser	Champion	-	3	Yes	4
4	Cement	Champion	Under-achiever	-	-	-	-	2	Yes	5
6	Cane or beet Sugar	Under-achiever	Under-achiever	-	-	-	-	2	Yes	6
7	Maize	Under-achiever	Champion	-	-	-	-	2	Yes	7
8	Tobacco	Champion	Loser	Loser	Champion	-	Loser	2	No	8
9	Live plants, Cuttings and Slips	-	-	Champion	Achiever	-	Champion	2	No	9
14	Palm oil and its fractions	Under-achiever	Champion	-	-	-	-	2	Yes	10
17	Wheat or muslin flour	Champion	-	-	Champion	-	-	2	No	11
18	Iron/steel bars and rods	Under-achiever	Under-achiever	-	-	-	-	2	Yes	12
12	Rolled iron or non-alloyed Steel	Under-achiever	Champion	-	-	-	-	2	Yes	13
2	Petroleum Oils	-	Champion	-	-	-	-	1	Yes	14
5	Tea	Under-achiever	-	-	-	-	-	1	Yes	15
10	Animals, vegetable fats and oils	Under-achiever	Loser	-	-	-	-	1	Yes	16
15	Soap and detergents	Under-achiever	-	-	-	-	-	1	No	17
19	Cereal Flours excluding wheat or muslin	Under-achiever	Loser	-	-	-	-	1	Yes	18
16	Grain Sorghum	-	-	-	-	-	-	0	No	19

Source: JICA Study Team

(2) Selection of Seven VCs for the Survey

From the 16 commodities, seven VCs were further selected using seven criteria. The criteria and the results are as summarized as below:

Table 4.2.3: Pre-Selection Criteria

Criteria	Notes
Growth potential of export	Rating according to the Revealed Comparative Advantage (RCA) and market performance
Possibility in leading overall Uganda's economic growth	Possibility of larger value addition, investment demand and the trend
Easiness of access to the export market	Current situation on the free trade agreement in the regional economic integration, availability of preferential access to the specific market
Expected positive impact on the logistics system	Possibility in modal shift

Source: JICA Study Team

Combining the analysis, seven products are pre-selected as seen below:

Table 4.2.4: Result of the Pre-Selection

	Commodity	Growth Potential	VA	Market Access	Impact Shift	Overall
		Rank	Rank	Rank	Rank	RANK
1	Cement	2	2	7	1	1
2	Iron and Steel articles	1	1	6	6	2
3	Cereals	3	5	4	2	3
4	Coffee	2	10	4	3	4
5	Fish	5	3	1	11	4
6	Livestock and product	6	5	3	8	6
7	Petroleum Oils	4	9	7	4	6

Source: JICA Study Team

The final evaluation of the products which selected Iron and Steel Products, Petroleum, Cereal Grains, and Livestock and Products (including leather). The products were evaluated according to the points listed in the table below. SWOT analysis was done to check further market potentials against the threats and the degree of strength against weakness to examine competitiveness.

Table 4.2.5: Summary of the Selection of Seven VCs

Indicators	Commodity Scores and Ranking						
	Cement	Cereal grains	Coffee	Petroleum oils	Fish	Iron/steel products	Livestock & products
Existing market demand	3	5	3	5	3	5	3
Current market growth	1	3	1	3	1	3	1
Competitive advantage	3	5	3	3	1	3	3
Existence of market access schemes	3	3	3	3	3	3	3
Potential for larger value addition	1	3	3	3	3	5	5
Public-private investment demand	1	1	1	5	1	5	1
Technical feasibility of commodity development	1	3	5	5	1	5	5
Movement of goods via road or railway	5	5	3	3	1	5	3
Total Score	18	28	22	30	14	34	24
Rank	6	3	5	2	7	1	4

Source: JICA Study Team

In addition to the six commodities reviewed above, palm and oil seeds were also included in to the selected VCs based on the field observation of the JICA Study Team as well as the good score shown for palm and animal and vegetable oil in the long-list. Based on the result, seven VC products were selected, namely:

- Iron/steel products
- Petrol oils
- Cereal grains
- Livestock and products
- Coffee
- Dairy
- Palm and oil seeds

4.2.3 Analysis of Results

As the result of the survey shall be utilized in the analysis of the respective industries in the following sections, only summary of findings are highlighted.

(1) Iron and steel products

Iron ore deposit was discovered in Muko. However, due to the ban on export of unprocessed ore, the deposit is to be somehow processed in the country. On the other hand, the current iron production is either using semi-processed inputs or scrap metals. Currently, products such as hollow sections, mild steel plates, galvanized and pre-pained iron sheets, and wire products are produced. For domestic and export use, producers established some depots in major towns connecting to other countries (e.g., Arua for South Sudan and Kasese for DRC).

Other distribution networks such as house building material distributors are also utilized. However, high cost of financing and energy tariff are the major constraints for the sector. Similarly, due to importation of raw materials and the fact that the product is heavy in weight, road network development and competitive freight costs are critical points for the development of the sector.

(2) Meat, hide and skins

Large areas of the country consist of the cattle corridor. According to the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), the production volume of meat including beef and goat/mutton in Uganda was estimated at 200,000 MT in 2013 increasing by almost 15,000 MT over a five-year period.

In terms of hides and skins, Uganda exported USD 73.756 Million worth in 2014. Despite the fall of the world imports of hides and skins after the global financial crisis in 2008, the overall demand has been growing.

On the other hand, the number of processing facilities is limited. It is only recently that the first industrial abattoir was established in Bombo (Uganda Food Security Company Ltd.). Slaughter houses are located within Kampala and in the major cities such as Jinja, Arua, Gulu, Mbarara, and Mbale. Apart from the numerous butchers, very limited numbers of processors are available in the meat industry.

In terms of the leather industry, only 9 tanneries exist in the country. Of which, 5 are located in Jinja and 2 in Masaka. The number of processing facilities implies the distance the products have to travel before and after the processing. Transportation before slaughtering largely relies on the trekking from farm gates. Cold chain is only used when processors have their own facilities and trucks. The trading is predominantly handled by middlemen. After the abolishment of the licensing, these trading systems almost have no quality control mechanisms available.

In terms of the skins and hides, it can be analyzed that Uganda and EAC countries exports are limited to raw form. On the other hand, NEC countries including Uganda actually import finished leather products. In summary, the trade pattern with EU and the corridor countries reveals a situation where the corridor countries export raw or semi-processed skins and hides and import finished leather goods from the EU.

(3) Cereal grain

Ugandan grain export has been growing at an average 8% per annum with key destination being the regional market. Production relies on small holders and collection is uncoordinated with little to no quality control done.

Exported grains are processed and/or distributed by cross-border traders, medium-to-large scale trading and grain processing companies. World Food Program is another big player.

The major markets for Ugandan grain are mainly, Kenya, DRC and South Sudan while Pakistan, Russia, Ukraine, Australia, and Germany among others, are the major competitors. Despite the close proximity, growing production costs and unreliable logistics harm Ugandan share in these markets.

(4) Petroleum oils

While petroleum products are expected to be presented with a sizable demand in the regional market, the waxy nature of Ugandan oil will require special treatment for distribution through pipeline. The oil nevertheless has some characteristics such as low sulphur contents which make it marketable for refining. On the other hand, the pipelines to supply oil to neighboring countries are planned alongside the main line for export outside the region. However, the construction of these pipelines requires firm agreement and arrangement to deal with security concerns.

(5) Coffee

Coffee is the major export commodity of Uganda contributing about 18% of the total export earnings in last decade. It is predominantly produced on a small scale basis with an estimated 1.5 million farmers with an average of 1.5 acres of land producing 80% of the country's production. Robusta coffee is the main type of coffee produced in Uganda accounting for about 80% of the production.

The coffee value-chain consists of production, collection, primary processing, export, roasting and marketing (wholesale and retail). As an exporting country, the process involved in Uganda is only up to export. The large share of value addition is done after roasting and marketing with 70% of the value in these stages. Only about 8% of the coffee undergoes roasting and grinding in Uganda therefore making Uganda's share in the value addition very limited. The coffee produced in Uganda is mainly collected in Kampala. Those from Rwanda and the eastern part of DRC is also collected and transported to Mombasa.

The problems are observed in quality control as well as productivity (the yield per season 0.5kg per tree compared to 12 to 14 kg and 7 to 8 kg per tree in Vietnam and Brazil, respectively). Coffee trading involves many intermediary traders between farmers and exporters resulting in reduced profit share to farmers. This eventually limits the increase of production and productivity.

(6) Dairy

In 2014, 1.9 billion litres of milk were produced of which 30 % was consumed at the farm level and 70 % marketed. Out of the marketed milk, 33% of the milk was consumed without processing. Milk production is also produced predominantly by small holders with limited capacity of controlling quality and processing. Only 20% of milk produced goes to industrial producers. Middlemen and cooperatives collect and bulk milk. After the ban on the use of aluminium cans for transportation, the milk is to be transported by tankers. While importation of milk transportation equipment is growing, those with cooling facilities face problems of inaccessibility to the power grid, limited water supply and poor road network.

(7) Palm and oil seeds

Current oil palm production is undertaken by small holders who started either through the IFAD supported project with the Government loan or a plantation under the Kalangala Oil Palm Growers Association (KOPGA). The outlet of palm oil is limited to a private company and the producer price is fixed with the processor with limited influence of market forces.

Sesame grown in Uganda are of two categories, namely, white sesame for both oil extraction and direct consumption and black sesame for oil extraction. Commercial production is almost non-existent: Sesame farming is done by small scale farmers with no agro input. Collection of sesame

is collected by foot traders, village collectors and buying agents operating on foot and bicycles and later sold to urban traders or exporters. The marketing end is controlled by small to medium scale processors and exporters. Only 20% of the production is exported with China being the main export destination. The volume of tradable sesame available on the market however, depends on the surplus in the household sector or disposition patterns.

4.2.4 Export Potential and Key Bottlenecks

(1) Iron and steel products

Opportunities in export market in COMESA and SADC countries may be found alongside the demand for construction. While Uganda has the track record of exporting iron and steel products to the regional market including to as DRC, Rwanda, Sudan and Tanzania, installation and building capacity of production facilities face a few critical issues. For instance, the business environment may not be conducive for the large-scale investment due to high cost of finance and energy tariff.

In order to reduce the procurement cost, development of transportation infrastructure to reduce the transportation cost is critical. On the other hand, the Common External Tariff scheme which has only three bands may not be conducive for such industries as iron and steel where semi-finished products are still largely imported.

(2) Meat, hide and skin

While meat has no a sizable export market share, hide and skin have been experiencing growth. In 2014 alone, an annual growth of 15 percent was recorded. The global market has also been expanding at the rate of 7% per annum in last 5 years.

The bottlenecks for growth in the meat industry start from production whereby cattle production is predominantly small scale. While middlemen handle a large share of the cattle trading, no proper systems of regulating quality and trading behaviours are in place. Quality infrastructure and proper processing facilities are critical for exports to destinations such as EU with quality requirements.

As for hide and skin industry, adequate tannery facilities to absorb raw hide and skins need to be put in place.

(3) Cereal grain

The major importers of maize are Japan, South Korea, Mexico and Egypt, whereas the exporters are US, Brazil, Argentina and Ukraine. The traded volume has been growing at an average of 8% per year over 5 years. Rice shows the same trend of growth. The largest importers are Saudi

Arabia, Iran, China and Benin. Asian countries such as India, Thailand, Pakistan and Vietnam with US are ones of the largest suppliers.

In terms of logistics, poor road conditions result in damage to grain and spillage. Other issues include low storage capacity. The overall storage capacity within the country is only 30% of the production volume. While Kenya is a large importer of Maize, Ugandan products are subjected to inspection by Kenya's phytosanitary authority.

(4) Petroleum oils

Expected to bring wealth to the region, however, the commercialization of the sector requires number of issues to be sorted out. First, licensing has just started and so far only one license has been issued. The major constraints may be infrastructure development which makes the products accessible to the market: The decision on the route of the pipelines needs to be finalized so that construction can take place. Similarly, infrastructure in the production areas including access road to major urban centers in the vicinity should be laid. Further problem may also be foreseen in insufficient skilled labor.

(5) Coffee

The world coffee market in 2014 was estimated to be 9 million tons valued at USD 17.5 trillion of which Uganda's share was only 2.3%. With the new buyers in emerging economies such as China and India, the world's coffee consumption has been experiencing growth at the rate of 2.3% per annum in recent years. While the traditional market grows at 2.4% per annum, the specialty coffee, though limited in terms of the traded volume, grow at 10% per annum in some European countries.

Key bottlenecks for expansion can be identified in the problems of compliance in quality and productivity. Compared to countries like Brazil that consumes a sizable portion of their product domestically, Uganda's local consumption is limited and this makes it difficult to boost farmers' income in this type of value chain.

(6) Dairy

Dairy products face growing demand in the domestic market. Dairy products import consisting of milk and cream, buttermilk and yoghurt amounted to USD 3.6 million in 2014. The world market reached a production volume of 62.9 million MT in milk equivalent but the growth rate is expected to slow down, forecasted at less than 2%. However, world's population and urbanization is still expected to grow by 13.7% in 2023 comparing with the amount consumed in 2011 to 2013. The current export volume is minimal while informal markets dominate about 80% of the dairy products marketed in the country.

Due to the market structure together with the insufficient production, it is difficult for formal processors with capacity to export abroad. Moreover, the overseas markets are not conducive for Uganda's product as far as competitiveness is concerned. Assuming that regional market may be the target market, quality breed, promotion of modern livestock farming and quality control as well as good road infrastructure would be necessary.

(7) Palm oil and sesame seed

While the world demand for crude palm oil fell by 5% in 2014, large deficit of the palm oil in Uganda as well as in the region provide opportunities for oil palm production. Uganda imports 171,086 MT of crude palm oil (CPO), majorly (90%) from Indonesia. Current issues are to stabilize the production. On the other hand, massive import of crude palm oil (CPO) from Indonesia which Uganda relies on, can influence on the price of CPO and Uganda's production may be forced to compete with the import price. Matured oil palm will provide the long-term but the production will not allow intercropping. There may be need to adopt changes in agronomic practice.

Sesame's world market amounts to USD 3 billion as at 2014. The amount traded increased from 1.4 million MT in 2013 to 1.67 MT in 2014. The major importers are China, Japan, and Turkey, representing 32.4%, 10.8% and 6.2%, respectively. Uganda exported 62.8% of the sesame to China in 2014, out of 22,000 MT of total export. Despite the small size of the production volume, the export has experienced surge. An average 40% growth has been observed in recent years. The bottleneck is found in the absence of large scale commercial farmers which causes insufficiency and inconsistency of product supply volume. Quality issue also stemmed from the proper post-harvest handling. Quality standard and certification, as well as productivity are also key issues for export development.

4.3 Overview of Industry Development

4.3.1 Overview of Industrial Structure

The VC analysis which selects products with high emphasis on the export market potentials shows some insights on the nature of the value-chains and the relationships between primary commodities and value-additions in Kenya and Uganda. The list below is the products with the higher score in the long-list.

Table 4.3.1: Long-Listed Products for Value Chain Survey

Sector	Products
Agricultural, Livestock, Fishery Products and the Processed Products	Milled Maize
	Coffee
	Flowers and plantings
	Processed milk products
	Edible pulses
	Processed fruits
	Tea (principally purple tea)
Mineral Products	Niobium
	Titanium
	Gold
	Mineral fuels and oils
	Fluorspar
Manufactured Products	Veterinary products
	Assembly of motorcycles
	Aluminum articles
	Pharmaceuticals
	Sewed apparel of textiles
	Steel products
	Fertilizers
	Wood and planned articles
	Knitted apparel
	Cement and lime products
	Glass and glassware
	Metal tools, implements and cutlery

Kenya

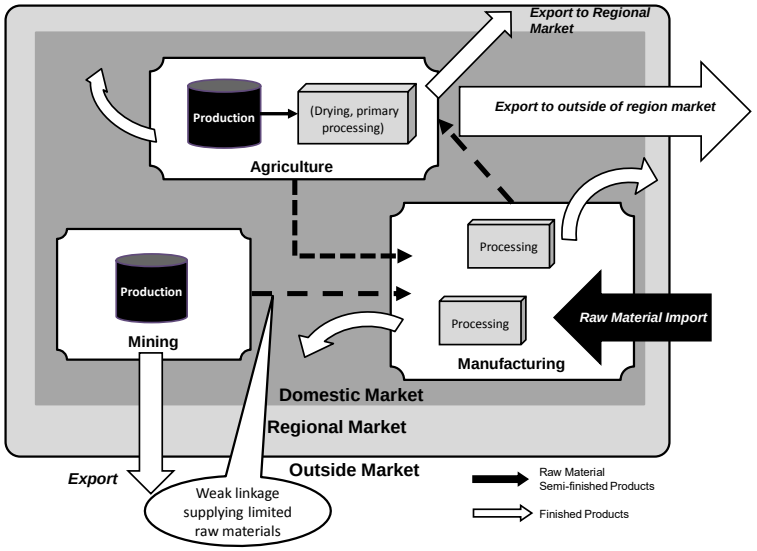
Source: JICA Study Team/Panafcon

Sector	Product
Agricultural, Livestock, Fishery Products and the Processed Products	Coffee
	Fish
	Dried Leguminous Vegetables
	Leather of \bovine or equine
	Cane or beet Sugar
	Maize
	Tobacco
	Live plants, Cuttings and Slips
	Palm oil and its fractions
	Wheat or melsin flour
	Tea
	Animals, vegetable fats and oils
	Cereal Flours excluding wheat or melsin
	Grain Sorghum
Mineral Products	Cement
	Petroleum Oils
Manufactured Products	Iron/steel bars and rods
	Rolled iron or non-alloyed Steel
	Soap and detergents

Uganda

Source: JICA Study Team/Panafcon

While some products with the market in the region are selected, the products with rather established trade systems with markets outside of the region (notably in agricultural products and mineral resources) are also listed. Included in these listed products, the VC analysis also indicated the structure and the relationship between various industries in Kenya and Uganda. The Figure below depicts the relationship of production, processing and the market access of these products roughly.



Source: JICA Study Team

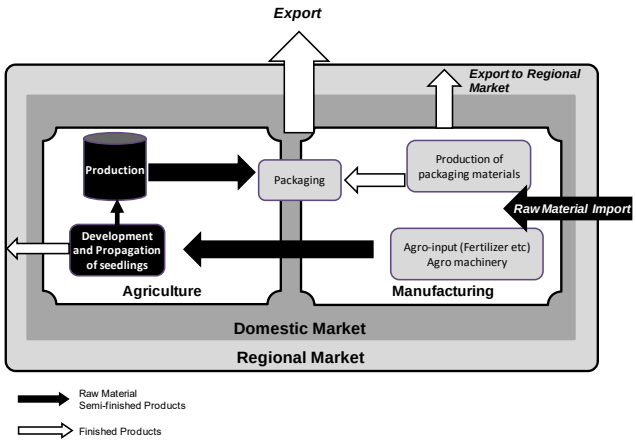
Figure 4.3.1: Relationship between Sectors and the Flow of Goods in Kenya and Uganda

Despite the primary commodities production from the agricultural and mining sectors in Kenya and Uganda, the value-addition within both countries is limited. As seen in the Figure on the left, the linkages between the primary commodities and value-addition are rather limited. Such

commodities are largely exported to the outside of the region with limited involvement of the processing sectors (e.g., tea, coffee, flowers and plantings). Some products consumed in the domestic products are, on the other hand, processed: such products including dairy products and meat products are consumed domestically or exported to the regional market. Likewise, cement production based on limestone deposits mainly serves domestic and regional demand.

Some manufacturing sector is heavily relying on the imported raw materials. For example, according to the VC survey, such industries as steel and plastics rely on the imported materials. The share of the cost of the raw materials for plastic packaging in Kenya, for example, takes 50% of the total cost. According to the interviews with other sectors, it is also noted that the smallness of the manufacturing sector in both countries cannot support the industries which supplies various types of manufactured raw materials. It should be also noted that the weak and small industrial activities limit the growth of industries which provide raw materials.

On the other hand, there are two distinctive issues which should be viewed as important aspects of broad-based industrial development. First, on-going evolution of some sectors as a cluster of the businesses may provide opportunities for broadening the types of industrial activities in the both countries. Large quantity of export induces forward and backward linkages and fosters other industries.

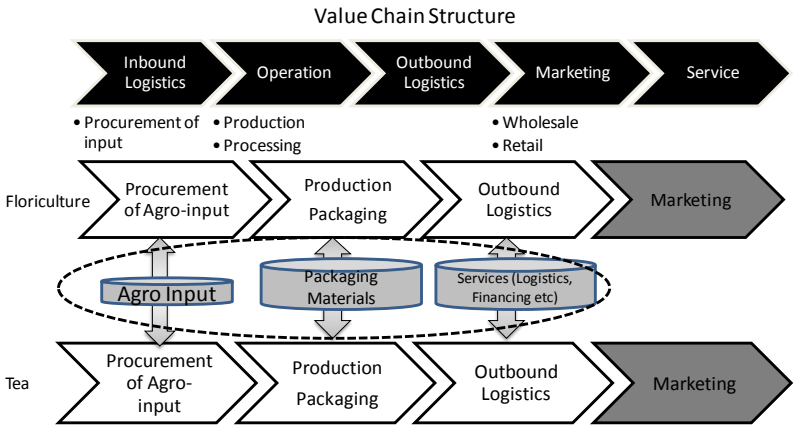


Source: JICA Study Team

Figure 4.3.2: Kenya's Floriculture Industry

For example, floriculture sector in Kenya have formed the cluster with the production and the suppliers of such products as agro-inputs such as seedlings, packaging and re-packing of the chemicals to retain the shelf life of flowers (See the figure on the left).

These types of clusters are actually observed in a few export goods. Therefore, it may be assumed that the types of industries may further induce the growth of other industries which can serve commonly to various industries notably in agro-processing. The Figure below shows a conceptualized relationship between value-chains and goods and services procured by these industries.



Source: JICA Study Team

Figure 4.3.3: Value Chain and Common Goods and Services Provided to Various Industries

It should be noted that the common supply of goods and services can only grow with a large volume of the demand created through development of their servicing sectors (e.g., in this diagram, floriculture and tea sector).

Secondly, the resource endowment of the areas should also be reviewed. The resource endowment in Kenya and Uganda as well as the neighbouring countries, notably petroleum in the region is expected to give significant impact on the industrial structure if they are adequately and effectively utilized. Two impacts which may be driving forces for the structural upgrading of the economy can be identified. First, the impact can be expected from the drastic reduction of energy cost due to access to the cheaper energy sources of petroleum, and coal together with natural gas to be imported from neighbouring countries. Cheap energy can improve the competitiveness of those manufacturing industries which require high calorific energy. Competitiveness of manufactured products such as glass, ceramics, hot and cold rolled irons may improve. Secondly, deposits of phosphate can also boost agricultural production through cheap access to fertilizer.

Based on the situation, the development of the area may be strategized by identifying three types products based on the assumptions below:

(1) Increase the amount of production

It is natural that increased volume of production can entail earnings. At the same time, increased production of one product can further induce the growth of the other sectors if the size of the production reaches to the certain level. Therefore, productivity of some key products should be further improved.

(2) Products with strong forward and backward linkages

It is important to identify the key products or sectors which have potential for growth first to reach to a certain level where they can start influencing other sectors. The manufacturing sector typically comprises such industries with linkages of supporting industries.

Apart from the export market outside of the region, improved connectivity of NEC countries provides better access to the regional market for manufactured products. The potentials should be therefore sought both for exportability within and outside of the regional market.

(3) Fundamental restructuring and development of the industries with resource endowment

Growth may be introduced through new resources which can provide the solutions for some problems of industrial development. For example, petroleum is expected to change competitiveness of Ugandan and East African economy.

The types of the products/industries which fit to the assumptions above can be raised as listed below:

A) Products/industries which take advantage of expanding domestic and regional markets fully in order to maximize the net profit of the region as well as to prepare for further basis for industrial development;

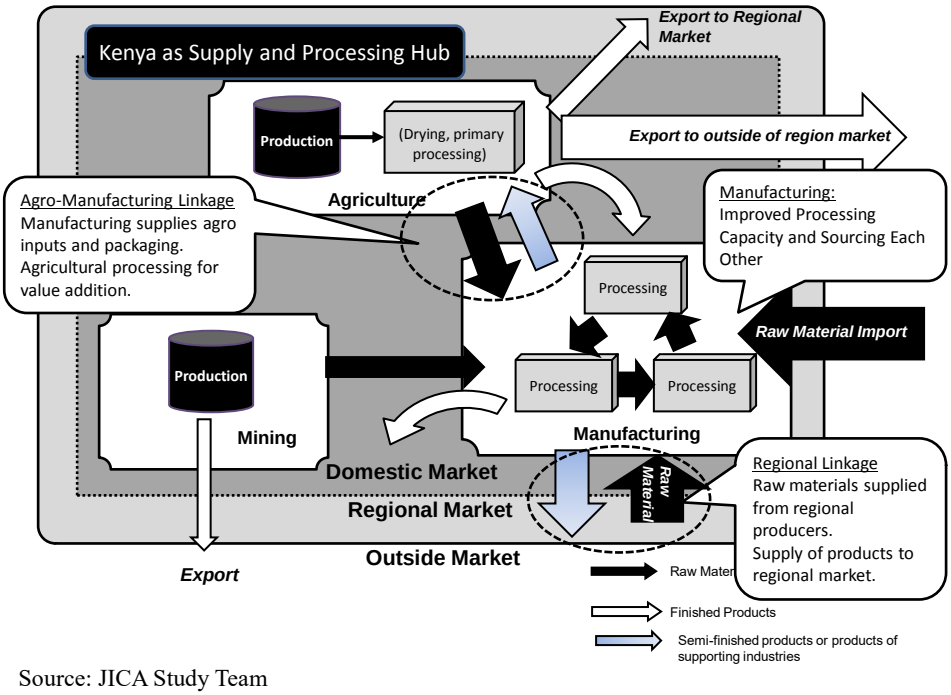
B) Products/industries which are started to grow with strong forward and backward linkages of competitive products/industries. Products/industries which are expected to add further value on the entire cluster of the products/industries;

C) Strategic products/industries which provide significant solutions for industrial structure upgrading.

4.3.2 Proposed Approach for Industry Development in Kenya

The result of the VC survey indicates broad idea of the structure of the Kenyan production sector. The primary commodities have already established a track record of export (egg, coffee, flower and planting and tea): some started or have already been playing critical roles of the regional hub, for example, by providing upstream inputs or trading centres[6]. The role of the hub of such activities may be found taking advantage of such as the position of Kenya with relatively developed industries and better connection to the export market through the Port of Mombasa as well as a relatively well facilitated air cargo network. The connectivity advantage also gives Kenya opportunities for accessing increasing demand of the domestic and regional markets. The image of industrial development in Kenya is illustrated below.

6 The floriculture was explained in the previous part. As for trading, Mombasa hosts the tea auction for black tea produced in East and Southern African countries.



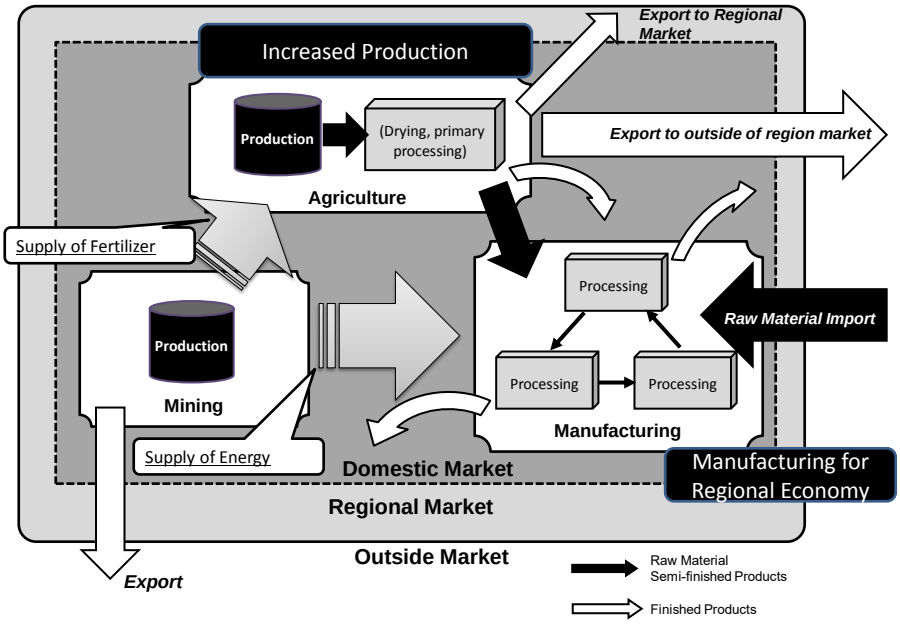
Source: JICA Study Team

Figure 4.3.4: Industrial Development in Kenya

Therefore, Kenya's industrial development should expand the production not only of currently available products but also types of products which can serve for the multiple sectors across the region. Whereas the manufacturing sector growth in other countries in the East African region may reduce the demand for Kenyan market over time, it may also give Kenya the possibility of taking the role of providing more technology-intensive and value-added products.

4.3.3 Proposed Approach for Industry Development in Uganda

According to the value chain analysis, Uganda's industries are mainly agro- and livestock-based industries. These industries, however, remain underdeveloped with the insufficient commercialization and underdeveloped and inefficient trading structure. However, it was revealed that competitiveness is still found in these sectors. The capacity of production as well as marketing channel to pull production based on demand may be thoroughly reviewed. As observed in the VC analysis in the previous section, Uganda's value addition activities are still in the infantry stage. While opportunities of higher value-addition of available primary commodities in such areas as agriculture may require further development of various steps in the value-chain, manufacturing using imported materials has been observed to serve both domestic and export market in the other corridor countries such as DRC and South Sudan. It is obvious that the deposit of a few key mineral resources such as petroleum and phosphate can be a significant source of structural change with large and vast impacts. The image of industrial development in Uganda is illustrated below.



Source: JICA Study Team

Figure 4.3.5: Industrial Development in Uganda

4.3.4 Selection of NEC-Key Growth Drivers

Growth drivers were selected based on those which can play the role of providing good initiatives for upgrading the industrial structure for its sustainable development. The growth drivers were categorized into: 1) expanding domestic and regional, and international markets for net profit, 2) strategic products or industries which provide significant solutions for industrial structure upgrading, and 3) Industries with strong forward and backward linkages. Kenya's industrial development may be more efficiently strategized if more emphasis is put on the development through such growth drivers as 1) and 3). On the other hand, Uganda's industrial development may be more efficiently strategized if more emphasis is put on development through such growth drivers as 1) and 2). The growth drivers were categorized as shown in the table below.

Table 4.3.2: Candidates of Growth Driver

Source of Growth	Kenya	Uganda
Expanding domestic and regional, and international markets for net profit	Coffee, Tea, Rice, Meat Products, Processed Fruits and Vegetable, Soda Ash, Niobium and Rare Earth Elements, Soap, Cosmetics and detergents, Construction Materials (cement, iron and steel)	Coffee, Dairy Products, Rice, Meat Products Consumer Goods (e.g., soaps and detergents), Leather Products, Construction Materials (iron and steel)
Industries with strong forward and backward linkages	Crude Oil, Coal, Natural Gas	Crude Oil, Petroleum, Phosphate
Strategic products or industries which provide significant solutions for industrial structure upgrading	Cut Flower, Apparel Industry, Leather Industry, Packaging	Oil Seeds, Palm Oil, Other Minerals (e.g., gold, iron ore, wolfram, Tin, Tantalite, Copper etc),
Other Service	Tourism, Logistic Service	Tourism, Logistic Service
Total	20 Drivers	15 Drivers

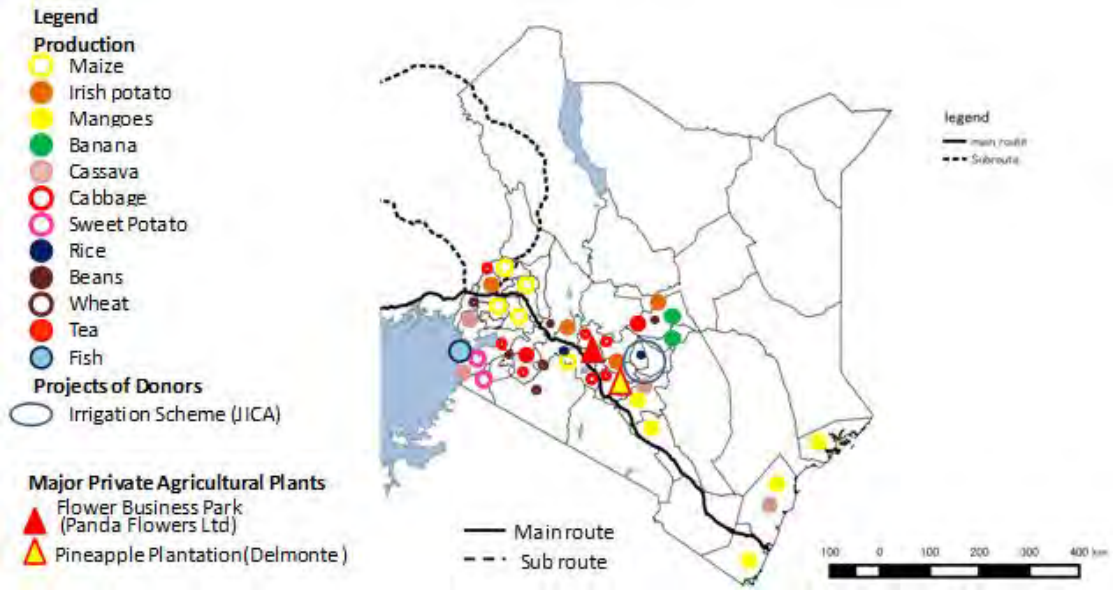
Source: JICA Study Team

4.4 Agriculture and Fishery Sectors Development in Kenya

4.4.1 Overview of Current Status

The agricultural sector in Kenya comprises of crop production (food crops, industrial crops and horticulture), livestock production (dairy industry, beef industry, sheep and goats, poultry, pigs, apiculture and camels), aquaculture and Forestry. Over 80% of the Kenyan population lives in the rural areas. Agriculture remains the backbone of the economy in Kenya, contributing 25% of the total GDP and employing 75% of the national labor force. Given the importance of the sector, it is a key factor for the overall performance of the economy.

In Kenya, agricultural land area is very limited. Agricultural area extends closely from the Northern Economic corridor. Production areas of 10 crops with major production and logistics routes of agricultural crops are shown in the figure below.



Source: JICA Study Team

Figure 4.4.1: Flow of Rice in 2015 and 2030

Forestry production isn't included in the figure because forestry production is very small. Livestock is also not shown since it is dispersed nationwide.

4.4.2 Assessment of Potential Products

It is considered that potential products in Kenya can be categorized as follows:

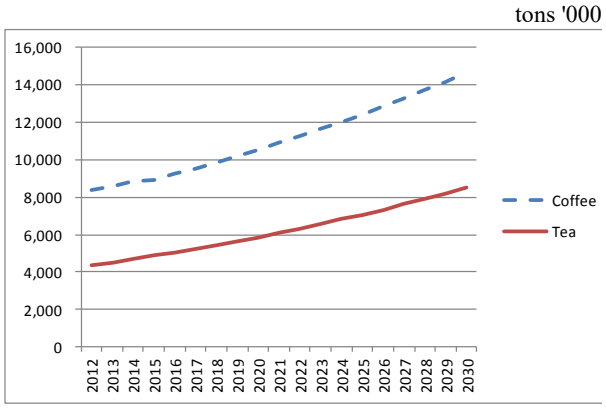
1) Products with existing value chain to overseas market that are expected to increase by expansion of production area. Increased value addition will also increase export volume resulting to more export earnings.
2) Current imports are as a result of shortage in domestic production. In future domestic consumption demand is expected to increase with population growth.
3) Production that adds value to the local economy is large.

The main industrial crops in Kenya are tea, coffee, sugar cane, cotton, sunflower, pyrethrum, barley, tobacco, sisal, coconut and rice etc.

Among these products tea, coffee, cut flower, processed fruits and vegetables are picked as potential products for category 1), rice is picked as potential products for category 2) meat production is picked as potential products for category 3). Demand of dairy products has been expanding with growth in population, and it may be projected that the trend will continue. But for dairy products since EU abolished milk quotas (EU previously restrained surplus production of raw milk by setting up the production upper limits for the raw milk in every area till March 2015.), it is expected that import volume from the EU will increase. It is a challenge for dairy production in Kenya to compete with imports from EU since the abolition of the milk quotas. As such therefore, dairy production was eliminated from Key Growth Drivers of Kenya. Sugar, Vegetable oil and Maize may be Kenya's potential crops but price is not competitive against Ugandan products which come from rain fed agriculture. The annual average rainfall in Uganda is 1,200mm/year, while in Kenya annual rainfall of potential area is 750-1000mm/year. Therefore, the potential area in Kenya is very limited by rainfall. Short rainfall translates to short cultivation and therefore the need for irrigation which is costly. As a result, Sugar, Vegetable oil and Maize are also eliminated from Key Growth Drivers of Kenya.

Kenya's Vision 2030 development strategy prioritizes tea, coffee, cut flower, processed fruits and vegetables as well as rice and emphasizes value addition for coffee and tea exports.

As for category 1), demand for tea and coffee will rise in future according to the International Coffee Organization and FAO. Projection of the world consumption of tea and coffee is shown below. As for category 2), amount of production and import of major import crops in Kenya is also shown below.



Source: JICA Study team based on the data of International Coffee Organization and FAO

Figure 4.4.2: Projection of the World Consumption of Tea and Coffee

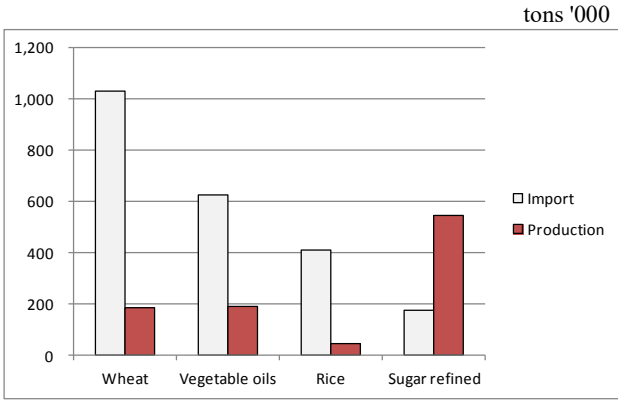


Figure 4.4.3: Amount of Production and Import of Major Import Crops in Kenya

4.4.3 Analysis of NEC Key Growth Drivers

Strengths and opportunities of each key growth driver are as follows:

(1) Tea

World demand for tea is assumed to be growing in China and India. China and India are major consuming countries and their populations are expected to grow. Already Kenya has a value chain of exports to India and China and this makes Kenya to have a competitive edge over other Tea producing countries. In addition, the demand for tea in future will be diversified into organic tea, residual pesticides free tea and, flavored tea etc. Kenya is historically a leading tea exporter to the world and so high quality value chain is already established. In addition, Kenya's tea has a characteristic feature of taste and aroma, which is suitable for processing into other products such as flavored tea. Kenya is therefore able to respond to the world's various demands than other countries. These factors make tea a Key Growth Driver in Kenya.

(2) Coffee

World demand for coffee is also assumed to be growing in China, India and Latin America. With the increasing population in these countries, their' cuisine culture continues to be westernized. Like in the case of tea, Kenya already has a value chain for exports to India, China and Latin America. This already established value chain for exports gives Kenya a competitive edge over other coffee producing countries. Similarly, in Kenya is home to high quality Arabica coffee that can be processed into high quality coffee referred to as "special coffee". The demand for "special coffee" is nowadays on the increase. The high quality Arabica coffee gives Kenya more advantage over countries cultivating Robusta coffee. This makes Coffee to be considered a Key Growth Driver in Kenya.

(3) Cut Flower

Kenya is the third largest exporter of cut flowers in the world, accounting for around 35% of all sales in the European Union. Main product, cut flower, can develop various flower related industries like seed, young planting, plant breeding, construction material for greenhouse and processing factory and cold storage among others. Kenya has a close link to the Dutch who are reputed to be amongst the largest producers of plantings in the world. She also has a discount tariff to export to the Dutch by KLM. This puts Kenya at an advantageous position over other flower producing countries. Considering this scenario, cut flower can be considered to be a Key Growth Driver in Kenya.

(4) Processed Fruits and Vegetable

Demand has grown faster particularly in developing countries where industrial growth has translated into greater urbanization, higher per capita incomes and expansion in the size of the middle class. As the global middle class grows, its demand for higher quality and more-diverse food increases. Increased consumption of fruits and vegetables can be attributed to more

households becoming health conscious. In Thika, Del Monte Kenya Ltd operates both plantation and processing factory successfully. It is a good sample of value chain from production to access to the Global market. Consequently, industry operators have increased their output to meet this growth in global demand. Considering this scenario, processed fruits and vegetable can be a Key Growth Driver in Kenya.

(5) Rice

The demand of rice in Kenya is projected to increase in future as the population grows. Kenya has a potential of about 540,000 ha irrigable area and 1.0 million ha rain fed area for rice production. Although currently Kenya is a net importer of rice, with improved water harvesting, storage, underground water resource utilization and innovative management technologies, the current irrigation potential can be increased by a further 800,000 ha to 1.3 million ha. Considering this scenario, Rice can be a Key Growth Driver in Kenya.

(6) Meat

The demand for meat production in Kenya is projected to increase in future as the population grows. Some county governments expressed confidence that abattoirs would spur meat business in the county due to high demand for quality beef by consumers. Slaughterhouses would also create employment for residents, in addition to being a key source of revenue to the county governments. Kenya recently entered into a deal with China to export meat products, a move estimated to pump billions of shillings into the local economy in the next five years and diversify export markets. Considering this scenario, meat can be a Key Growth Drivers in Kenya.

4.4.4 Development Scenario of Key Growth Drivers

Future production forecast of the key growth drivers was calculated based on the following information.

(1) Tea

Projection on production amount was calculated based on data for production area and yield of 2010-2014. Growth rate for production area is 3% for Smallholder, and 7% for Estate. Production area of each year is calculated by this CAGR. Average yield is 1.9 ton/ha for Smallholder and 2.57 ton/ha for Estates. Yield is calculated by these each average yield. Expected Production of 2015, 2020, 2025, and 2030 were calculated based on the production area and the average yield.

(2) Coffee

Projection on production amount was calculated based on data for production area and average yield. CAGR of production area is 0.3% for Cooperatives, and 0.2% for Estate. Production area of each year is calculated by this CAGR. Average yield is 0.294 ton/ha for Cooperatives and 0.758 ton/ha for Estates. In 2030 the target yield for Cooperatives is 0.758 ton/ha, equivalent to yield average of Estates. At that time CAGR of yield of Cooperatives is 6.1%. Expected Production of 2015, 2020, 2025, and 2030 were calculated based on the production area and the yield, which is 0.758 ton/ha for Estates and calculated figure by 6.1% CAGR for Cooperative.

Table 4.4.1: Production of Tea

	2010	2011	2012	2013	2014
Production Area					
Smallholder (ha)	115	123.3	124.9	127.3	128.6
Estates (ha)	56.9	64.5	65.7	71.3	74.4
TOTAL (000 ha)	171.9	187.8	190.6	198.6	203
Production					
Smallholder (ton)	225	218.6	218.5	249.8	262.4
Estates (ton)	174	159.3	150.9	182.6	182.7
TOTAL (000 ton)	399	377.9	369.4	432.4	445.1
Yield					
Smallholder (ton/ha)	1.96	1.77	1.75	1.96	2.04
Estates (ton/ha)	3.06	2.47	2.30	2.56	2.46

Source: Economic survey 2015

Table 4.4.2: Production of Coffee

	2010	2011	2012	2013	2014
Production Area					
Co-operatives (ha)	84.2	82.4	85.2	85.2	85.3
Estates (ha)	24.5	24.5	24.6	24.6	24.7
TOTAL (000 ha)	108.7	106.9	109.8	109.8	110
Production					
Co-operatives (ton)	22.3	19.6	28	21.9	32.7
Estates (ton)	19.7	16.7	22	17.9	16.8
TOTAL (000 ton)	42	36.3	50	39.8	49.5
Yield					
Co-operatives (ton/ha)	0.265	0.238	0.329	0.257	0.383
Estates (ton/ha)	0.804	0.682	0.894	0.728	0.680

Source: Economic survey 2015

(3) Cut flower

Kenya's export volume of cut flower is shown in the following table. CAGR of export production for 2010-2014 is 3.2%. Expected Production for 2015, 2020, 2025, and 2030 were calculated based on the CAGR.

(4) Processed fruits and vegetable

Kenya's export value of processed fruits and vegetable is shown in the following table. CAGR of export production 2010-2014 is 7.9%. Expected Production of 2015, 2020, 2025, and 2030 were calculated based on the CAGR.

Table 4.4.3: Export of Cut flower

	2010	2011	2012	2013	2014
Export amount (ton)	120,220	121,891	123,511	124,858	136,601

Source: ICA Study Team based on Kenya National Bureau of Statistics in 2014

Table 4.4.4: Export Processed Fruits and Vegetables

	2010	2011	2012	2013
Export amount (USD)	120,647	121,103	130,651	151,495

Source: JICA Study Team based on ITC

(5) Rice

Projection on production amount was calculated based on National Rice Development Strategy (2008-2019) (NRDS). According to NRDS target production is the same as expected consumption volume. The expected consumption volume was calculated based on the population data which was prepared by JICA Study Team. The consumption figure per person is an averaged volume in the last 10 years/Year 2004 to 2013.

(6) Meat and Meat production

Kenya's export amount of meat and meat production is shown following table. CAGR of export production 2009-2013 is 15.5%. Expected Production of 2015, 2020, 2025, and 2030 were calculated based on the CAGR.

Table 4.4.5: Production of Rice

	2013	2020	2025	2030
Population	45,372,067	51,386,163	57,843,381	64,890,267
Production area (ha)	25,216	44,794	67,524	101,789
Rice consumption (ton)	362,977	411,089	462,747	519,122
Production (ton)	115,032	213,943	333,261	519,122

Source: JICA Study Team based on National Rice Development Strategy (2008-2018)

Table 4.4.6: Export of Meat and Meat Production

	2009	2010	2011	2012	2013
Export amount (ton)	3,408	5,073	6,095	5,788	6,068

Source: JICA Study Team based on Statistical abstract 2014

Based on the above condition, production projection of key growth drivers is as shown in the table below.

Table 4.4.7: Production Projection of Key Growth Drivers

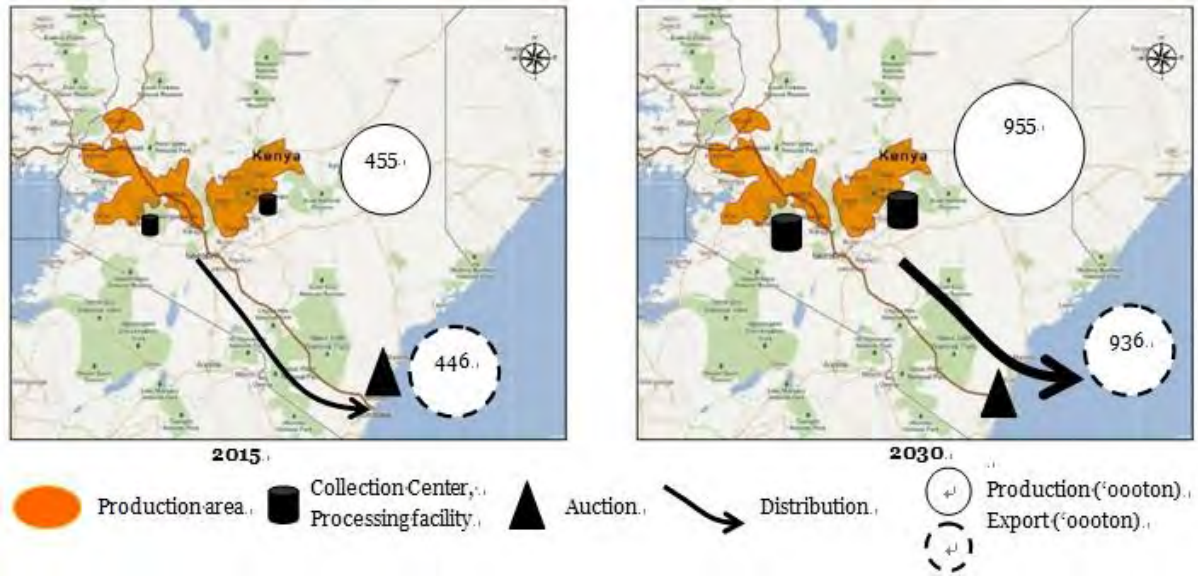
	Unit	2015	2020	2025	2030
Tea	000 ton	455.6	577.9	739.8	955.4
Coffee	000 ton	47.4	57.6	71.5	90.3
Cut flower	000 ton	141	165	194	228
Processed fruits and vegetable	000 USD	176	258	377	550
Rice	000 ton	170.5	247.0	358.0	519.1
Meat and meat production	000 ton	8.0	16.7	34.3	70.4

Source: JICA Study Team

4.4.5 Necessary Interventions with Priorities

Challenges for achievement of production projection along with the value chain of each growth drivers and necessary intervention are as followings.

(1) Tea



Source: JICA Study Team

Figure 4.4.4: Flow of Tea in 2015 and 2030

Challenges for tea value chain are summarized in the following table.

Table 4.4.8: Challenges for Tea Value Chain

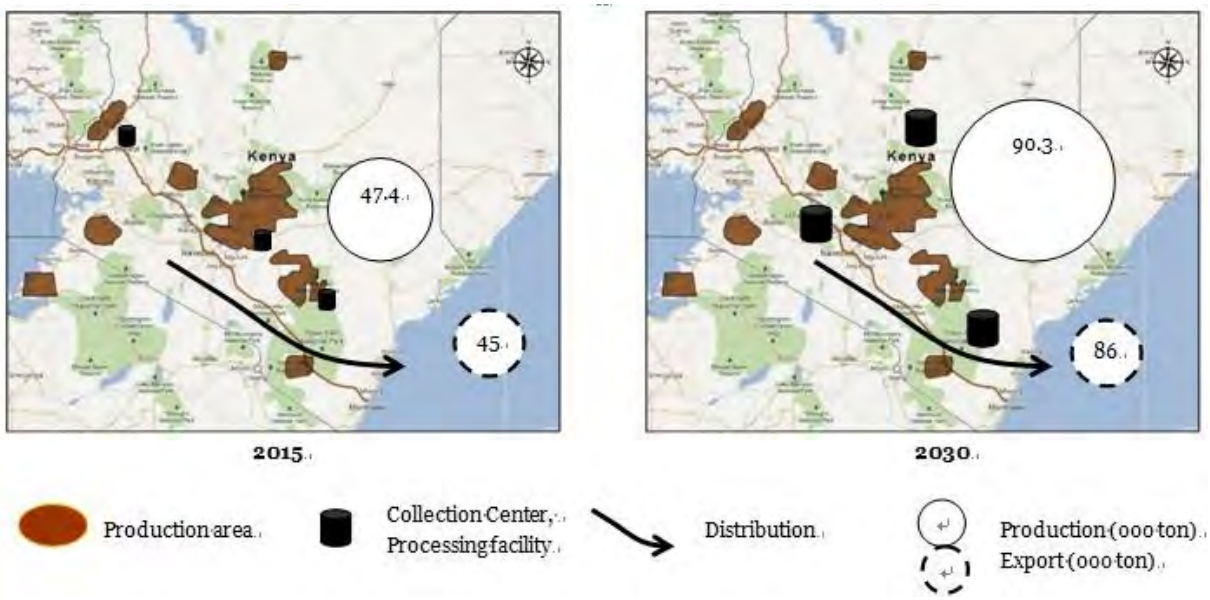
Production	Collecting/ Storage/ Transporting	Processing/ Packaging	Marketing/ Export
Yield of smallholders is low.	There is no traceability system. Pesticide-free product is mixed and sold with other product.	Main process for making in Kenya is Cut Tear Curl (CTC). CTC Tea product is used for filler for tea bag and the added value is very low.	Tea production in Kenya is Pesticide-free and aromatic. But the production has not become a brand.

Source: JICA Study Team

Necessary interventions for tea industry are follows;

1) To develop processing technology in order to encourage value addition. For example, to promote not CTC processing way but standard processing way. Main stream of processing way in Kenya is CTC but tea processed through CTC adds low value.
2) To assist brand-building. Tea in Kenya is Pesticide-free and aromatic. But the production has not become brand
3) To give technical assistance to increase productivity; for example, by using fertilizer and giving proper financial assistance.
4) To assist in develop new markets, fair-trade, organic and traceable products etc. by matching producers with buyers as well as through the diversification of the market.
5) To construct Collection Center, processing facilities and logistics centers in the production area. This will change the logistics in NEC in terms of container movements, the amount of containers moving to the East shall increase.

(2) Coffee



Source: JICA Study Team

Figure 4.4.5: Flow of Coffee in 2015 and 2030

Challenges for coffee value chain are summarized in the following table.

Table 4.4.9: Challenges for Coffee Value Chain

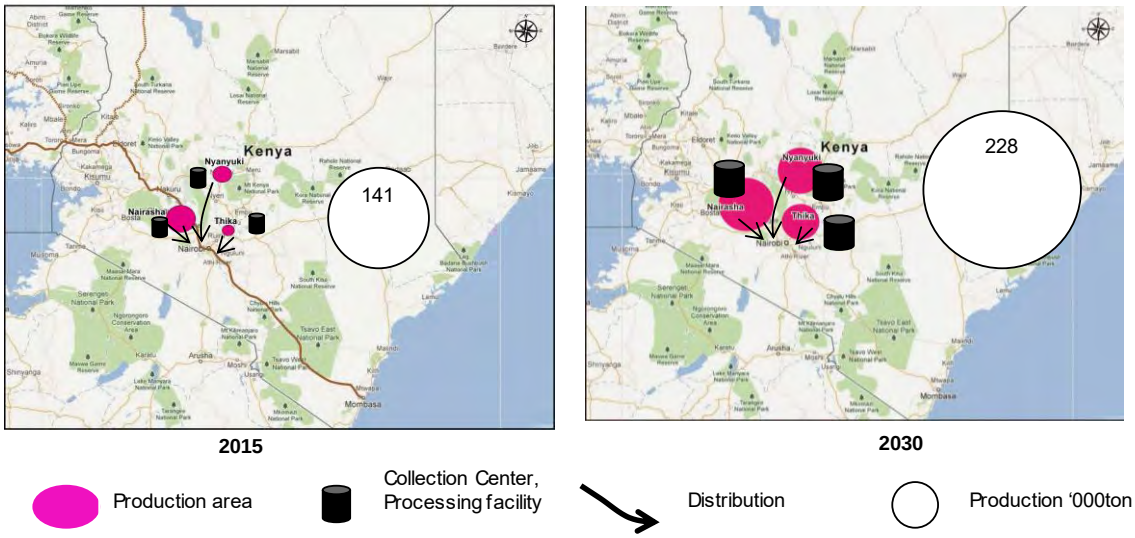
Production	Collecting/ Storage/ Transporting	Processing/ Packaging	Marketing/ Export
Yield of Co-operatives is lower compared with Estates.	There is no traceability system. Most of production could not be specified production area.	Almost all coffee is exported as raw beans.	Production area has not become a brand.

Source: JICA Study Team

Necessary interventions for coffee industry are as follows;

1) Promote and give technical assistance to increase productivity; for example, by using fertilizer and giving proper financial assistance and also post-harvest processing. There are several ways of coffee processing: - washed, un-washed and pulped natural etc. several ways of processing should be introduced in order to meet various demands of buyers.
2) Assist to develop new market, fair-trade, organic and traceable products etc. by matching producers with buyers. Meru coffee farmers have a commercial license to market their product directly on the Nairobi Coffee Exchange and to international buyers. Direct trading should be developed as a new way of trading.
3) Construct Collection Centers, processing facilities and logistics centers in the production area. This will change the logistics in NEC in terms of container movements. The amount of containers moving to the East shall increase.

(3) Cut Flower



Source: JICA Study Team

Figure 4.4.6: Flow of Cut Flower in 2015 and 2030

Challenges for cut flower value chain are summarized in the following table.

Table 4.4.10: Challenges for Cut Flower Value Chain

Production	Collecting/ Storage/ Transporting	Processing/ Packaging	Marketing/ Export
It is difficult to get quality seed and nursery tree.	Temperature management is difficult.	Most packing material is imported.	Getting certificate for international market like Japan is difficult.

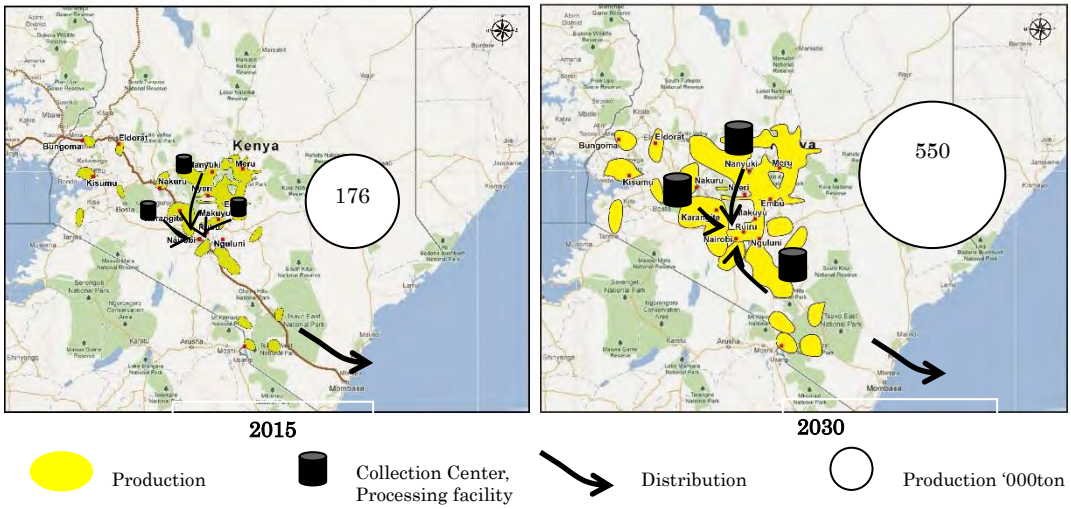
Source: JICA Study Team

Necessary interventions for cut flower industry are as follows;

1) Development of irrigation system especially water saving irrigation like drip irrigation and micro irrigation further more hydroponic[7] system by using clay ball and coco peat;
2) Promote investment through attractive investment conditions e.g. Tax exemptions, low land lease rates, low electricity costs.

7 Hydroponics is a subset of hydro culture and is a method of growing plants using mineral nutrient solutions, in water, without soil. Terrestrial plants may be grown with their roots in the mineral nutrient solution only, or in an inert medium, such as gravel.

(4) Processed Fruits and Vegetables



Source: JICA Study Team

Figure 4.4.7: Flow of Processed Fruits and Vegetables in 2015 and 2030

Challenges for value chain of processed fruits and vegetables are summarized in the following table.

Table 4.4.11: Challenges for Processed Fruits and Vegetables Value Chain

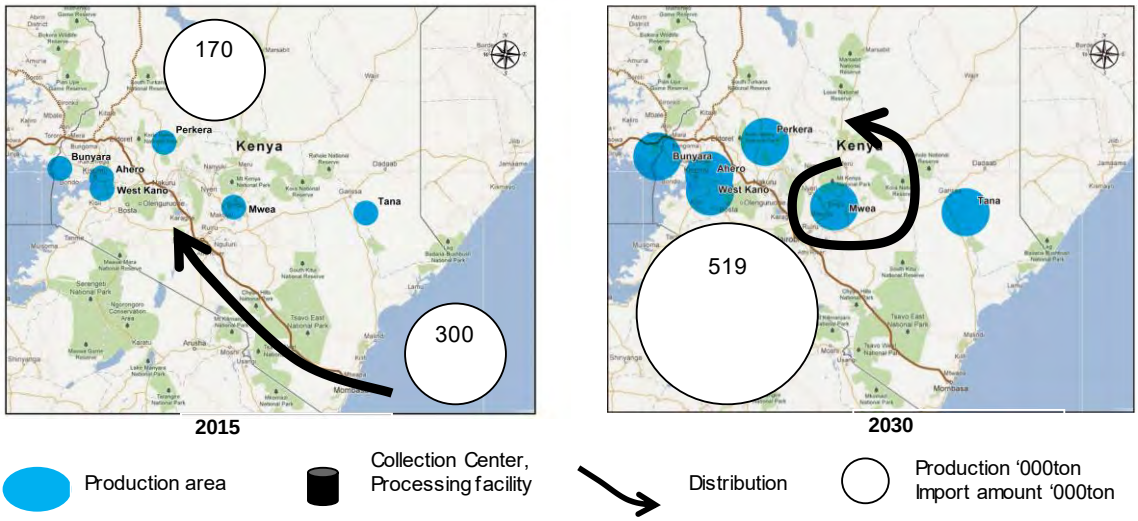
Production	Collecting/ Storage/ Transporting	Processing/ Packaging	Marketing/ Export
Farmers don't know of proper use fertilizer and Pesticide. Difficulty in Quality control is shortage in irrigation system.	Conducting cooperative delivery system is difficult because of weak Farmers cooperatives. Feeder roads (From collecting facility to main road) are unpaved	Shortage of packaging material and machinery.	Difficulty in getting certificate for countries like Japan.

Source: JICA Study Team

Necessary interventions for Processed Fruits and Vegetables industry are as follows;

1) Improve feeder roads at the Coast area where mango growing dominates.
2) Develop the railway and a better road linking farms to factories in order to catalyze exports of canned pineapples- case of Thika-based Del Monte Ltd.
3) Develop more seamless connection to the railway system from factory in order to improve logistics operations.

(5) Rice



Source: JICA Study Team

Figure 4.4.8: Flow of Rice in 2015 and 2030

Challenges for rice value chain are summarized in the following table.

Table 4.4.12: Challenges for Rice Value Chain

Production	Collecting/ Storage/ Transporting	Processing/ Packaging	Marketing/ Export
Shortage in Irrigation system.	Shortage of storage.	Shortage of Post harvesting facilities.	Production area has not become brand.

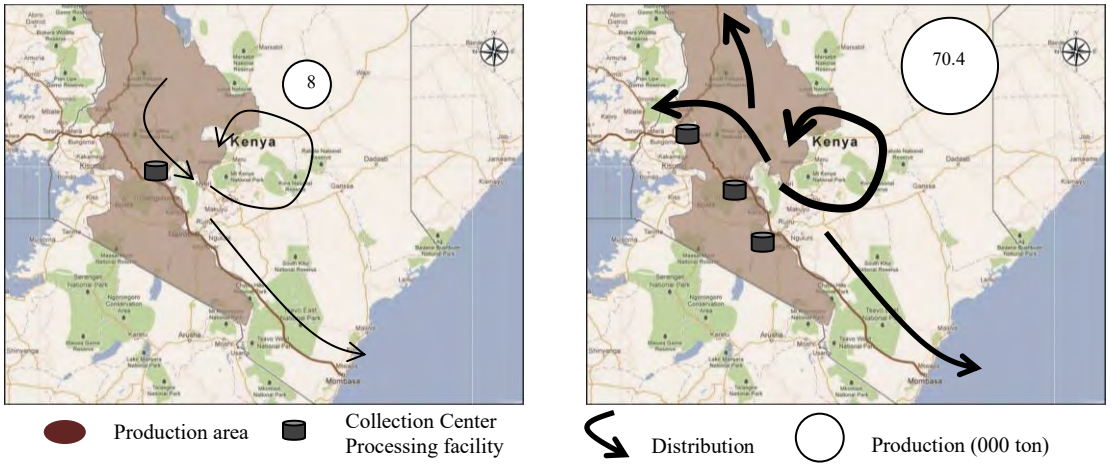
Source: JICA Study Team

Necessary interventions for rice industry are as follows;

1) Increase investments in research and development of water saving irrigation, such as SRI,
2) remote viable public private sector partnerships[8], to utilize private sector's technical assistance in order to improve the farming systems,
3) Develop both farmers and farmer organizations to be empowered to undertake production, processing and marketing of rice as an enterprise,
4) Expand and improve existing schemes together with development of upland and wetland areas that will go a long way in increasing the area under production,
5) Develop clean and certified seed for distribution to farmers,
6) Develop land tenure system in the rice growing schemes to enable farmers to access loans,
7) Introduce small-scale mechanization equipment and machinery while gradually shifting to large scale farming,
8) Develop public-private sector partnership and development partner collaboration in resource mobilization for its successful sustainable implementation.

8 Public private sector partnerships in this case are in a broad sense of the PPP project. Private companies provide agricultural resources (seeds, fertilizer, agrichemical and etc.) and technical transfer to farmers in order to quality control. After harvesting the companies purchase the production. Such an inclusive agricultural business has been increasing.

(6) Meat and Meat production



Source: JICA Study Team

Figure 4.4.9: Flow of Meat and Meat Production in 2015 and 2030

Challenges for value chain of meat and meat production are summarized in the following table.

Table 4.4.13: Challenges for Meat and Meat Production Value Chain

Production	Collecting/ Storage/ Transporting	Processing/ Packaging	Marketing/ Export
High costs of feedstuff for poultry and pig farming. Drought is and diseases are issues for pastured cattle.	Insufficient cold chain Transportation cost is high.	Shortage of Slaughterhouses and processing facilities.	Difficulty in getting certificate for export to countries like Japan.

Source: JICA Study Team

Necessary interventions for meat and meat production industry are as follows;

1) Develop structure to provide feedstuff at stable price,
2) Develop clean facilities, for example Slaughterhouse and processing facility, and operate according to health standard,
3) Develop cold chain facilities including cold chain transportation system in order to reduce transportation cost,
4) Technical transfer in order to get certificate.

4.4.6 Suggested Projects/Programs and Implementation Plan

Based on the above conditions, the following projects and programs are suggested.

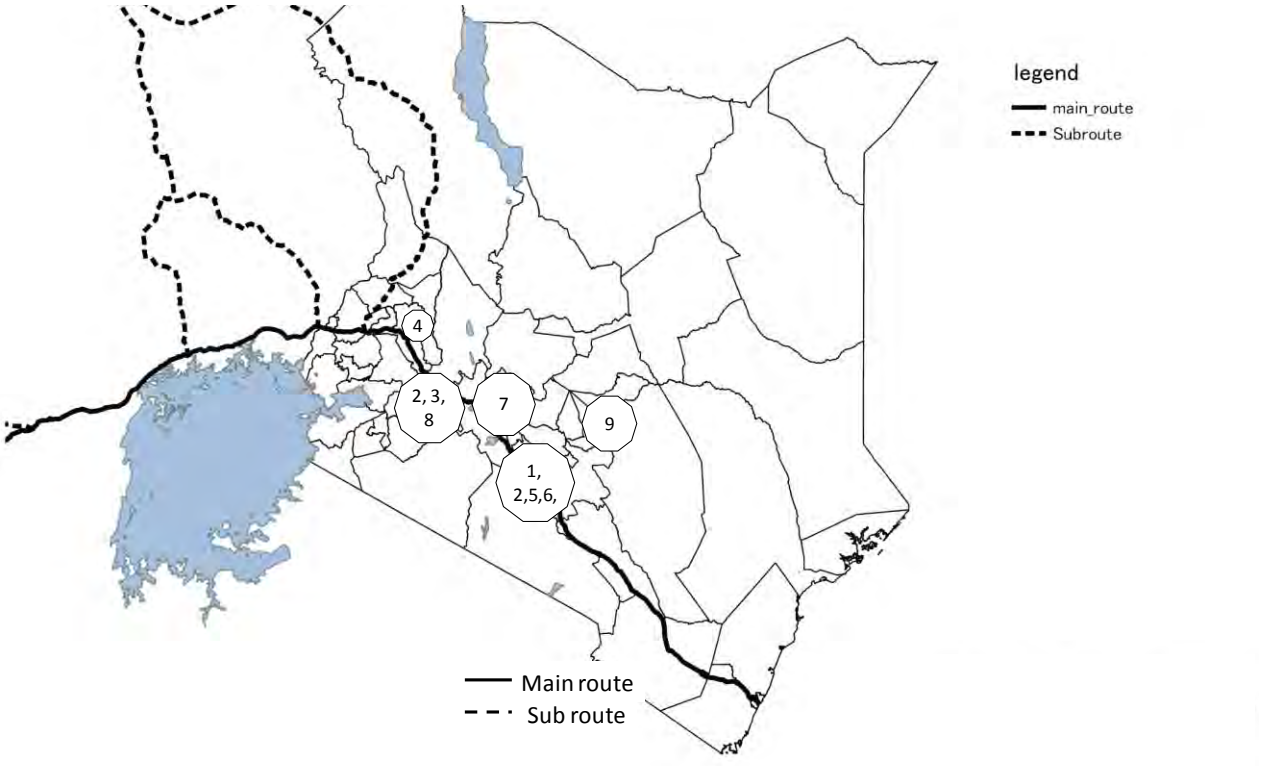
Table 4.4.14: Suggested Agriculture and Fishery Sectors Development Projects in Kenya

No	Project type	Name of Project/Program	Project/Program Description	Mode of Execution	Cost (Million USD)
1	Finance	Agricultural financing improvement program	The project comprises i) creating financial service for improving agricultural productivity in micro businesses, ii) financial services for medium term loans for the agricultural sector, development of small and medium enterprises and cooperatives.	TA (Loan)	17.4

No	Project type	Name of Project/Program	Project/Program Description	Mode of Execution	Cost (Million USD)
2	Facility	Food processing hub development program	The project comprises i) building Processing facilities, ii) developing basic infrastructure and iii) building non-core infrastructure, i.e. administrative buildings, training centers, trade and display centers, workers' hostels, research and development centers and marketing support system etc.	DBB /PPP	17.4
3	Facility	Distribution improvement program of commercial crop	The project comprises i) distribution facility improvement, ii) distribution system improvement, iii) strengthening capacity of operation of cooperative and medium and small enterprises.	TA	7.0
4	Promotion	Fertilizer Promotion program	The project comprises i) create a soil diagnostic kit for field trials, ii) implement the baseline survey of the target area, iii) for proper fertilizer usage, implement the workshop of dissemination responsible for extension workers, iv) to implement training for farmers on proper fertilizer usage, v) monitoring and evaluation of farmers who have received training and vi) implement field training as field day.	TA	6.1
5	Export	Specialty coffee export promotion project	The project comprises, i) Formulation of specialty coffee branding strategy and making action plan, ii) implementation of training about getting certification and cupping etc. in Japan and Kenya, iii) implementation of promotional activities by the local media, etc iv) Implementation of trial promotions and visit of exhibitions in each country.	TA	5.2
6	Export	Tea brand development program of Tea	The project comprises, i) Formulation of tea branding strategy, ii) Making action plan and support of various guidelines Manual, iii) implementation of promotional activities by local media, etc iv) Implementation of trial promotions and visit of exhibitions in each country.	TA	5.2
7	Export	Flower export promotion program	The project comprises i) implementation of training getting certification for export to Japan, ii) implementation of promotional activities by the media, etc iii) Implementation of trial promotions and visit of exhibition in each country.	TA	5.2
8	Livestock	Value chain of livestock development pilot project	The project is conducting pilot project as following items i) improvement of productivity of meat, ii) increased production of fodder for feedstuff, iii) conduct technical transfer on breeding and building breeding centers and iv) implementation of training about getting certification.	DBB /PPP/ TA	17.4
9	Irrigation	Mwea Irrigation project	The project comprises construction of new irrigation system, rehabilitation of existing irrigation system and technical cooperation in agriculture. Irrigation area will be turned from 7,860ha to 16,920ha by this project.	DBB	114.6

Source: JICA Study Team

Following figure illustrates the location of the Suggested Projects/Programs.



Source: JICA Study Team

Figure 4.4.10: Location of Suggested Agriculture and Fishery Sectors Development Projects in Kenya

The implementation plan of the suggested projects is prepared as illustrated in Figure 4.4.11. The implementation plan was prepared considering the following priority criteria; 1) projects whose D/D or F/S were completed implying that the Kenyan side put higher priority on these projects (No.9); 2) projects that can start immediately by input of technical training or expert dispatch and projects whose value chain already exists (No.5,6 and 7); 3) projects whose preparation survey including D/D or F/S needs long time (No.1,2,3,4 and 8).

No.	Name of Project/Program	Implementation schedule														
		Short term					Midium term					Long term				
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1	Agricultural financing improvement program															
2	Food processing hub development program															
3	Distribution improvement program of commercial crop															
4	Fertilizer Promotion program															
5	Specialty coffee export promotion project															
6	Tea brand development program of Tea															
7	Flower export promotion program															
8	Valuechain of livestock development pilot project															
9	Muwea Irrigation project															

D/D or F/S Implementation

Source: JICA Study Team

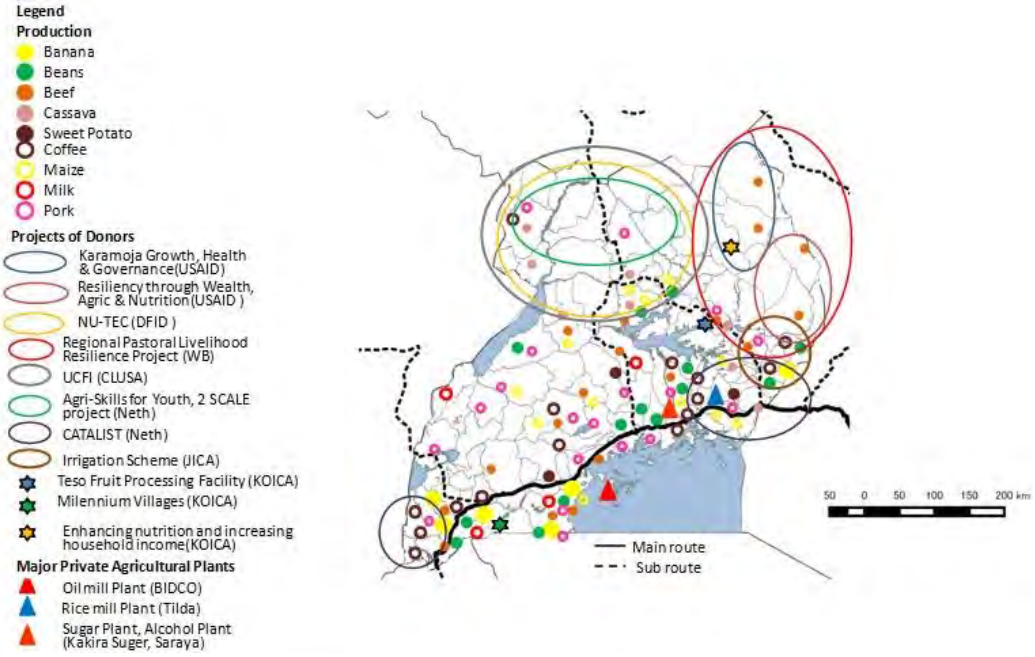
Figure: 4.4.11: Implementation Plan of Suggested Agriculture and Fishery Sectors Development Projects in Kenya

4.5 Agriculture and Fishery Sectors Development in Uganda

4.5.1 Overview of Current Status

The agricultural sector in Uganda comprises of crop cultivation, fishing, livestock production and forestry. The sector is still dominant in Uganda, especially in terms of employment, and therefore is a high priority area in the government's National Development Plan. Agriculture is still the main industry of the Ugandan economy. It contributed about 24.4%, of the total GDP in 2011/2012 and also provides 71.9% of employment. Most industries and services in the country are also dependent on this sector.

Almost all the land area is suitable for agriculture. Produce from the suburbs of Kampala are exported to South Sudan and Kenya through the northern economic corridor. Stockbreeding is performed over the whole area. Production areas for major crops, projects area of major donors and major private agricultural plants are shown in the figure below.



Source: JICA Study Team

Figure 4.5.1: Production Areas for Major Crops, Projects Area of Major Donors and Major Private Agricultural Plants

Fishery and forestry production are not included in the figure because fishery is carried in water bodies while forestry production is very small.

4.5.2 Assessment of Potential Products

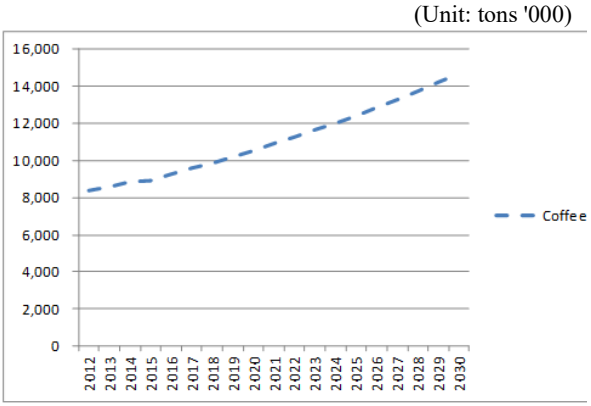
It is considered that potential products in Uganda are categorized as follows:

1) Products with existing value chain to export markets that are expected to increase by expansion of production area. Increased value addition will further increase export volume resulting in more export earnings.

2) Current imports are as a result of shortage in domestic production. In future domestic consumption demand is expected to increase with population growth. Particularly with Uganda, some of the products that originally came from Mombasa currently are produced in Uganda, this reduces the logistics westwards. By changing to produce in Uganda, this has the effect of increasing the logistics eastwards.
3) Production that contributes to value addition to the local economy.

Preliminarily it can be highlighted that coffee, tea, tobacco, maize, fish, cocoa beans, plant cuttings (flowers), oil seeds, dried leguminous vegetables (beans) are the most important agricultural primary products for Uganda. Among these products coffee and Oil seed are picked as potential products for category 1), palm oil and rice is picked as potential products for category 2), meat production and Maize are picked as potential products for category 3). Demand of dairy products has been expanding with growth of the population, and it may be expected that the trend will continue. But for dairy products since EU abolished milk quotas (EU previously restrained surplus production of raw milk by setting up the production upper limits for the raw milk in every area till March 2015.), it is expected that import volume from the EU will increase. It is a challenge for dairy production in Uganda to compete with imports from EU since the abolition of the milk quotas. As a result, dairy production is eliminated from Key Growth Drivers of Uganda.

As for category 1), demand for coffee is likely to rise in future according to the International Coffee Organization. Projection of the world consumption of coffee is shown below.



Source: JICA Study team based on the data of International Coffee Organization and FAO

Figure 4.5.2: Projection of the World Consumption of Coffee

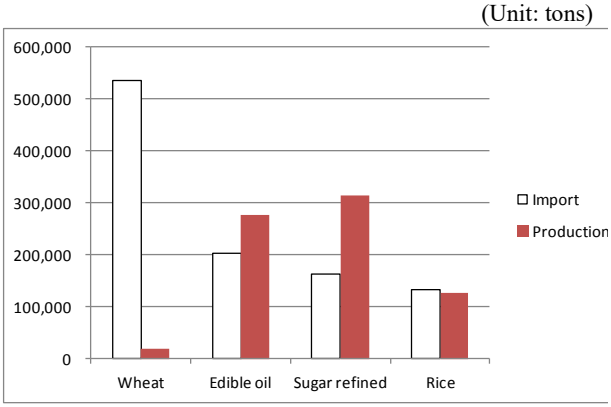


Figure 4.5.3: Amount of Production and Import of Major Import Crops in Uganda (2012)

4.5.3 Analysis of NEC-Key Growth Drivers

Strengths and opportunities of each key growth driver are follows.

(1) Coffee

World demand for coffee is also assumed to be growing in China, India and Latin America. With the increasing population in these countries, their cuisine culture continues to be westernized. Just like tea, Uganda already has a value chain for exports to India, China and Latin America. The already established value chain of exports places Uganda at a more advantageous position over other Coffee producing countries. Also in Uganda, organic Arabica coffee can be cultivated and processed to produce high quality coffee referred to as “special coffee”. The demand of “special coffee” is nowadays on the increase. Uganda has more advantage over countries cultivating Robusta coffee because of its high quality organic Arabica coffee.

For agricultural development, land is a big issue. Plantation development encountered difficulties and development approach has shifted to accumulate small farmers. In coffee industry, the Government promoted accumulation of small farmers and organizing farmers’ association. As a result, there exists some big federation like National Union of Coffee Agribusinesses and Farm Enterprises (NUCAFE), and also some investors who developed such a federation, for example The Good African Coffee. Such federation and private company own processing facilities, so they can add value to the products. From such a situation, Coffee can be a Key Growth Drivers in Uganda.

(2) Oil Seed (Sesame)

World demand for Sesame is also assumed to be growing especially in China. In the past China exported big amounts of sesame but now imports it. As people’s livelihoods improve they become more interested in food which is essentially healthy. In China middle class population is increasing and so the demand for sesame is expected to continue increasing. Sesame cultivation needs to be done not mechanically but manually. In Uganda, there is history of sesame cultivation and cheap labor. It is strength to have value chain to China, Korea and Japan, which are major world consuming countries. From such condition oil seed (sesame) can be Key Growth Drivers in Uganda.

(3) Palm Oil

Global demand for edible oils is increasing as a result of the world's rising population and improving economic conditions among developing countries. The Oil Palm is a highly productive source of Oil. For this reason, it has become the prime source of vegetable oil for many tropical countries and constitutes thirty-four percent of total edible oil production worldwide.

Agricultural land is an issue in palm industry. However, the Government initiated the Kalangalae Oil Palm Project under PPP arrangement which has been successful for the last 20 years. There are world class plantation management practices that are being utilized in this project. Uganda

will achieve self-sufficiency in palm oil production. From such a condition Palm oil can be a Key Growth Driver in Uganda.

(4) Rice

The demand for rice in Uganda is assumed to be increasing in future as the population grows. Uganda has a potential of about 202,000 ha irrigable area. Although currently Uganda is a net importer of rice, locally produced rice can replace imported rice by improving irrigation facilities, storage, underground water resource utilization and innovative management technologies and also branding with consistent quality, and readily available on the market. In such a situation Tilda Uganda Ltd and other mid-small entrepreneurs have interest in Rice industry and started investment. From such a condition Rice can be Key Growth Drivers in Uganda.

(5) Maize

Maize is an important cereal food crop. The market opportunity is both domestic one and also Kenya and South Sudan who are always faced with chronic maize deficits. That is why a bigger percentage of Uganda's maize that is traded ends up in the export markets, especially in the EAC and COMESA partner states of DR Congo and South Sudan particularly for the latter. Maize is primarily used for food and animal feeds production. These two uses, to a larger extent, shape the production, consumption and trade patterns of the grain in Uganda and the region. EAC partner is also categorized as a food-deficit country with more than 40 percent of its 44 million people living in chronic food-deficit regions. From such a condition the demand of Maize is assumed to be increasing and Maize can be a Key Growth Driver in Uganda.

(6) Meat production

Beef is the most important source of meat for human consumption and there has been increasing national demand for beef as a result of population growth, change in tastes as well as economic growth. However, according to FAO the per capita consumption for all meat was only 12.1 kg far from the FAO and WHO recommended 50 kg. This consumption is very low and there is huge consumption demand in order to satisfy the domestic demand in addition to the EAC countries. Government also developed the 2003 meat policy with a mission to satisfy the national meat requirements, contribute to food security and increase farmers' incomes. From such a condition, Meat production can be a Key Growth Driver in Uganda.

4.5.4 Development Scenario of Key Growth Drivers

(1) Coffee

Projection on production amount was calculated based on data of production area and yield of 2010-2014. Growth rate of production and production area is very low. However, on the eastern area of Uganda, the average yield is higher, 1.64 ton/ha. Therefore 1.64 ton/ha is to be the target yield in 2030. Currently, the yield growth rate is 6.3%. The yield for each year is calculated with this growth rate. Expected Production of 2015, 2020, 2025, and 2030 were calculated based on the production area and the yield.

Table 4.5.1: Production of Coffee

	2010	2011	2012	2013	2014
Production Area (000 ha)	320	270	320	310	312
Production (000 ton)	211.7	195.8	166.9	191.3	186.1
Yield (ton/ha)	0.614	0.612	0.618	0.598	0.600

Source: FAOSTAT and UGANDA CENSUS OF AGRICULTURE 2008/2009

(2) Oil Seed (Sesame)

Projection on production amount was calculated based on data of production area and yield of 2010-2014. Almost every area has 2-times cropping potential a year. However, they cultivate sesame once a year. The average yield is 0.65 ton/ha and so twice the yield, 1.30 ton/ha is to be the target yield in 2030. At the time the yield growth rate is 4.2%. Yield of each year is calculated with this growth rate. Production area of target year is used average of 2010-2014.

Table 4.5.2: Production of Oil Seed (Sesame)

	2009	2010	2011	2012	2013
Production Area (000ha)	178	184	216	124	124
Production (000ton)	292	280	283	207	207
Yield (ton/ha)	0.61	0.66	0.76	0.60	0.60

Source: FAOSTAT

(3) Palm Oil

Projection on production amount was calculated based on data of production area and yield of strategy plan of Bidco Ltd. Their yield is 3.74 ton/ha. Bidco's future target production area is 100,000 ha. In the first phase from 2003 to 2015 they achieved 11,000ha development by PPP. In the second phase they set out 30,000ha for development in the next 10 years. Projected production area of 2015, 2020, 2025, and 2030 were calculated based on the production area and the target yield.

Table 4.5.3: Production of Palm Oil

	2009	2015	2025
Production Area (ha)	10,695	11,000	41,000
Production (ton)	40,000	41, 140	153, 340
Yield (ton/ha)	3.74	3.74	3.74

Source: JICA Study Team based on hearing with Bidco Ltd.,

(4) Rice

Projection on production amount was calculated based on Uganda National Rice Development Strategy (UNRDS) issued in 2008. According to UNRDS, Uganda targeted to achieve rice self-sustenance by 2013. However, that was not achieved and so projection on production amount in 2030 is to be the same as expected consumption volume. The expected consumption volume was calculated based on the population projection data which was prepared by JICA Study Team. According to UNRDS, the consumption figure per person is 8 kg.

Table 4.5.4: Rice Consumption

	2015	2020	2025	2030
Population	35,756,800	40,455,308	47,093,905	55,065,635
Rice consumption (ton)	286,054	323,642	376,751	440,525

Source: JICA Study Team based on Uganda National Rice Development Strategy (2009)

(5) Maize

Ugandan Maize production is shown in table on the right. CAGR of production 2010-2014 is 4.83%. Expected Production of 2015, 2020, 2025, and 2030 were calculated based on the CAGR.

Table 4.5.5: Production of Maize

	2010	2011	2012	2013	2014	CAGR
Production (000 ton)	2,374	2,551	2,734	2,748	2,868	4.83%

Source: STATISTICAL ABSTRACT 2015

(6) Meat Production

Ugandan Meat production is shown in the following table. CAGR of production 2010-2014 is 3%. Expected Production of 2015, 2020, 2025, and 2030 were calculated based on the CAGR.

Table 4.5.6: Production of Meat

(Unit: 000 ton)

	2010	2,011	2012	2,013	2014	CAGR
Beef	180,300	185,709	191,280	197,019	202,929	1.03%
Goat/Mutton	33,619	34,627	35,666	36,736	37,838	1.03%
Pork	19,669	20,259	20,867	21,493	22,138	1.03%

Source: Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), and Uganda Bureau of Statistics

Based on the above condition, projection on production of key growth drivers are as shown in the following table.

Table 4.5.7: Production Projection of Key Growth Drivers

(Unit: 000 ton)

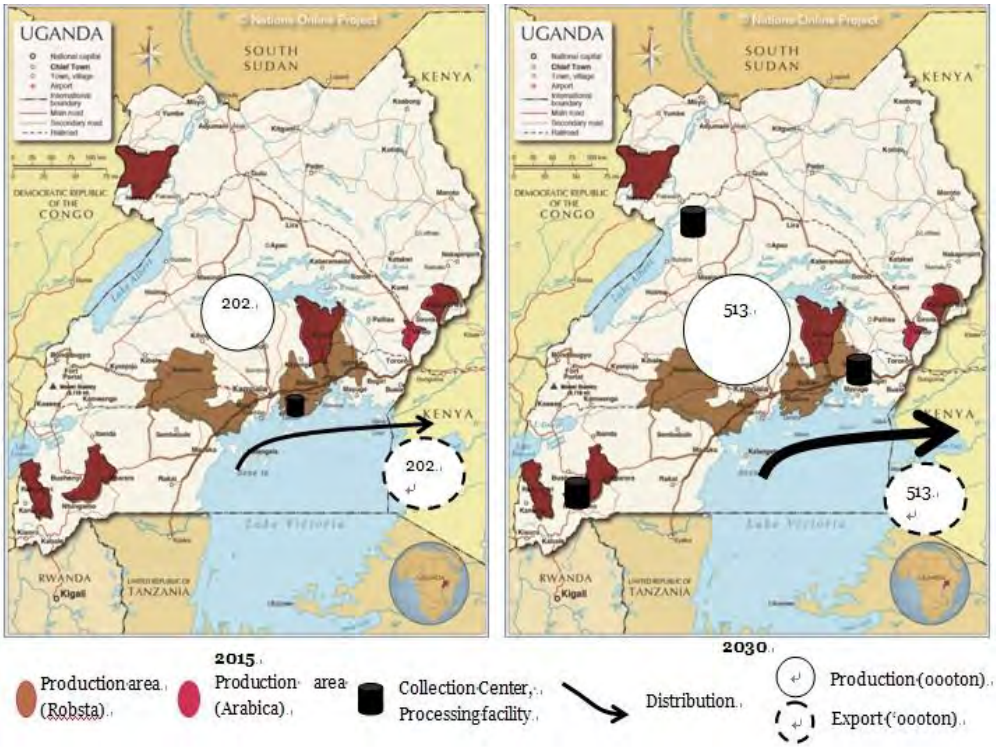
	2015	2020	2025	2030
Coffee	202.6	276.2	376.7	513.7
Oil Seed (Sesame)	179	220	270	330
Palm Oil	41. 1	97. 2	153. 3	209. 4
Rice	193	254	334	440
Maize	3,007	3,808	4,823	6,109
Meat Production	270.8	309.8	352.5	403.8

Source: JICA Study Team

4.5.5 Necessary Interventions with Priorities

Challenges for achievement of production projection along with the value chain of each growth drivers and necessary intervention are as follows.

(1) Coffee



Source: JICA Study Team

Figure 4.5.4: Flow of Coffee in 2015 and 2030

Challenges for coffee value chain are summarized in the following table.

Table 4.5.8: Challenges for Coffee Value Chain

Production	Collecting/ Storage/ Transporting	Processing/ Packaging	Marketing/ Export
Very low yields.	There is no traceability system.	Almost all coffee is exported as raw beans.	Production area has not become a brand.

Source: JICA Study Team

Necessary interventions for coffee industry are as follows;

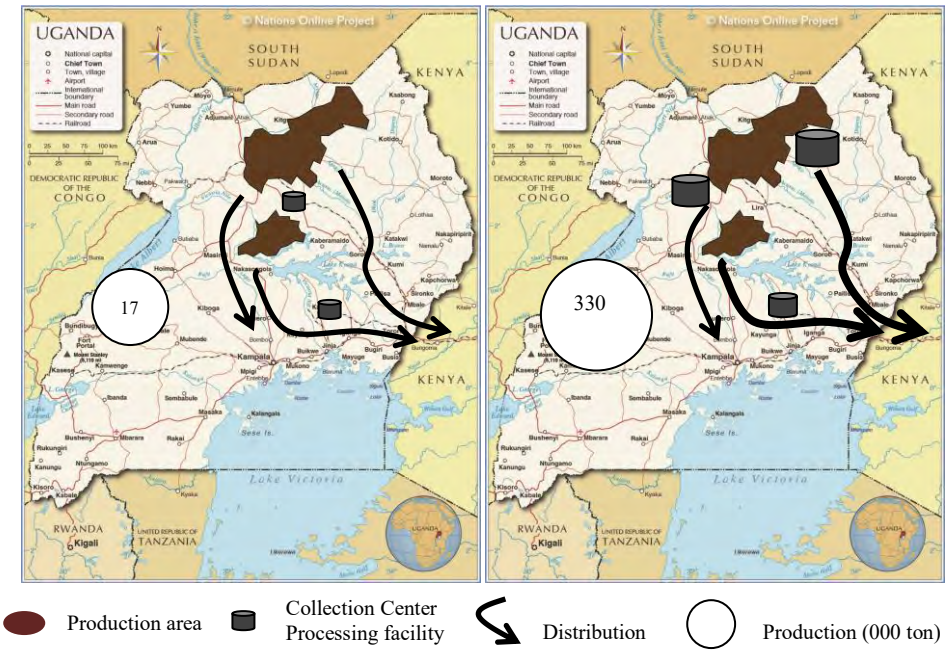
1) Promote productivity; give technical assistance on farming methods for example use of fertilizers, giving proper financial assistance and also post-harvest processing. There are several ways of processing coffee; washed, un-washed and pulped natural among others. A number of processing methods should be introduced in order to meet diverse demands of buyers.
2) Assist to develop new market, fair-trade, organic and traceable products etc. by matching between producers and buyers. The 1st Uganda National Coffee Festival and Exhibition was

conducted 2015 October by NUCAFE, (National Union of Coffee Agribusinesses and Farm Enterprises). Such like exhibition events should be done more.

3) Construct Collection Center, processing facility and logistics centers in the production areas. This will change the logistics in NEC in terms of increase in numbers of container movement to the East. Promote investment by creation of attractive investment environment. Several private companies will start operation of their factories and export value added coffee thereby boosting the coffee industry.

4) Promote domestic coffee drinking culture. In Uganda there is a tea culture but not so for. The government should take some promotion events to popularize coffee drinking.

(2) Oil Seed (Sesame)



Source: JICA Study Team

Figure 4.5.5: Flow of Oil seed (Sesame) in 2015 and 2030

Challenges for oil seed (Sesame) value chain are summarized in the following table.

Table 4.5.9: Challenges for oil seed (Sesame) Value Chain

Production	Collecting/ Storage/ Transporting	Processing/ Packaging	Marketing/ Export
No quality seeds. Farmers don't use fertilizers due to lack of good financing facilities. Land ownership is not clear.	Transportation cost is very expensive so farmers sell at their farm gate. Shortage of storage in production areas.	Almost all sesame is exported as raw seed.	Difficulty in meeting good buyer.

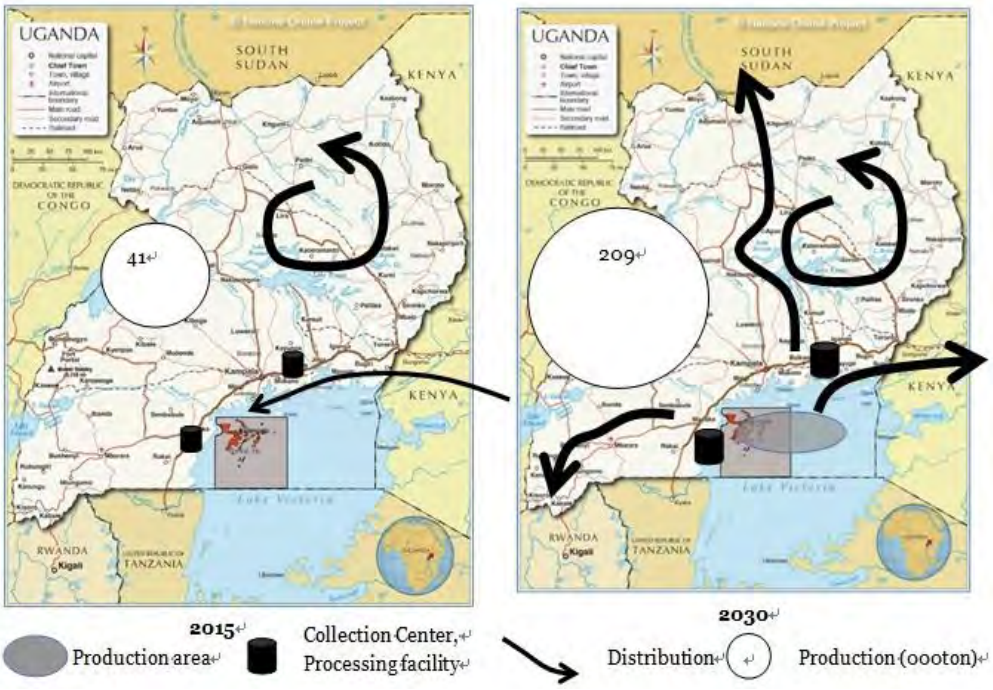
Source: JICA Study Team

Necessary interventions for Oil seed (Sesame) industry are as follows;

1) Develop good quality seeds and fertilizers for distribution to farmers by developing financial facilities.

2) Develop both farmers and farmer organizations to undertake cooperative delivery system.
3) Expand production areas by making clear land ownership especially in northern sesame high production area.
4) Matching between farmers who cultivate good quality pesticide chemical free sesame and buyer who think that pesticide free sesame is high value.

(3) Palm Oil



Source: JICA Study Team

Figure 4.5.6: Flow of Palm Oil in 2015 and 2030

Challenges for palm oil value chain are summarized in the following table.

Table 4.5.10: Challenges for Palm Oil Value Chain

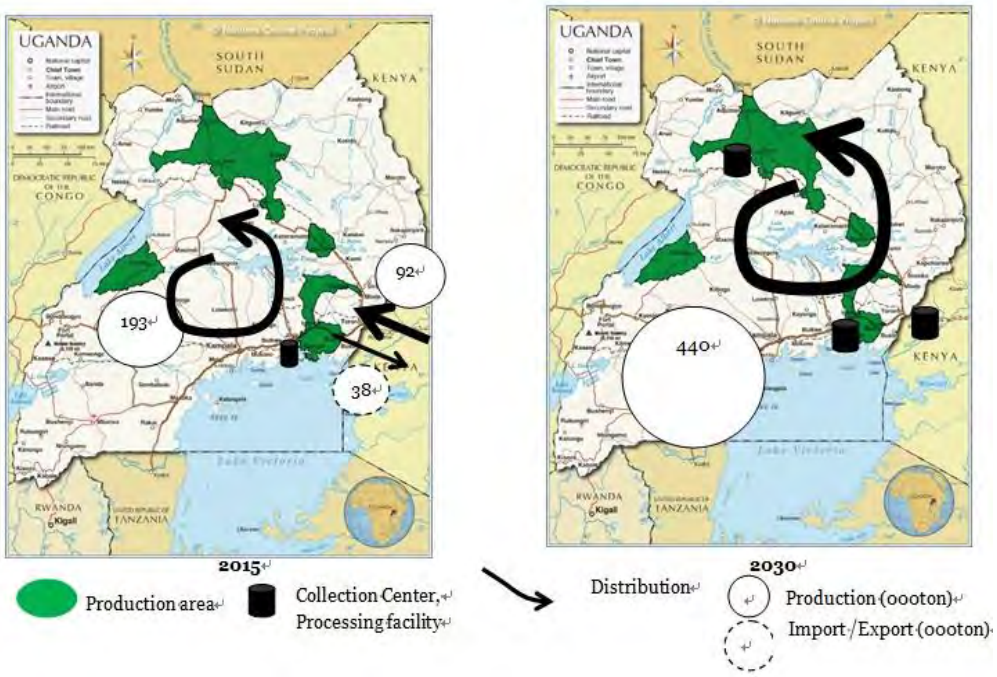
Production	Collecting/ Storage/ Transporting	Processing/ Packaging	Marketing/ Export
Long time needed for expansion of production area.	Unpaved feeder roads (From collecting facility to main road)	High fuel cost for processing machine.	-

Source: JICA Study Team

Necessary interventions for palm oil industry are as follows;

1) To develop feeder road and inland transportation by water. Palm oil production area is huge. Effective transportation will save transportation costs. Now fuel for factory is imported. To improve inland transportation by water is useful for saving factory operation cost. Domestic petroleum oil development is also useful in order to save the fuel cost for transportation.
2) Replicate good lessons learnt in Karangara to the other palm oil areas.

(4) Rice



Source: JICA Study Team

Figure 4.5.7: Flow of Rice in 2015 and 2030

Challenges for rice value chain are summarized in the following table.

Table 4.5.11: Challenges for Rice Value Chain

Production	Collecting/ Storage/ Transporting	Processing/ Packaging	Marketing/ Export
Shortage of Irrigation system. Low yields because of poor water use and not using fertilizer and quality seed. Farmers lack good financing facilities.	Farmer can't conduct cooperative delivery system because of poor cooperative power and facility.	Shortage of post harvesting facilities.	Production area has not become a brand.

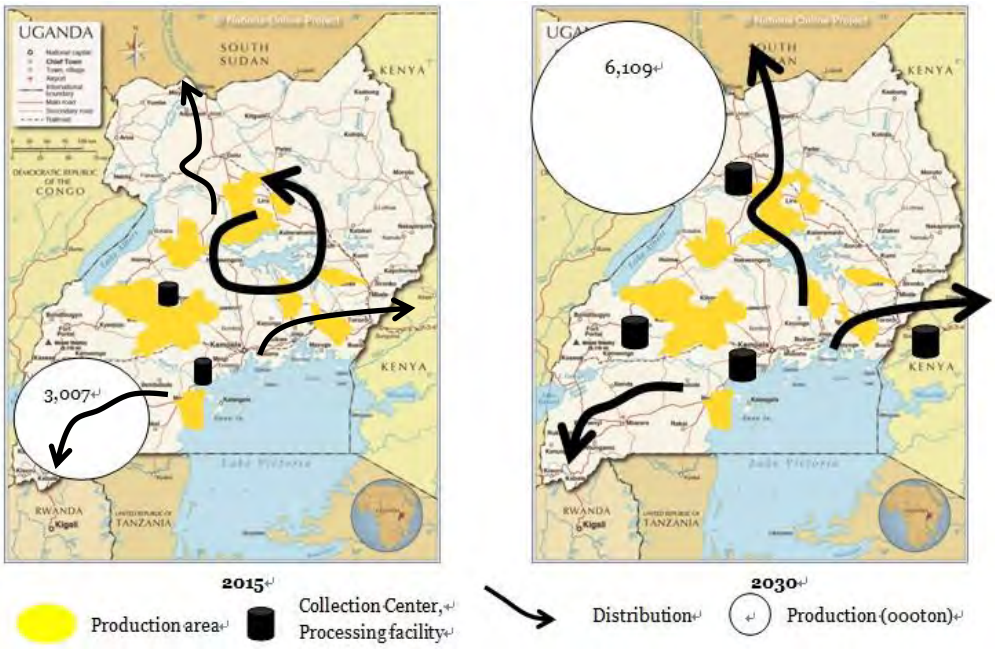
Source: JICA Study Team

Necessary interventions for rice industry are as follows;

1) Promote viable public private sector partnerships, to utilize private sector's technical assistance in order to improve farming systems,
2) Develop both farmers and farmer organizations to undertake production, processing and marketing of rice as an enterprise.
3) Expand and improve existing schemes together with development of upland and wetland areas will go a long way in increasing the area under production.
4) To develop clean certified seeds for distribution to farmers.
5) Develop land tenure system in the rice growing schemes to enable farmers access loans,
6) Introduce small-scale mechanization equipment and machinery while gradually shifting to large scale farming,

7) Develop public-private sector partnership and development partner collaboration in resource mobilization for its successful and sustainable implementation.
8) Promote investment by creation of attractive investment environment. Private companies to start operation of their factory and invest in development field. They will export value added rice. Such private companies will boost the Rice industry.

(5) Maize



Source: JICA Study Team

Figure 4.5.8: Flow of Maize in 2015 and 2030

Challenges for maize value chain are summarized in the following table.

Table 4.5.12: Challenges for Maize Value Chain

Production	Collecting/ Storage/ Transporting	Processing/ Packaging	Marketing/ Export
Shortage in Irrigation system. Low yields because of poor water use low use of fertilizers and quality seeds. Farmers lack access to good financial facilities.	Farmer can't conduct cooperative delivery system because of poor cooperative power and facility.	Shortage of post harvesting facilities	Production area has not become a brand.

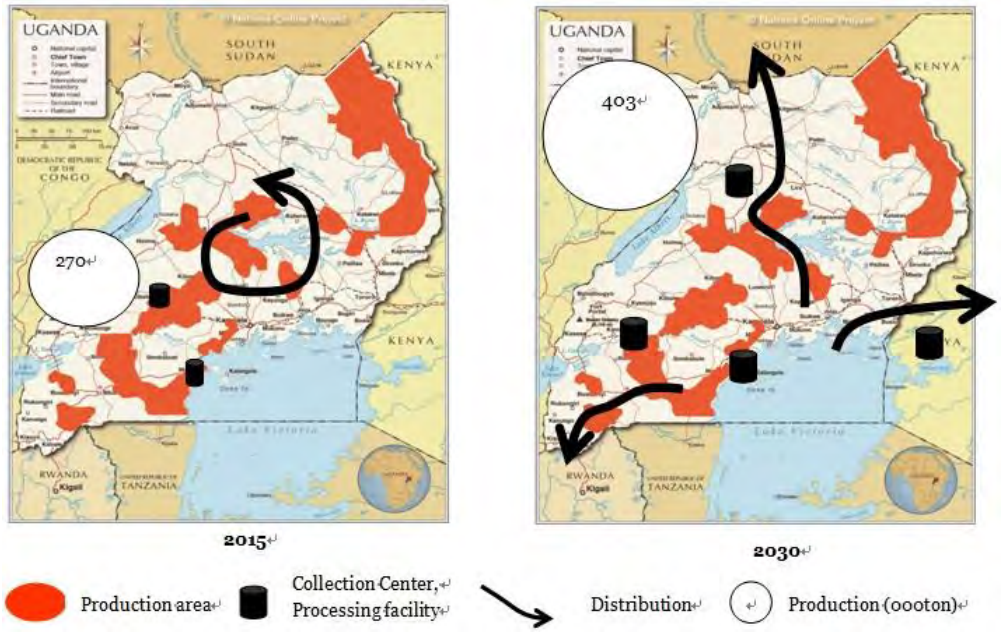
Source: JICA Study Team

Necessary interventions for maize industry are as follows;

1) Develop both farmers and farmer organizations to undertake production, processing and marketing of maize as an enterprise.
2) Develop feeder roads to reduce post-harvest loss. Effective transportation will save production cost.

3) Introduce small-scale mechanization equipment and machinery while gradually shifting to large scale farming.

(6) Meat Production



Source: JICA Study Team

Figure 4.5.9: Flow of Meat Production in 2015 and 2030

Challenges for meat production value chain are summarized in the following table.

Table 4.5.13: Challenges for Meat Production Value Chain

Production	Collecting/ Storage/ Transporting	Processing/ Packaging	Marketing/ Export
High cost of feedstuff. Difficulty in Hygiene control.	Insufficient cold chains High cost of Transportation	Shortage of slaughterhouses and processing facilities.	Difficulty in getting certificate for export

Source: JICA Study Team

Necessary interventions for Meat industry are as follows;

1) Develop Value chain, from production to processing and transportation with cold chain with the involvement of the private sector.
2) Support disease control and develop processing infrastructure,
3) Develop quality control standard for expansion of beef exports.

4.5.6 Suggested Projects/Programs and Implementation Plan

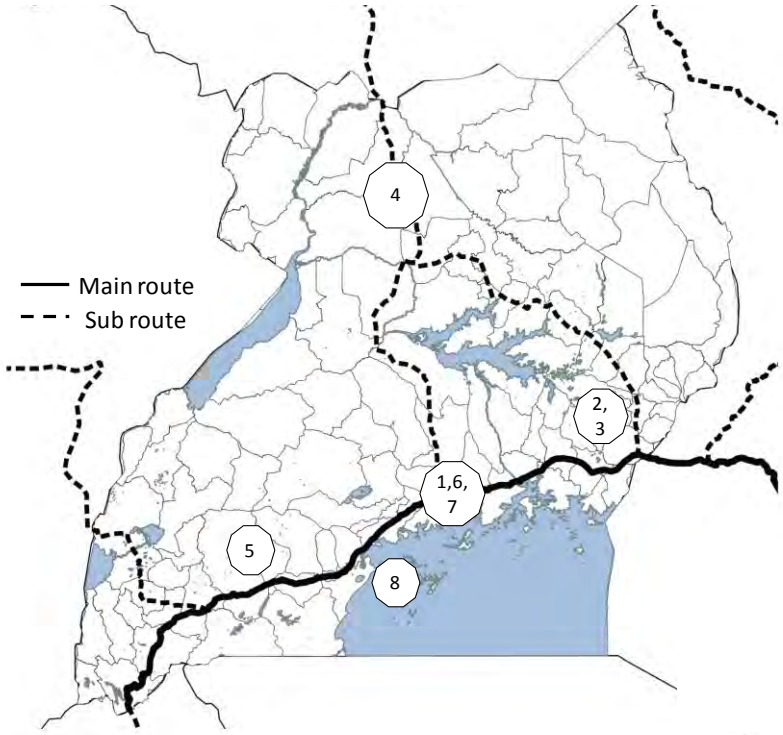
Based on the above condition the following projects and program are suggested.

Table 4.5.14: Suggested Agriculture and Fishery Sectors Development Projects in Uganda

No	Project type	Name of Project/Program	Project/Program Description	Mode of Execution	Cost (Million USD)
1	Organization	Agricultural union commercializati on support program	The project comprises i) promotion activities for small-scale farmers to join cooperatives, ii) provide training for agricultural cooperatives for strengthening organizations, iii) develop business plan and action plan, and iv) to formulate agricultural cooperative cluster and v) to monitor and evaluate the implementation of the business plans and develop future plans.	TA (Loan)	17.4
2	Facility	Irrigation Scheme Development project in Central and Eastern Uganda	The project comprises construction of new irrigation system, rehabilitation of existing irrigation system and technical cooperation in agriculture. Irrigation area will be turned from 5930 ha to 7890ha by this project.	DBB/ TA	76.8
3	Promotion	Fertilizer Promotion program	The project comprises i) to creation of a soil diagnostic kit for field trials, ii) to implementation of the baseline survey of the target areas, iii) for proper fertilizer usage, implementation workshop for dissemination to extension workers, iv) implementation of trainings for farmers on proper fertilizer usage, v) monitoring and evaluation of the farmers who received the training and vi) implementation of field training as field day.	TA	6.1
4	Promotion	Superior seed production enhancement projects for small sesame farmers support	The project comprises i) corporatization of farmers group, ii) dissemination of quality seeds, iii) modernization of agriculture, iv) improvement of distribution, v) improvement of financing facility and vi) promotion of branding of rice.	TA	7.8
5	Promotion	Maize promotion support program	The project comprises i) corporatization of farmers group, ii) disseminate quality seed, iii) modernization of agriculture, iv) improvement of distribution and v) improvement of financing facility.	TA	6.1
6	Export	Specialty coffee export promotion project	The project comprises, i) Formulation of specialty coffee branding strategy and making action plan, ii) implementation of training about getting certification and cupping etc. in Japan and Uganda, iii) implementation of promotional activities by the local media, etc, iv) Implementation of trial promotions and visit of exhibitions in each country.	TA	5.2
7	Livestock	Livestock processed products promotion program	The project comprises i) survey of existing condition of livestock processing facilities and hygiene control systems and regulations, ii) technical cooperation on strengthening modernization of processed goods production method and iii) capacity development on hygiene management.	TA	7.8
8	Industry	Kalangala PPP project (in a broad sense of the PPP project, the cultivation of oil palm and oil refinement)	The project comprises, i) to finance for smallholders, ii) implementation of training about palm cultivation, iii) to develop collecting system from farm gate to factory iv) to provide nursery plant and fertilizers and v) to purchase fresh fruit bunches.	DBB/PPP/ TA	94.0

Source: JICA Study Team

Following figure illustrates the location of the Suggested Projects/Programs.



Source: JICA Study Team

Figure 4.5.10: Location of Suggested Agriculture and Fishery Sectors Development Projects in Uganda

The implementation plan of the suggested projects is prepared as illustrated in Figure 4.5.11. The implementation plan was prepared considering the following priority criteria; 1) projects whose D/D or F/S were completed implying that the Kenyan side put higher priority on these projects; 2) projects that can start immediately by input of technical training or expert dispatch and projects whose value chain already exists; 3) projects whose preparation survey including D/D or F/S needs long time.

No.	Name of Project/Program	Implementation schedule														
		Short term					Midium term					Long term				
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1	Agricultural union commercialization support program															
2	Irrigation Scheme Development project in Central and Eastern Uganda															
3	Fertilizer Promotion program															
4	Superior seed production enhancement projects for small sesame farmers support															
5	Meize promotion support program															
6	Specialty coffee export promotion project															
7	Livestock processed products promotion program															
8	Kalangala PPP project															

D/D or F/S Implementation

Source: JICA Study Team

Figure 4.5.11: Implementation Plan of Suggested Agriculture and Fishery Sectors Development Projects in Uganda

4.6 Mining and Petroleum Sector Development in Kenya

4.6.1 Overview of Current Status

(1) General

In the past years in Kenya there has not been any significant consideration of the potential of metallic resources in the country. The recent discovery of mineral sand enriched with Titanium, Niobium and Rare Earth Elements (REEs) near Mombasa may direct change towards significant consideration of the potential of metallic resources in Kenya. In order to attract investors and mining operators, the Government of Kenya developed Kenya Mining Investment Handbook 2015 in partnership with UK Aid from the UK Government. Strategic development approach has been made in the mining sector to make Kenya a more attractive destination for investments, as shown below:

1) Establishment of the Ministry of Mining
Recognizing the importance of mining to the achievement of national development goals, the government established the first ever Ministry of Mining.

2) Acquisition of Data
The Ministry has intensified efforts to acquire mineral and geological data. A countrywide aero magnetic survey project is scheduled to be carried and completed by 2017. The contract to acquire the data has been awarded to the Chinese Geological Institute, a non-commercial and government body, which will work under the supervision of an independent panel that will ensure the quality of data acquired is up to international standards.

3) Formation of Mining Certification laboratory and Geo-Data Bank
The Ministry is pursuing international accreditation for mining certification for its laboratory in Kenya. The laboratory will provide qualitative mineral analytical services, certify minerals, and identify various precious and semi-precious minerals carry out research on mineral analytical techniques.

4) Mining Cadaster System
The Ministry has automated its mineral licensing system through the launch of an online mining cadaster portal. This system will increase efficiency and transparency in the grant of mineral rights and concession management.

5) Infrastructure Projects
Infrastructure development is a key economic pillar in Kenya's Vision 2030, the nation's development blueprint. These include:

- New Paved Roads Construction Project
- Mombasa Port Efficiency Project
- Standard Gauge Railway Project
- National Optic Fiber Project

- The Lamu Port and South Sudan Ethiopia Transport (LAPSSET) Project

(2) Mining Activities

Cement Industry: Kenya has sizeable deposits of limestone, marbles and dolomites mostly utilized in cement manufacturing and construction industries. Among the large cement manufacturers present in Kenya are Bamburi Cement (Lafarge Holcim Group) with an installed annual capacity of 2.1 million tons; East Africa Portland Cement Company (EAPCC) with 1.3 million tons, and Athi River Mining (ARM) with one million tons. Both Mombasa Cement and Savannah Cement have nearly 1.5 million tons of manufacturing capacity. Overall manufacturing capacity will be 5.9 million tpa in total in Kenya.

Soda Ash: Tata Chemicals Magadi Ltd. of India (formerly Magadi Soda Ash Ltd.) mined trona from Lake Magadi. Tata Chemicals Magadi increased production capacity at Lake Magadi to one million tpa in 2015. Part of Soda Ash is consumed domestically by glass producers and by ARM in the production of sodium silicate. Soda Ash is used in detergents, soaps, and chemical and metallurgical applications

Fluorspar: Kenya Fluorspar Company Ltd. (KFC) is one of the major established mining companies in Kenya and its fluorspar production capacity is 125,000 tpa at its Kimwarer Mine, near Eldoret. The product is mostly exported to India and Europe.

Kwale Mineral Sand Project: Kwale is located 10 km inland from the coast and 50 km south of Mombasa. The Kwale mine is estimated to have reserves of 140 million tons of Titanium ore and produce 4.6 million tons of final products for sale. The project commenced production in late 2013 with a mine life of 13 years. Over the first six years, production is expected to ramp up to produce an annual average of 80,000 tons of Retile, 330,000 tone of Ilmenite and 40,000 tone of Zircon.

Mrima Hill Project: The Mrima Hill Mine is a world class niobium and rare earth resource in Kenya, located 70km southwest of Mombasa. The license was granted on a 21-year Special Mining License to Cortec Mining Kenya Limited, a private company incorporated in Kenya. In March 2015 the government has announced based on the court order that no private firm or individual will be allowed to explore minerals at Mrima Hills in Kwale County. The contentious exploration business of the niobium and rare earth metals at Mrima Hills will be done by the State through the National Mining Corporation which is yet to be formed.

Gold Mine Projects: Most of Kenya's gold productions come from artisanal miners in Nyanza, Rift valley and Western Provinces. Goldplat plc of South Africa has started producing gold at the Kilimapesa project in Jan 2012, as Kenya's first gold mine commissioned since independence in 1963. Kilimapesa has a JORC-compliant resource of 8,715,291 tones at 2.40 g/t Au for 671,446oz of gold at a cut-off grade of 1 g/t of gold for all categories. Acacia Mining Project comprises

2,800km2 of the Ndori Greenstone Belt in west Kenya, which has a significant potential for gold, as well as copper, lead and zinc. Acacia Mining focuses on three primarily locations where potential gold systems and base metals deposits may exist.

Coal Exploration: Coal deposit was confirmed in the area of Mui sedimentary basin where general geological survey was carried out in 1940s. In order to explore affordable domestic energy resources, Ministry of Energy and Petroleum started coal exploration and divided the area into four blocks and put them to an international tender. According to a media report, Concession Agreement for block C and D was signed with Fenxi Mining (China) in 2011, and Fenxi Mining would pay the government 3 million US dollars for Block C and 500,000 US dollars for Block D, in return for a renewable concession of 21 years. It also allows the government to have an 11 % participation in the project, sharing gross revenues at a rate of 23.6 % for Block C and 21.1% for Block D. The concession will be developed together with a local joint venture partner, Great Lakes Corporation. 400 million tons of coal reserves have been identified in Block C. Further tender rounds are planned for 31 blocks, covering all over the Kenya.

(3) Petroleum Sector

Oil and Gas Discovery: To date, 41 acreages are leased out based on Product Sharing Contract (PSC) with 21 companies. In 2012, Africa Oil with partner Tullow Oil Plc announced successful results from the Ngamia-1 exploration well on Block 10BB, which was the first exploration well at Lokichar Basin in the Tertiary Rift Area which is an extension of the productive trend established in the Lake Albert basin of Uganda. To date, more than 1 billion barrels of recoverable oil has been discovered at Block 10BB and 13T. 1 Tcf of natural gas was discovered at Block 9 in Anza Basin where provides exposure to the Cretaceous Rift system and productive in Sudan. 750 Bcf of gas is also discovered in Lamu Basin (offshore)

Petroleum Master Plan: On the discovery of oil in Lokichar basin in 2012, the Ministry of Energy and Petroleum approached World Bank for assistance to review regulatory and legal framework, and intensify capacity building In pursuant to the discovery and development of the oil and gas sector. In 2015, formulation of comprehensive report on development of oil and gas sector in Kenya was completed and published as" Toward a Petroleum Master Plan 2015".

Crude Oil Export Pipeline: Dispute on routing of the crude oil pipeline appears to come to an end in Kenya. A joint communiqué from both Kenyan and Ugandan Governments was issued on 10 August 2015, stated that "the two Heads of State agreed on the use of the Northern Route i.e. Hoima-Lokichar-Lamu for the development of the crude oil pipeline." The pipeline is the longest heated pipeline in the world at an estimated length of 1335 km.

4.6.2 Assessment of Potential Products

Potential mining and energy products which contribute economic development of NEC are considered as follows:

Coal: Coal is a very basic affordable industrial fuel used for power generation, cement industries, and other energy intensive industries such as bricks and ceramics. Kenya has used imported coal, mostly from South Africa, however, this situation will change. Kenya will be a coal self-sufficient country in a few years' time. Identified coal reserve in Fenxi Mining Block C is 400 million ton and quality of the coal is classified as semi-bituminous. Agreement on Mining License was in place and Resettlement Action Plan is in progress.

Crude Oil: Confirmed recoverable oil reserve to date is more than 1 billion barrels from Lokichar basin in the Tertiary Rift Area. The produced oil will be exported via pipeline from Hoima, Uganda, to Lamu, Kenya, which was given green right following a state visit to Uganda by the president of the Republic of Kenya in August 2015. The project is expected to be operational in 2020. Kenyan Government is planning to build oil refinery in Lamu to supply product oils to domestic market and also export to LAPSSET countries via. Pipeline.

Natural Gas: Natural gas can be used for power generation but more importantly it is a very valuable feed stock for Urea production and its intermediate product of Ammonia. These makes important component of fertilizer. Kenya is importing one million tons of fertilizer annually, but this situation can be changed. Considering growing food requirement in African countries, demand for fertilizer will grow, and domestic urea production will be justified. Natural gas is also used for methanol production as well as a use as an industrial fuel.

Soda Ash: Kenya is one of the major Soda Ash exporting countries in the world. Production capacity is 1 million tpa and most of the products are exported. Glass manufacturing is one of the area where Soda Ash is used. Introduction of natural gas will allow the country to manufacture sheet glass domestically to meet the growing demand in the construction sector. Further growth is expected due to a change of architectural style of office buildings and more glass is used. Soda Ash is also used to manufacture detergents, soaps, and other chemical products. Once the market grows to a sizable scale, domestic production will also be viable.

Niobium and Rare Earth Elements: Niobium is a kind of rare metal and Brazil alone reserves majority (96% to date) of the world niobium resources. The Mrima Hill Mine is a newly emerged world class niobium and rare earth mine in Kenya. The development of the niobium and rare earth metals at Mrima Hills was taken over by the State and will be owned and operated by a National Mining Corporation which is yet to be formed. Kenya will be a major player in the world niobium market.

Iron Ore-Base Metals: Iron ore was discovered in the Nyanza, Central and Coast Region. Steel industry is different from other base metal industries. Steel is not a product of purified iron, but alloyed with carbon and other minor elements. Composition of these minor elements will differ from purpose to purpose of use. Heat treatment is also very important process to make the product marketable. Huge amount of investment is required to construct steel making facilities and huge amount of coking coke or natural gas will be used as a reducing agent, significant amount of pure oxygen is used for converters. Sizable electric power plant is required to supply the power to electric furnaces. More importantly end product need to be competitive in the international market. Steel manufacturing facility in Kenya may not be economically viable without significant domestic demand such as ship building and/or car manufacturing industry.

Titanium: Kwale Mineral Sand Project has started production of titanium ore since 2013. Production rate will ramp up to about 6% of world production and deplete in 13 years. Titanium exists on earth abundantly but mostly at low concentration. Kwale Mineral Sand Project will be able to procure higher concentration of ore. Production process of the titanium Ingot is sophisticated and requires significant investment. With 13 years of mine life, invest in ingot manufacturing facility in Kenya will not be economically viable. Titanium production will be an economic growth driver in short term but not long term in the country.

4.6.3 Analysis of NEC Key Growth Drivers

Key NEC Growth Driver will be: Crude Oil, Natural Gas, Coal, Soda Ash and Niobium.

(1) Crude Oil Pipeline Project

Crude oil produced in Kenya will be transported by a crude oil pipeline to Lamu for export or refining. Crude oil from South Sudan will also be connected at Lokichar. Expected production rate from Kenyan oil field is 100,000-120,000 bpd. This will bring Kenya sales revenue of USD2,190 million/yr at USD60/bbl base. The revenue will offset the expenditure for oil products in 2020.

(2) Oil Refinery Project

The oil pipelines and refinery are a major component of the LAPSSET Corridor project. The refined products pipeline from Lamu to the North Eastern part of Kenya and Ethiopian will ease the current reliance on Mombasa for refined products to the North of the country and thus potentially reduce the cost of refined products across the region. Extensive feasibility study will be required to justify the construction of refinery in Lamu and also alternatively regional micro refinery may also be studied to minimize the infrastructure investment.

(3) Natural Gas

With natural gas available, Kenya will be able to manufacture Urea and Ammonia by itself. Domestic production of Urea will contribute to the security of food production in the country. Introduction of natural gas will also benefit general manufacturing industries, in addition to power industry.

(4) Coal

Coal plays very important role in power sector and also cements industries. Rail infrastructure must be constructed from mine site connected to a main railway system to deliver the coal to cement industries and other potential industries including coal power plant. It is important to plan coal based power plant in Mombasa area as an anchor customer, and if practical, replacing the idea of constructing LNG power plant with a capacity of 700 MW. Kenyan Government is planning to construct large scale coal fired power plant in Lamu Industrial Area using imported coal from South Africa. To receive coal, large scale port facilities and coal terminal will also have to be constructed together with the coal power plant.

Domestic coal has been discovered in Kitui County in Kenya and potentially available for power generation once infrastructure is constructed from Kitui to Lamu. To develop initial phase of the coal mine, coal users should be identified as anchor customers and associated transportation infrastructure should be constructed.

Kenyan Government needs to set policy in prioritizing the energy choice, i.e., import or domestic to avoid infrastructure redundancy.

(5) Soda Ash

It is reported that Soda Ash production has been slowdown for the last few years due to a contamination by soil erosion during rainy season. Tree plantation programs are underway to protect the mine (Lake Magadi) from erosions to maintain quality of Soda Ash product and its production rate. Glass is one of the promising products in Kenya which can be manufactured by domestically available materials. Glass products are heavy and bulky, and it is advantageous to manufacture locally. Natural gas is an important heating medium for manufacturing glass products. Marketing of domestically produced soap and detergent should also be considered.

(6) Niobium

Kenya will be a major supplier of niobium to the international market. Demand of niobium is expected to grow with the growth of steel product, electronic devices and the development of electric vehicles. Japan is one of the major niobium importers in the world and suggested to

communicate with Japanese trading companies and steel manufacturing companies to gain shares in the market.

4.6.4 Development Scenario of key Growth Drivers

(1) Crude Oil Pipeline and Export

Kenya has a plan to use its indigenes crude oil for own refinery at Lamu, otherwise export. Planned production rate will be some 100,000-120,000 bpd. The crude oil pipeline from the Hoima in Uganda to Lamu is expected to be operational by 2020. Further detailed feasibility study should be carried out to confirm the construction cost, project schedule, and overall economics. As part of the study, pipeline route to be finalized and Resettlement Action Plan should be prepared. ROW (right of way) need to be secured and plan for export terminal need to be firmed up. Project entity for pipeline project should be founded and finance should to be closed to start the construction work. There are numbers of options in the project. Development scenario is summarized in the table below.

Table 4.6.1: Development Scenario of Crude Oil Pipeline and Export in Kenya

2015	1) Study Agreement among Stakeholders
	2) Study Committee to be founded by Stakeholders
	3) Detailed Feasibility Study carried out
	4) Detailed Route Survey carried out
	5) EIA carried out
	6) ROW secured
2016	7) Resettlement Action Plan prepared
2017	8) Pipeline Operation Company founded
	9) Finance closed
	10) EPC Contractor decided
	11) EPC Work Started
2020	12) Commercial Operation start

Source: JICA Study Team

(2) Natural Gas Supply

Important infrastructure to make the natural gas valuable is pipeline. In order to extend the pipeline, anchor customer should be deployed at strategically important locations or where gas need to be delivered. Anchor customer includes fertilizer plant, power plant, methanol plant and/or Sponge Iron DRI plant.

Assuming that natural gas supply starts 2020, it should be delivered to the anchor customer at nearest strategic Location, i.e., Lamu. Fertilizer with a capacity of 1 million pta is assumed in Lamu in 2020. Pipeline will be further extended to Mombasa where additional 1 million tons of urea production capacity and also 700 MW of gas power plant are assumed in 2025. These become an anchor customer to justify the pipeline extension project. Delivery of natural gas to general industry including glass making industry will also start in Mombasa. In 2030, additional power

plant of 700 MW will be installed either in Lamu or Mombasa. Overall gas demand is assumed as on the right.

(3) Coal

Coal supply is assumed to start in 2020. Initial coal customer will be a power plant of 700 MW capacity in Mombasa or mine mouth coal power plant in Kitui. Coal is also delivered to cement industries. Estimated coal requirement in Mombasa and Nairobi for cement industries are 0.8 million tpa, if these operate at full capacity. Cement industry is growing at 8% annually and coal consumption will also grow. Power demand will increase at a higher rate than that of GDP in Kenya. One additional 700 MW power plant is assumed in Mombasa in 2025, and further 700MW power plant is assumed in Mombasa. Overall coal requirement is assumed as above.

Table 4.6.2: Natural Gas Anchor Customer Development Plan

(Unit: mmscfd)

Year	Urea Plant	Power Plant	Industry	Total
2020	80			80
2025	160	100	10	270
2030	160	200	20	380

Source: JICA Study Team

Table 4.6.3: Coal Anchor Customer Development Plan

(Unit: million tpa)

Year	Coal Power Plant	Cement	General Industry	Total
2020	1.8	0.8	0.1	2.7
2025	3.6	1.2	0.2	5
2030	5.4	1.6	0.5	7.5

Source: JICA Study Team

(4) Niobium

(5) Niobium is mined and produced in the only limited countries, and similarly, numbers of buyers are also limited. Acquisition of market share may not be difficult for new comers in view of supply security, and 30% of world market share in 2030 may be attainable. Assuming that world market of niobium as a FeNb equivalent is 80,000 ton with an annual growth of 2% annum, and the price level is the same level as that of 2012, estimated revenue will be as above.

Table 4.6.4: Niobium Production and Market Development Plan

(FeNb Equivalent basis)

Year	World Market (ton)	Kenya World Share	Kenya Niobium Production (ton)	Sales Revenue (USD million)
2020	80,000	10%	8,833	230
2025	88,326	20%	17,665	459
2030	97,520	30%	29,256	761

Note: FeNb Market Price at USD26/kg, @2012 by JOGMEC Mineral Resource Report, World Production Forecast by JOGMEC
Source: JOGMEC Data and JICA Study Team

(6) Soda Ash

Soda Ash is important ingredient for manufacturing glass and detergent and soap:

- Kenya is importing flat glass and grass wears, although most of the ingredients are self-sufficient. Glass making industry is energy intensive and requires low cost clean energy, i.e., natural gas. Once natural gas is available, flat grass manufacturing industry will be founded

in Kenya. Potential of flat glass market in East African countries are considered significant and will be a driver of economic growth of the country.

- Kenya is manufacturing detergents and soaps, and exporting 62,863 ton in 2013. This figure will increase due to an advantage of self-sufficient situation of these ingredients. Market of these products will mostly be East African nations where potential is considered the highest in the world.

4.6.5 Gap Assessment for Development Scenario

(1) Crude Oil Pipeline Project

Crude oil pipeline plays very important role in the economic development of the country. Feasibility study was undertaken at the hike in crude oil price of USD100/bbl. Expected tariff in the study was USD15.2/bbl compared with USD11.0/bbl for Great Nile Petroleum of Sudan Crude Oil Pipeline. Nature of the crude oil produced in Albertine Graben is waxy and highly viscous, and need to be heated to prevent plugging in the pipe. The pipeline is also designed as an international common carrier; and serves to transport mixture of different crude oils, from Uganda and Kenya, and in future from South Sudan and Ethiopia. Apart from the construction and operational issues, following issues should be agreed upon among the stake holders: (1) Financial Framework, (2) Operatorship, (3) Capacity Right Ownership, (4) Quality Bank. It is noted that Capacity Right refers to an allocated maximum capacity to each users of the pipeline and in case actual flow rate is below the allocated maximum capacity, the allowance can be rented out for others to use. The Quality Bank refers to a mechanism of penalty and/or compensatory payments to crude oil producers depending on quality of the crude they deliver in to the oil pipeline system.

(2) Refinery in Lamu

In general, refining industry is exposed to a tough international competition and refined product must meet the international standard. Nature of domestic crude oil may not necessarily be advantageous due to a higher residue contents. This leads to a heavier investment for cracking capacity, however, nature of low sulfur is advantageous due to a smaller investment for desulfurization capacity. Further feasibility study need to be carried out.

(3) Natural Gas Pipeline

In order to introduce natural gas, pipeline need to be installed. Size of the pipe is decided based on the consumption in terms of flow rate by strategic anchor customers. Anchor customer includes fertilizer plant, power plant, methanol plant, and/or Sponge Iron DRI plant. Anchor customers should be deployed strategically important locations or where gas need to be delivered. Framework of such plan should be prepared as part of master plan.

(4) Coal Transportation Infrastructure

Coal should be transported by rail. Rail branch line will be installed from coal mine to main rail way system. Coal transportation system including coal terminal should be studied further and location of coal power plant will need to be identified.

(5) Mineral Potentials

Large potential of mineral resources is developed in the carbonate formation in the west side of the country near the border with Uganda. This area can be developed in collaboration with Ugandan side based on some type of joint mining development agreement etc. for the benefit of both countries.

4.6.6 Necessary Interventions with Priorities

Potential projects which contribute to the development of NEC will be as follows:

1) Coal mine development and associated construction of railway branch line
   - Develop Coal Power Plant as anchor customers 2020
2) Natural gas development and associated pipeline construction
   - Develop Urea Plant Project as an anchor customer in Lamu in 2020
   - Develop Urea Plant Project as an anchor customer in Mombasa in 2025
   - Develop Power Project as an anchor customer in Mombasa/Lamu 2025/2030
3) Crude Oil Pipeline Project
   - Further study is necessary

Acquisition of land for ROW (Right of Way) will be a responsibility of the host government.

4.6.7 Suggested Projects/Programs and Implementation Plan

(1) Coal Transportation Infrastructure

Use of coal will not only be limited to power generation but also support basic industries such as cement, brick, glass and ceramic product manufacturing industries. Currently, the major potential users are located in Nairobi and Mombasa areas and therefore large bulks of coal should be transported to those destinations by rail.

Construction of a railway branch line from the main rail line, i.e., Mombasa to/from Nairobi, to the coal mines in Kitui should be listed as a top priority infrastructure project, considering the importance of domestic affordable energy resource in the country.

Feasibility study on the coal transportation system including coal terminals should be carried out sooner rather than later. Acquisition of ROW will be the responsibility of the Central and County

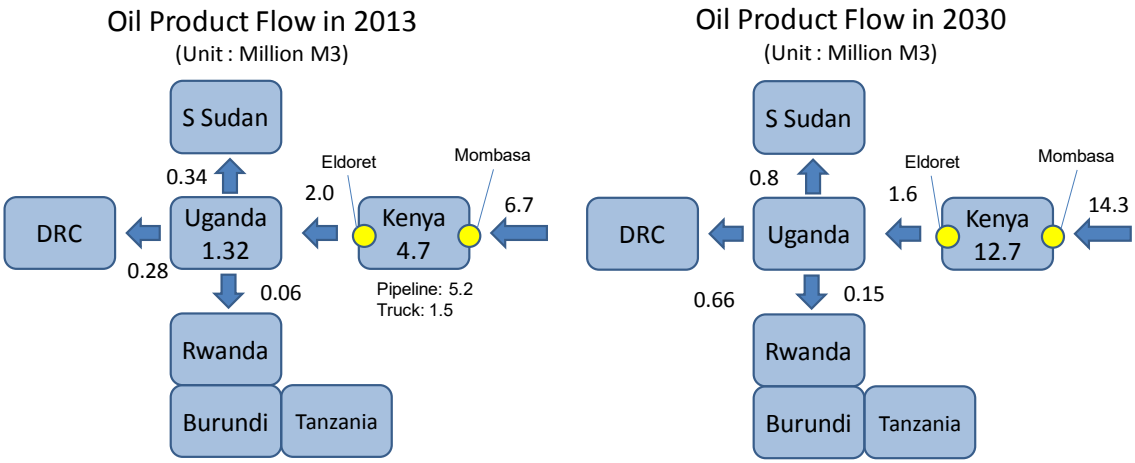
Government. Both levels of government need to work jointly to implement resettlement plan as part of ESIA, which is considered as the hardest hurdle in the project.

(2) Expansion/Extension of Oil Product Pipeline

Kenya has operated an oil product pipeline from Mombasa to Nairobi since 1978, and it was further extended to Eldoret and Kisumu.

Construction project of oil product pipeline in the EAC (East African Community) member nations has been endorsed by EAC member nations and the project is considered to have potential to contribute to the economic development as well as energy security in the region.

The pipeline system in Kenya will be extended further and tied into the Uganda's system and further extended to Kigali, Rwanda, and/or Tanzania. The oil flows in 2013 and 2030 are shown below.



Note: In Uganda, refinery will be operational at 30,000 bpd (1.3 million m^3) in 2020 and upgraded to 60,000 bpd (2.5 million m^3) in 2025
Source: Towards a Petroleum Master Plan for Kenya 2015

Figure 4.6.1: Oil Flow in 2013, and 2030

SCADA (Supervisory Control and Data Acquisition) system needs to have a common platform and protocol if possible to optimize the oil product flow in the region. Refer to Ugandan section for detail.

JICA has an experience of assisting the rehabilitation and expansion of existing SCADA System of National Gas Grid under the Gas Transmission Company Limited of Bangladesh.

4.7 Mining and Petroleum Sector Development in Uganda

4.7.1 Overview of Current Status

Geological aspect of Uganda is dominated by old rocks up to 3,100 million years old and demonstrates high potential of discovery of minimizations. Pegmatite formation is developed in SW Region and carbonate formation is developed in the Eastern Region. Aluminous clays

enriched in various minerals including REEs are also developed in the SE Region. Albertine Rift, part of Great Rift Valley, runs in the west part of the county developed oil fields in its Tertiary formation. Uganda's mineral industries are expected to grow with the development of mineral mines licensed for exploration and mining of tin, cobalt, copper, lead, zinc, PGMs, phosphate, iron ore, niobium (columbium), salt, tungsten, limestone, and REEs for the next few years. Mined minerals are expected to be processed and refined in the country to maximize the value. Significant growth is expected in the petroleum sector in the next few years. Proven oil reserve in the Albert Graben is estimated 6.3 billion bbl with the recoverable oil of 1.3 billion bbl to date. 0.5 TCF of natural gas was also discovered.

Major structural change has taken place in the Ministry of Energy and Mineral Development since July 2015. Former Directorate of Energy and Mineral Development was spitted into three Directorates, i.e., Energy Resources & Development, Petroleum, and Geological Survey & Mines. Directorate of Petroleum was further broken down into three disciplinary Departments, Upstream, Midstream, and Downstream. Refinery and Pipeline (both crude oil and product oil) is governed under the Midstream Department. Directorate of Geological Survey & Mines was also broken down into three disciplinary Departments, Geological Survey, Geothermal Resources, and Mines.

60,000 bpd Refinery (initial phase is 30,000 bpd) will be built in Kabaale, Hoima District, and majority of produced crude oil will be exported through the port on the Indian Ocean. Controversial routing of the crude oil pipeline appears to be settled between both the government of Uganda and Kenya in August 2015 and agreed on the use of northern route, i.e., Hoima-Lokichar-Lamu. Government of Uganda has also signed MOU with Tanzanian Government to evaluate Hoima-Tanga route to develop least cost route to provide value for Ugandan Resources.

(1) Activities of Mining Sector

Most of Uganda's mining and mineral processing facilities are owned and operated by private companies. Legal framework was renewed in 2001-2004. Under the new regulatory system, Exploration License (EL) has been granted to private entities to encourage initiating the exploration. Number of EL holders has increased significantly from three (3) in 2007 to 508 in September 2014. Mining Lease (ML) holders for mining operation are 34 as of September 2014. Among those, 15 are non-metallic mines and 19 are metallic mines including six gold, four iron ore, three wolfram, three tin, two Tantalite, and one copper mine.

In September 2013, the Government signed an agreement with Guangzhou Dongsong Energy Group of China for the development of the Sukulu phosphate rock deposit. The company is expected to manufacture 300,000 t/yr of phosphate fertilizers, 300,000 t/year of steel products, and some REEs including niobium. The Government is planning to build a sulfuric acid plant with a capacity of 200,000 t/yr to support phosphate fertilizer production.

(2) Petroleum Leasing Round

Uganda's first licensing round covering six blocks in the Albertine Graben was announced in February 2015 with a publication of Request for Qualification (RFQ) for the petroleum exploration. The qualified firms will be issued a detailed request for bids together with the Model Production Sharing Agreement (PSA) for the specific blocks. Companies submitting the best evaluated bid for each of the blocks will proceed to negotiations with Government prior to signing the PSA. The licensing round is expected to conclude with the award of licenses by the first quarter of 2016. Ugandan Government is founding National Oil Company to takes 15-25 % of share in upstream operation under the PSA.

(3) Current Petroleum Development Status

Three international oil companies, Tullow Uganda Operations Pty Limited, Total E&P Uganda and China National Offshore Oil Corporation (CNOOC) Uganda Limited are licensed in EA–1, EA–1A, EA–2 and EA–3A on Lake Albert (Albertine Graben), each held a one-third share. 21 oil and gas discoveries have been confirmed in the area to date, four of which were relinquished to government. Appraisal of 17 out of the 21 discoveries has been completed. Proven oil reserves are estimated 6.3 billion bbl in total, and 1.3 billion bbl will be recoverable oil. Proven gas reserve is estimated 0.5 Tcf.

The Government of Uganda and the licensed companies has entered into a Memorandum of Understanding (MoU) for commercialization of the discovered resources. This MoU includes development of a refinery at Kabaale in Hoima District. The refinery would have an initial capacity of 30,000 bpd and expanded to 60,000 bpd to the growth of domestic demand.

The Refinery project will be developed based on a PPP (Public Private Partnership) scheme. The Government takes 40% of the interest and a joint-venture partner to take 60% in the Project. Through the competitive bidding process, consortium of RT-Global Resources and VTB Capital PLc and JSC Tatneft was selected as a joint venture partner. Negotiation with the consortium partner will be closed shortly. Member states of the East African Community will also participate in the refinery project and take some shares.

The government is planning to acquire 29 km2 of land to host refinery, industrial park and airport, and other infrastructure facilities, and intending to develop Master Plan for the Industrial Park.

Refinery Project includes product oil pipeline from Hoima to a Buloga, Central Product Oil Terminal near Kampala. The pipeline is 205 km long, 10-inch diameter, multi-product pipeline. Detailed route survey and environmental baseline study is underway.

Development of cross border product oil pipeline is one of the major discussion topics among the EAC countries. Status of these projects is as follows;

- Kampala-Eldoret Product Oil Pipeline: 325 km, 12-inch bilateral flow, Feasibility Study completed
- Kampala-Mubalala-Kigali Product Oil Pipeline: 450km, 10 inch, Feasibility Study completed
- Mubalala-Tanzania Product Oil Pipeline: Feasibility Study underway

Financial option including PPP scheme has been discussed among the nations.

Following a state visit to Uganda by His Excellency Hon. Uhuru Kenyatta, President of the Republic of Kenya, a joint communiqué from both Governments was issued on 10 August 2015 which stated that "the two Heads of State agreed on the use of the Northern Route i.e. Hoima-Lokichar-Lamu for the development of the crude oil pipeline." The pipeline is the longest heated pipeline in the world at an estimated length of 1,335km.

Government of Uganda has also signed MOU with Tanzanian Government to evaluate Hoima-Tanga route to develop least cost route to provide value for Ugandan Resources.

Government of Uganda is founding National Oil Company (NOC) shortly. NOC is expected to play an important role in upstream, midstream (refinery) and downstream (pipeline) sectors, as an entity of PPP scheme and also as a profit recipient from these projects.

4.7.2 Assessment of Potential Products

According to a statistics of trade volume in terms of weight, cement and clinker, oil products, and steel products have taken up major part of the cargos. Demand for these products is expected to increase continuously.

(1) Mineral Mine Sector

1) Cement Industry

Cement Industry is founded at limestone mine site. In general, 1.1-1.2 tons of limestone will be used to manufacture 1 tone of Portland cement. This is the reason why cement industry is located at the limestone mine site. Demand of cement is growing at the rate of 7-8% annually. Tororo Cement is the largest and long established company in Uganda and located at the limestone mine of Tororo. Current installed capacity is 1.8 million ton /year but operating at 80% of capacity due to a limited avail of quality of limestone. Expansion of cement grinding capacity from current 1.8 million to 3.0 million is underway. Additional capacity of Clinker Producing Plant with 3000 ton/day is also planned, depending on the discovery of new limestone deposit at Tororo area, otherwise it need to rely further on imported clinkers.

Hima Cement in Kasese is also located at limestone mine, and operating at 850,000 ton/year. Further expansion to double the capacity was planned. However, life time of limestone deposit is running out in 16 years at the current production rate, and therefore expansion plan

may need to be abandoned. Hima Cement imports petroleum coke as a primary fuel through either port of Darussalam or Mombasa.

Key issue for both companies is that existing limestone deposit is running out. In order to increase the production, they need to rely on imported clinkers otherwise to develop new limestone mines and infrastructures.

2) Iron Ore and Steel Industry

Demand for steel products is increasing at the rate of 7-8% annually. To meet the increasing demand, import of final product and intermediate product such as billet and roles are increasing. On the other hand, sponge iron mill is suffering from the competition. Uganda Steel Rolling Mill Ltd. in Jinja district, using Rotary Kiln DRI Process, produces 150 Mt/day of sponge iron fueled by charcoal. In order to compete with the import materials, the company is planning to expand the capacity to 300 Mt/day introducing hematite from Kigazi region in South Western Uganda. However, available charcoal is limited due to a concern of deforestation, and need to investigate alternative fuels.

Government of Uganda is trying to initiate an organized approach to develop hematite deposit in southwestern Uganda. The plan includes the construction of a centralized sponge iron production facility in Kabale based on PPP scheme, including associated infrastructures as follows:

- Railway network to transport the product to Mombasa and/or Darussalam,
- Natural gas pipeline from Lake Kivu and/or Albertine Graben,
- 1000 MW power plant for induction furnace as part of steel making process.

3) Phosphate Fertilizer

Production of phosphate fertilizer is coming on stream in few years' time. Planned production rate is 300,000 tpa. Market destination is not known yet but Ugandan Government will receive royalties and taxes from the mining operation.

4) Other Mineral Potentials

Uganda has unique mineralization formations in the country. Pegmatite Formation is developed in SW Region and Carbonate Formation is developed in the Eastern Region. Aluminous clays enriched in various minerals including REEs are also developed in the SE Region. Significant potential is envisaged in the country. Mining Lease (ML) holders for mining operation are 34 as of September 2014. Among those, 15 are non-metallic mines and 19 are metallic mines including six gold mines, four iron ore mines, three wolfram mines, three tin mines, two Tantalite mines, and one copper mine.

(2) Oil and Gas Sector

1) Crude Oil Pipeline

Nature of the crude oil produced from Albertine Graben is waxy but very low sulphur. Transportation of this crude oil will have an operational challenge and need to maintain operation temperature higher than 50 deg C. The pipeline will also be designed as an international common carrier, and serves to transport mixture of several different crude oils. Apart from the construction and operational issues, following issues should be agreed upon among the stake holders: (1) Financial Framework, (2) Operatorship, (3) Capacity Right Ownership, (4) Quality Bank

Before formulating project entity, further detailed route survey and detailed feasibility study should be carried out to see if the ROW (Right of Way) can be secured and the project is economically viable.

2) Refinery Project

Preliminary Feasibility Study of Refinery Project was carried out by Foster Wheeler, a major engineering contractor in the world, in 2011. The report reviews the crude oil assay, various refinery configurations, and preliminary financial analysis. Detailed configuration is left to an operating company to carry out. The report provides very good basis for further detailed studies.

4.7.3 Analysis of NEC Key Growth Drivers

(1) Cement Industry

Whole sales price of cement in Uganda is USD 200 per metric ton compared with USD120 in Kenya in 2015, and also compared with an international price level of USD100-USD120 in 2014. Energy cost take up 40% of production cost and considered as one of the major contributor to the high cost. In addition, reserve of limestone is depleting at the major existing cement manufacturing plant. Cement industry is placed in a difficult situation. Extensive study must be carried out and it can be done as a part of Mining Master Plan which has not been done in Uganda.

(2) Steel Making Project

Uganda has a large scale and quality of hematite reserve in South West region. Government of Uganda is considering utilizing the resources to develop steel making industry. Steel making industry is different from other base metal industries. Steel is not a product of purified iron, but alloyed with carbon and other minor elements. Composition of these minor elements will differ from purpose to purpose of use.

Steel Industry is a capital intensive industry and require long time to recover capital investment, and also very energy intensive. Supply of large amount of coking coal or natural gas should be

secured. DRI (Direct Reduction Iron Process) is considered suitable choice considering the scale of domestic market and following issues need to be investigated further.

- Abundant natural gas reserve need to be confirmed
- Numbers of skilled people to operate the steel making facilities
- Cost competitiveness need to be confirmed

Uganda Steel Rolling Mill Ltd. in Jinja district, using Rotary Kiln DRI Process, produces 150 Mt/day of sponge iron fueled by charcoal. The company has developed operating skill and technology to produce sponge iron and part of steel product (rebar), and may be able to operate natural gas based large scale steel making facilities. Ugandan natural gas resources are limited in size. However, large scale natural gas reserves were discovered in Tanzania, and these gases can be introduced to Uganda for steel making facilities including power plant. Technologies and economical viabilities should be reviewed further as part of Mining Master Plan, including option to utilize potential petroleum coke produced by refinery in Hoima as a reduction agent for Rotary Kiln DRI, or Syn gas production process.

(3) Mineral Potential

In addition to Sukuru phosphate mine, where Guangzhou Dongsong Energy Group of China is producing 300,000 t/yr of phosphate fertilizers and some REEs including niobium, there are some other potential of phosphate and REEs prospects in the Carbonate Formation Area. More than 500 Exploration License (EL) are granted to mining entities and 34 mining entities are given Mining Lease (ML) to date, however, no detailed information for the mining activities has been made available yet. Strategic approach should be introduced to assess the mining potential in the country.

(4) Crude Oil Pipeline

Pipeline is constructed and operated by PPP Company. Ugandan portion of the pipe size will be 24 inch and capable of transporting 200,000 bpd of crude oil. Pipe size will be enlarged form Kenyan terminal station at Lokichar to 30-38 inch to accommodate Kenyan crude oil and also South Sudan’s crude oil.

The pipeline is the longest heated pipeline in the world with an operating temperature of more than 50 deg C at an estimated length of 1335 km. Initial feasibility study of the pipeline project was undertaken at the hike in crude oil price of USD100/bbl and expected tariff in the study was USD15.2/bbl. Further detailed feasibility study is necessary to reflect the change of circumstances.

(5) Refinery

Construction of domestic refinery in Kabaale will benefit the county significantly i.e., improve the trade balance and contribute to stabilize the currency value. Product oils, including LPG, will fill in domestic market, and part of the products can be exported to adjacent countries. Refinery capacity and configuration should be reviewed based on the updated demand forecast and future potential industries. Summary of oil demand forecast by the Government of Ugandan and also demand forecast based on World Bank Report in terms of refinery throughput, in S. Sudan, DRC, and Rwanda is as on the right.

Table 4.7.1: Oil Product Demand Forecast

(Unit: bpd)

Year	Base Latent Demand in Uganda	Demand in S.Sudan DRC, and Rwanda	Total Demand
2015	33,074	14,671	47,745
2020	44,260	30,205	74,465
2025	59,230	32,363	91,593
2030	79,263	34,521	113,784

Source: Kenyan Government "Toward Oil Master Plan 2015" and Uganda Government Statistics

Considering these statistic figures, required refinery scale in 2020 will be 60,000 bpd, and expanded to 120,000 bpd in 2030. Petroleum coke may play an important role as an alternative to coal and support primary industries such as power generation, cement and brick manufacturing. Detailed crude oil property analysis to be carried out to maximize the value of the indigenes crude oil. This type of crude oil may make high quality base oil for lubricant, and electrical insulation oil, and petroleum coke can make a needle coke for electrode.

4.7.4 Development Scenario of Key Growth Drivers

(1) Crude Oil Pipeline Project:

Uganda will be exporting 200,000 bpd of crude oil from 2020. This will bring the sales revenue of USD4,380 million/yr to Uganda at USD60/bbl base. The Government of Uganda has signed MOU with the Government of Tanzania to evaluate the Hoima-Tanga Route to develop least cost route to transport the crude oil and to provide value for Ugandan resources. ROW for the crude oil export pipeline can be shared with other utility lines including oil product pipeline from Uganda and natural gas pipeline from Tanzania.

(2) Refinery Project:

In accordance with the current plan, Ugandan refinery project with the capacity of 30,000 bpd will be commissioned in 2020. Further expansion of additional 30,000 bpd capacity will be commissioned in 2025. Uganda will be a self-sufficient country till 2025.Uganda imported 1.32 million m3 of oil product in 2013. Amount of the expense was USD 700 million assumed at the crude oil price of USD80/bbl. After 2020, expenditure will be minimized till 2025. Demand forecast indicates that required refining capacity can be 60,000 bpd in 2020 instead of 30,000 bpd, and further expansion to be considered in 2030. Further feasibility study should be undertaken.

4.7.5 Gap Assessment for Development Scenario

(1) Mining Sector

Significant potential is envisaged in the country. Although more than 500 Exploration Licenses (EL) are issued and 34 mining entities are given Mining Lease (ML), no detailed information for the mining activities has been made available yet. Strategic approach should be introduced to assess the mining potential in the country. Cement industry is placed in a difficult situation. Extensive study must be carried out, including cement ingredient sources, fuel options, and overall economics, and require infrastructure. Iron ore exploration and feasibility of steel industry should be investigated further, including option to utilize potential petroleum coke produced by refinery in Hoima as a reduction agent for Rotary Kiln DRI, or Syn gas production process.

Government of Uganda is planning to introduce Mineral Certificate in comply with the Great Lakes Initiative. It will enable to trace minerals from mine sites and stages of trade among the Great Lakes member states subsequently will minimize conflicts in the marketing of the mineral products, and deter illegal mining. However, it appears that this has been left as just an idea. Environmental impacts associated with mining activities are significant in general, and information about mining activities should be shared among the relevant ministries i.e., the Ministry of Energy and Mineral Development and the Ministry of Water and Environment. There must be some mechanism to be in place to work jointly. Joint capacity building exercise will identify the issues.

(2) Oil and Gas Sector:

According to the demand forecast by the Government of Uganda, refinery capacity may need to be larger than that of current plan. Required refinery capacity may need to be reviewed. Petroleum coke may play an important role as an alternative to coal to support primary industries such as power generation, cement and brick manufacturing industries. Refinery product needs to be further investigated. This type of crude oil may make high quality base oil for lubricant, and electrical insulation oil, and pet coke can be needle coke for electrode. Crude oil pipeline is also very important infrastructure to mineralize the oil resources, however, numbers of issues need to be solved and decisions have to be made among the stake holders. It may take some more time to reach agreement especially under the lower crude oil pricing situation.

4.7.6 Necessary Interventions with Priorities

(1) Mineral Resource Sector:

Uganda possesses a high potential of mineral resources and may be able to play important role in the international mineral market. In order to maximize the value of the mineral resources, and also to be benefited from the value, foundation of National Mining Company may be required.

The company is expected to play important role in the development of mining sector. However, mineral strategy has not been fully developed yet. Government is required to develop mining short, mid, and long term plan as follows:

- In short term
  Set up mining strategy and capacity building through the Mining Master Plan.
- In Mid Term
  Develop infrastructure and develop downstream industries.
- In Long Term
  Accommodate mineral resources from adjacent countries including DRC, Ruanda, etc, and provide base of mineral processing and refining for export.

Outline of Mining Master Plan is as follows;

1) Review of Current Situation
   - Legal Framework
   - Social Feature, Regional Economy and Industry
   - Exploration and Production Status
   - Mining Information and Database
   - Infrastructure
2) Market Review and Value Chain Analysis of Mineral Resources
3) Strategic Mineral Target
4) Review of Strategic Geological Mineralization Map and Database
5) Mineral Identification and Registration Technology
6) Mining and Mineral Extraction Technologies and Environmental Impact
7) Environmental Standard and Monitoring Technologies
8) Concept of Compact Mining
9) Financial Options
10) Education Program, Training and Capacity Building
11) Recommendation and Action Plan

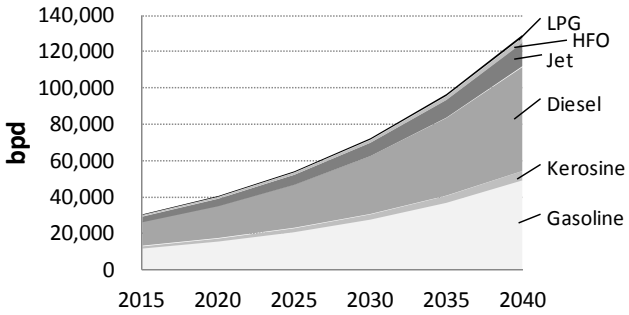
(2) Oil and Gas Sector

Uganda has a secured reserve of 6.3 billion bbl of crude oil with 1.3 billion bbl of recoverable oil. Construction of refinery should be given higher priority, to stop expenditure for oil product import. As discussed before, required capacity of refinery can be larger than current plan, as follows:

- **2020: 60,000 bpd, instead of 30,000 bpd and expanded to 60,000 bpd in 2025**
- **2030: expanded to 120,000 bpd**

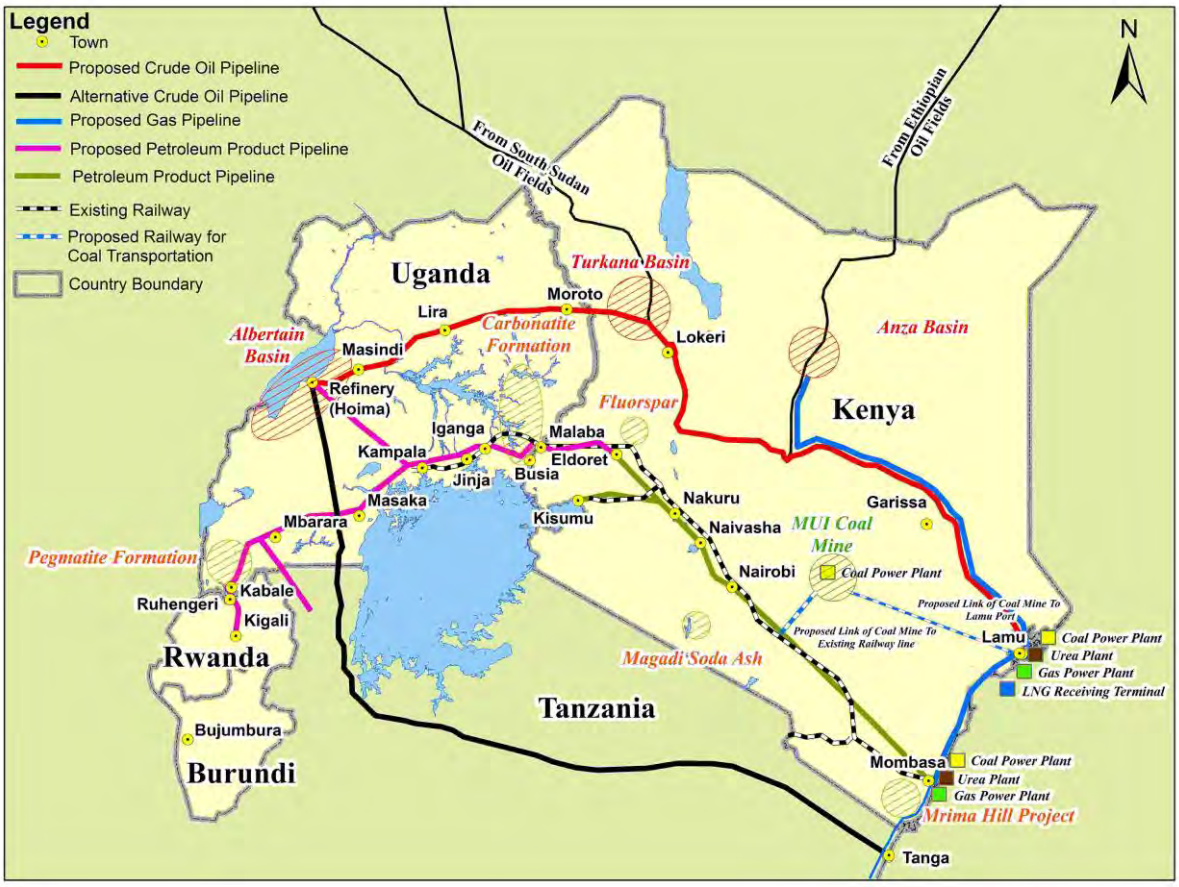
Cross country oil product pipeline system should also be developed phased with the refinery construction project to capture potential market. Further market study should be carried out in S

Sudan, Rwanda and DRC, etc. Overview of the potential projects which contribute to the development of NEC will be as follows:



Source: MEDM, Uganda

Figure 4.7.2: Oil Product Demand Forecast in



Source: JICA Study Team

Figure 4.7.1: Proposed Pipeline Projects in Kenya and Uganda

4.7.7 Suggested Projects/Programs and Implementation Plan

(1) Refinery Project: (Mid-stream Division under the Directorate of Petroleum)

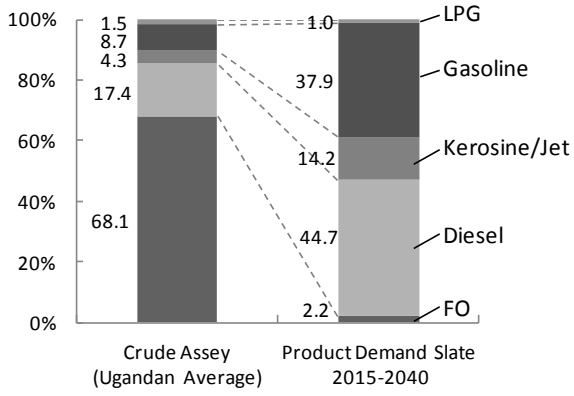
Refinery Project consists of refining facilities and oil product shipping pipeline from the refinery to an oil product terminal near Kampala.

Project entity will be founded shortly through a PPP scheme. A consortium of RT-Global Resources, VTB Capital PLC and JSC Tatneft is taking 60% of the equity and the National Oil Company of Uganda, which is yet to be established, is expected to take the rest.

Member states of the East African Community are also expected to take some share in the project. National Oil Company of Uganda is expected to play a role in upstream, midstream (refinery) and downstream (product marketing) sectors as an entity owner founded on a PPP scheme.

1) Refinery Construction Project

According to demand forecast by the Government of Uganda, oil product demand by 2030 will be 70,000 bpd, and will go up to 115,000 bpd if demand in S. Sudan, Rwanda, and DRC is included. Required capacity of the refinery must be larger than the current plan of 30,000bpd at initial stage/60,000 bpd at later stage. The Oil demand forecast is described in the following figure.



Source: MEDM, Uganda

Figure 4.7.3: Crude Assay compared with Product Demand Slate

Product demand slate in 2015-2040 shows that 98% of the product is white oil products and demand for fuel oil is 2% only. Nature of crude oil in Uganda is waxy and contains high residue slate. Crude Assay data shows that 32 % of yield is white oil and 68% is residue. This means that refinery requires significant cracking and upgrading capacities if it is constructed on a stand- alone refinery basis.

Demand forecast does not account for potential demand for asphalt which will be used in infrastructure construction. Demand for fuel oil for industrial use also appears to be under estimated. These demands including those of adjacent countries should be investigated.

Refinery products will also be facing competition with the products imported from Kenya and/or Tanzania.

It is recommended that a detailed feasibility study be carried out for the refinery and optimize the refinery configuration and throughput capacity. Crude Oil net back price, if necessary, should be negotiated with crude oil producers.

2) Oil Product Tailing Pipeline from Refinery

Currently construction of Hoima-Kampala 205km, 10 inch pipeline is underway. Routing studies is on-going, and acquisition of ROW and resettlement plan are also underway. Pipe size depends on the size of refinery configuration and throughput capacity. The current pipe size may need to be reviewed.

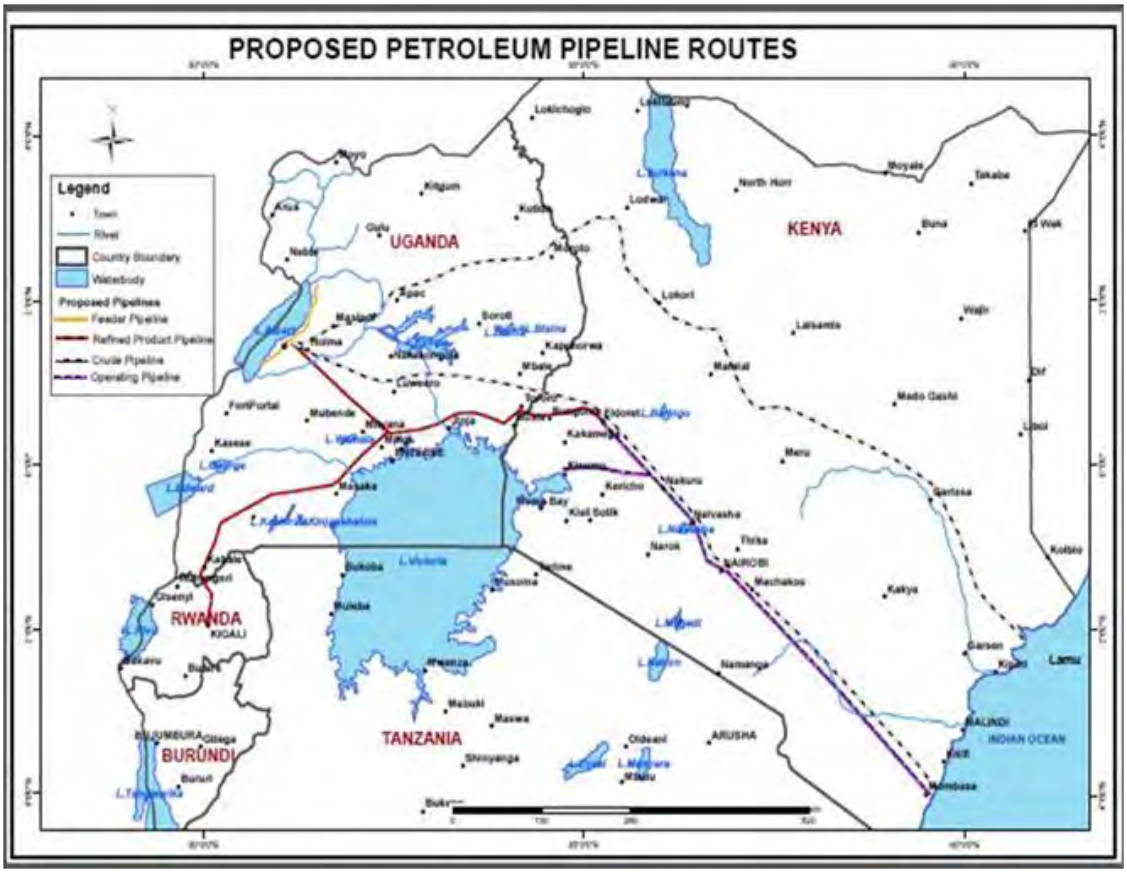
(2) Cross Border Product Oil Pipeline

Development of cross border oil product pipeline is one of the major discussion topics among the EAC member nations. The status of these projects is as follows;

- Kampala-Eldoret Product Oil Pipeline: 325km, 12inch bilateral flow, Feasibility Study is completed
- Kampala-Mbarara-Kigali Product Oil Pipeline: 450km, 10 inch, Feasibility Study completed
- Mbarara-Tanzania Product Oil Pipeline: Feasibility Study is underway

Oil Product pipeline plays a very important role in the security of energy supply in the region. Oil flow should be optimized to balance out the demand and supply in the area and in the region.

It is recommended to carry out further Feasibility Study including existing oil product pipeline from Mombasa to Eldoret through to Kampala and Kigali to see if the oil product price in the area is competitive with the price of import from Dar es Salaam, Tanzania.



Source: JICA Study Team

Figure 4.7.4: Proposed Petroleum Pipeline Route

(3) Mining Master Plan

The objective of the Mining Master Plan is to maximize the value of mineral resources in the country and also to achieve sustainable mining development. Reinstatement plan and a mechanism to prevent illegal mining are also included in the plan.

Application Form for Technical Assistance (TA) will be developed by the Directorate of Geological Survey and Mines under the Ministry of Energy and Mineral Development.

In this context, the Government of Uganda (GOU) requested Government of Japan (GOJ) to implement a project to formulate a master plan on logistics in Northern Corridor in order to promote regional development. Concurrently with this, the Government of Kenya (GOK) also requested GOJ for a project on Northern Corridor which shares same goal and outputs.

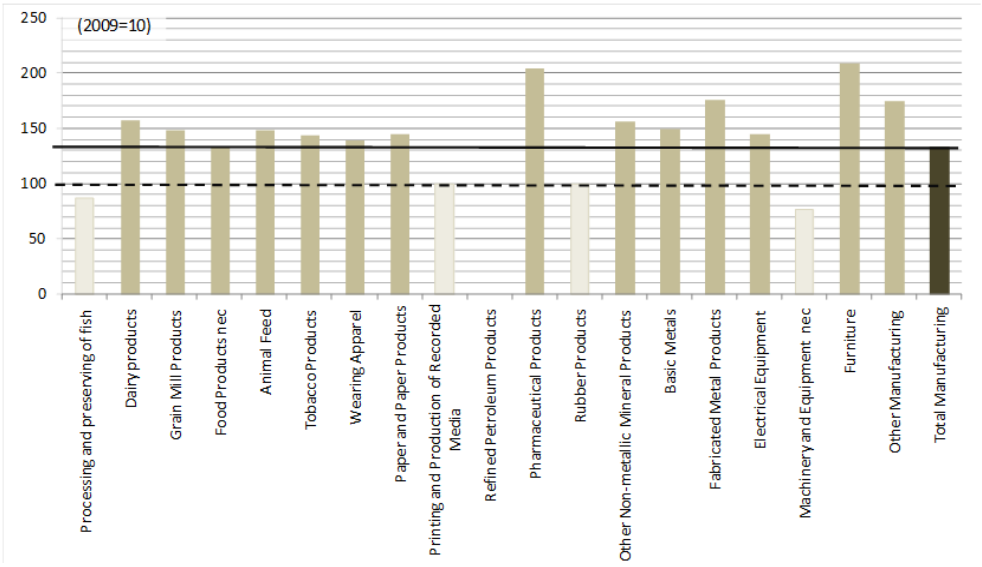
In response to the request of GOU and GOK, Japan International Cooperation Agency (JICA) dispatched "Detail Design Formulation Team for the project" in October and November, 2014. The team proposed to apply a project concept as Northern Economic Corridor, since the project should cover not only logistics but also the regional development along the Northern Corridor. The GOU and GOK agreed with the concept and signed the Record of Discussion with JICA for the implementation of the Project for Formulation of the Master Plan on Logistics in Northern Economic Corridor (hereafter the Project).

4.8 Manufacturing Sector Development in Kenya

4.8.1 Overview of Current Status

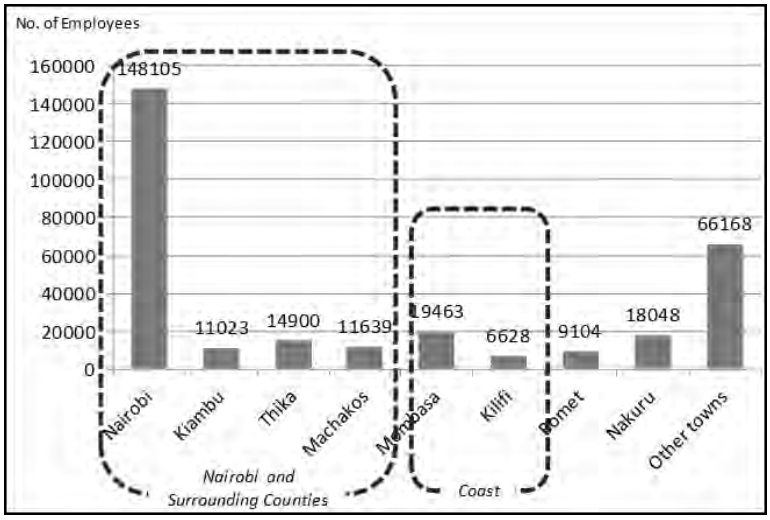
Kenya's manufacturing sectors accounts for around 10% of GDP in the recent years. Despite the large expansion of service sector and gradual growth in agriculture, manufacturing growth rate is rather moderate over the years. Food Products have the largest share with almost a quarter of the manufacturing value-added followed by Beverage and Printing and Recorded Media with the share of 12% and 9% respectively.

The recent trend of the sub-sector breakdown is shown in the Figure below. It shows the level of production compared to the one of 2009 as 100. It indicates the large increase in Dairy, Animal Feed, Pharmaceuticals, Basic Metals and Metal Fabrications, Electrical Equipment and Furniture comparing with the total manufacturing production, whereas such sectors as Fish processing, Textile and Wearing Apparel, Petroleum Refinery, and Machinery. The only one petroleum refinery in Mombasa closed and the production was decreased to nil.



Source: JICA Study Team based on KNBS "Economic Survey 2014"

Figure 4.8.1: Quantity Index of Manufacturing Subsector with Large Increase and Decrease (2014)



Source: JICA Study Team based on KNBS (2013) Basic Report on the 2010 Census of Industrial Production

Figure 4.8.2: Number of Employees in the Manufacturing Sector in Major Urban Areas in Kenya

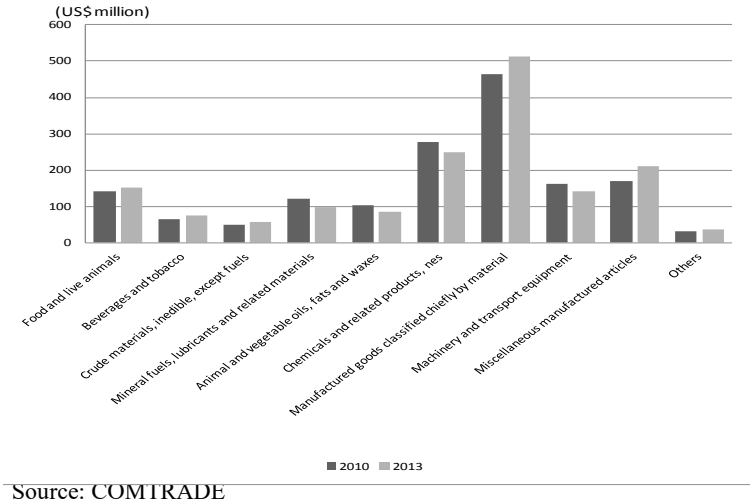
Due to unavailability of recent data on distribution of manufacturing production, the geographical distribution of the manufacturing sector is analyzed using the number of employees of manufacturing sector in major counties captured in the Census of Industrial Production (CIP). The major concentration can be found in Nairobi which forms further agglomeration with surrounding areas (See Figure on the left). This can be attributed to the concentration of various economic functions in Nairobi as well as the distribution of population as work force and the market which are rather skewed to the central and western side of the country.

According to CIP, 49% of the employees for the manufacturing sector are in Nairobi: Nairobi has more than 50% of share in all industries except Food Products, Leather and Related Products, Woods and of Products of Woods, Cokes and Refined Petroleum Products, and Other Transport Equipment's. Food Products, Textile, Leather and Related Products, and Woods and of Products, on the other hand, show some dispersion across the sampled towns including "Other Towns". It

may be due to either the resource-based nature of the industries or the requirement of being in the proximity to local markets[9].

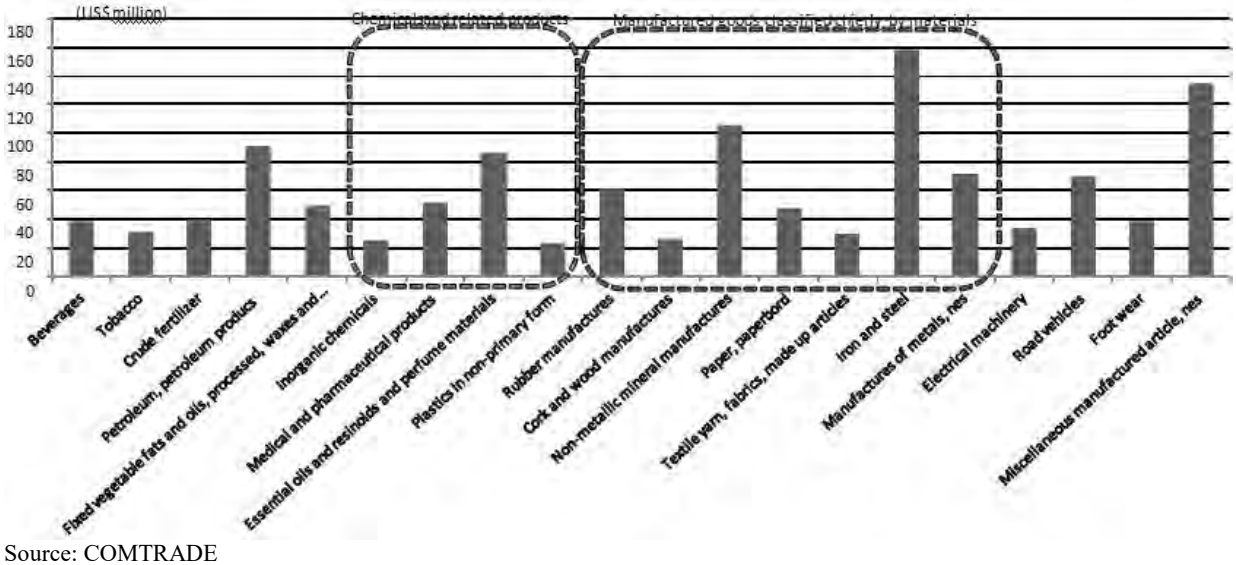
4.8.2 Assessment of Potential Products

Although the predominant exported products of Kenya are agro-based commodities such as tea and cut-flowers, two distinct characteristics are found in the Kenyan manufacturing sector. First, the exported goods to the regional market are mainly manufactured goods. Together with the domestic consumption, various manufacturing products may have potentials for further development in Kenya. As seen in the figure below, Kenya's export to neighbouring countries is manufactured goods rather than agro-based products. "Chemicals and related products" and "manufactured goods classified chiefly by materials" are two categories with outstanding export values.



Source: COMTRADE

Figure 4.8.3: Kenya's Export to EAC countries and DRC (2013, SITC category)



Source: COMTRADE

Figure 4.8.4: Kenya's 20 Large Groups of Exported Goods to EAC countries and DRC (2013, SITC 2-digit)

The Figure 4.8.4 further shows 20 major commodity groups (SITC 2-digit) of Kenya's export to EAC countries and DRC with SITC 2-digit breakdown. Product groups can be further

9 KNBS (2013) Basic Report on the 2010 Census of Industrial Production

categorized: "chemicals and related products" form a group (the products in the left dotted circle in the left Figure); and "manufactured goods classified chiefly by materials" (the products in the right dotted circle in the left Figure). "Essential oils and residuals and perfume materials" (such as beauty make-up preparations) and "iron and steel", "non-metallic mineral manufactures" (such as ceramics, glass, and cements) are the items with larger export value in the two categories explained above. The current trade pattern with the regional market show the structure where Kenya processes the materials either imported from outside of the region or produced domestically and serve for the demand of the regional market. Such products may include construction materials (such as steel products), fast-moving consumer goods (such as soaps and detergents and cosmetics), and processed foods[10].

Based on the truck records of Kenya's export to the regional market as well as the expected growth potentials of the regional market, the types of the products which can be assumed to have some growth potentials in the regional markets are expected to expand production and marketable volume. They are also viewed as possible stimulants of further development in other sectors. Those can be identified based on the potential growth of demand, both for final consumption and demand from industries as raw or intermediary inputs. The following items are to be viewed as an example of potential products.

Table 4.8.1: Manufacturing Potential Industries in Future of Kenya

Source of Growth	Potential industries
Growth of the consumer market	Consumer goods such as soaps and cosmetics, processed foods
Economic development activities	Construction materials: Iron and steel, cement, sheet glass (currently re-export), aluminum products, ceramics (under current production, partially re-export), pipes, electricity installation and wires, agro and veterinary inputs.
Growth of export and domestic market transaction	Packaging materials (various types of products including paper, glass, plastics, aluminum and steel)

Source: JICA Study Team

Apparel products are manufactured goods exported predominantly outside of the region. In 2013, out of total Kenya's export, which was USD5.5 billion, USD283 million (5% of the total export) was earned from apparel products. Kenya's apparel industry started with US's initiative of providing duty and quota free access to the US market for African countries under the African Growth and Opportunity Act (AGOA). Despite some slow down after the global financial crisis in 2008, Kenya's apparel industry resumed growth[11]. As seen in the table on the right, the export of EPZ firms has shown growth over the years with a compounded average growth rate of 13.2%[12].

[10] The selection process of the products for value chain analysis highlights the potentials of construction materials. Steel, glasses, and cement products appears in Table 4.1.2. The fast-moving commodity goods such as soaps and cosmetics are selected regarding the truck records of export in EAC market though they are not so visible their export value may not be as large as the predominant primary commodities such as tea and cut flower.

11 GDS/World Bank (2015) Kenya Apparel and Textile Industry: Diagnosis, Strategy and Action Plan

12 Calculation of JST based on Economic Survey 2015 data.

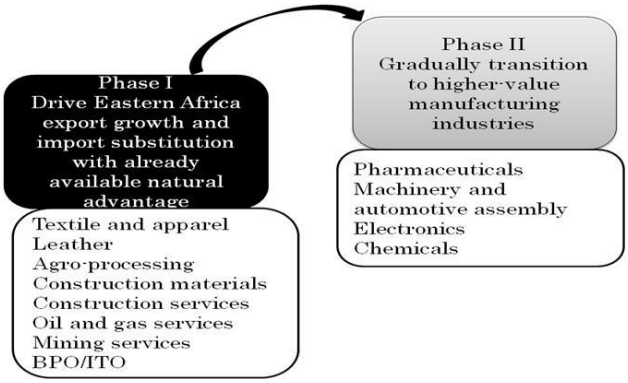
Table 4.8.2: Apparel Export of Kenya's EPZ Enterprises under AGOA

	2010	2011	2012	2013	2014*
Exports (KSH million)	16,190	20,948	22,308	24,246	30.119
Growth Rate (%)	-	29.4	6.5	8.7	24.2

Note: *Projection
Source: Source: KNBS, Economic Survey 2015

4.8.3 Analysis on Key Growth Driver for NEC

The Ministry of Industrialization and Enterprise Development (MOIED) depicted the transformation of the industrial sector as in the Figure on the right. While industries with high demand will lead and induce further development in other related sectors, the technical level should be upgraded for high value addition. Capturing the demand is a very important starting point to strengthen the industry.



Source: MOIED

Figure 4.8.5: Long-Term Transition from Priority Sector in Kenya's Industrial Transformation Programme

Current level of industrial development cannot support the manufacturing industries supplying various raw materials and semi-finished goods. Before forming a cluster of industry, it is necessary to increase the production and sales of currently available industries. A certain size of the industry can, then, induces the forward and backward linkages to stimulate the development of supplier and supporting industries. It is further indicating growth of import in the short- to medium-term in order to support growth of growth drivers. During this period, reduction of cost factors is the key. The cost reduction should be realized in both the production and the importation of the raw materials. Development Scenario of Key Growth Drivers

Incorporating the analysis on the potential sectors for growth explained in 4.8.2, growth drivers of Kenya's manufacturing sector can be identified. In this analysis, the short- to mid-term drivers are explained using three example drivers, namely, soap, cosmetics and toiletries and iron and steel as the driver for domestic and regional market, and apparel for export-oriented industry. Another aspect to pay attention may be that the selection of potential value chain in 4.1.2 included such products as packaging. It indicates that Kenya's industry also provides materials used for the commercial or export purpose. This types of supporting industries using partially imported from outside of region are also included in Kenya's strength in the regional industrial formation. Therefore, packaging is also analysed as the fourth type of a growth driver.

Table 4.8.3 shows the categories and examples of the industries selected as growth drivers.

Table 4.8.3: Categories of Kenya's Manufacturing Growth Drivers

Category	Timeframe for Development	Examples of Industries
Processing for domestic and regional market	Short to mid-term	Construction materials (e.g., iron and steel, glass, aluminum), consumer goods (e.g., soaps and detergents, processed foods), plastics and packaging. It can be both heavy and light industry.
Export-oriented light manufacturing	Short to mid-term	Textile and apparel, Leather
Processing with higher technology and productivity for domestic and regional market	Mid- to long-term	Pharmaceuticals and chemicals (including veterinary products), automobiles

Source: JICA Study Team

(1) Consumer goods: Soaps, cosmetics and toiletries

Table 4.8.4: Kenya's Export of Cosmetics (STIC 553) and Soap (STIC 554) to NEC Countries

	Value (USD Million)		Weight (t)	
	2010	2013	2010	2013
Burundi	1.84	2.68	942	1,718
DRC	12.31	12.93	13,859	11,608
Rwanda	3.90	4.46	2,113	2,427
Uganda	28.10	26.73	16,648	16,233
Tanzania	33.05	39.00	28,217	30,877
Total	79.21	85.79	61,778	62,863

Source: Source: UN-COMTRADE

With gradual economic growth and consumers' increased purchasing power, it is expected that consumer goods and basic household items can catch the demand in the African market. Kenya hosts some key multinational companies producing and distributing so-called Fast-Moving Consumer Good (FMCG) with track records of export of consumer goods such as soaps and cosmetics. As seen in the table above, the export of soaps and cosmetics in total to the neighboring countries amounted to USD 85 million in 2013 which has grown by 8.3%. The production of soaps and detergent recorded higher growth rate in 2014 by 5.9% and 3.1%, respectively[13]. The geographical location with good access to NEC countries as well as to imported materials such as palm oil and other chemical substances may give an advantage for further expansion of the production and export.

(2) Iron and steel

EAC market shows demands for housing and construction materials. The demand for iron and steel products as well as other construction materials is expected to be sustained by the economic development. On the other hand, the production of iron and steel in Kenya relies largely on imported materials. The slow-down currently experienced by the Chinese economy with the large surplus in the global market is alarming in the short-run: for instance, the price of iron and steel products produced in Kenya may not be competitive. By reducing cost factor, the competitiveness of local steel industries should improve. First, transportation is a key factor as its proportion in

13 KNBS (2015) Economic Survey 2015

the total cost is high for iron and steel industries due to the nature of the product. Secondly, the tariff structure of the Common External Tariff (CET) may require review regarding the current situation where locally available technology only processes intermediary products. CET imposes tariff for intermediary goods whereas raw materials are zero rated.

(3) Export-oriented light industries

Export-oriented light industries can provide various externalities apart from the earnings: Industries such as garment and leather can first create large volume of employment. At the same time, leather industries can entail forward linkages to upgrade livestock production.

However, there are a number of difficulties observed in these sectors. Kenya's relatively high labor wage compared to global players such as Bangladesh among other weaknesses, require at least shift in production to be more targeted, with small quantity, but with higher value added products[14]. Moreover, as for the apparel industry, Kenya has been relying heavily on the AGOA scheme.

Despite animal population, Kenya's leather export is predominantly primary and semi-processed products. It is also noted that Kenya exhibits weak competitiveness in various aspects for the leather industry starting from labor skills to government supports compared to Ethiopia and global leaders such as China and Italy[15]. In order to overcome the difficulties and develop the industries, good strategy is required with implementation of policy measures. For example, it is recommended that Kenya starts to expand its access to the regional market to establish the basis for further development[16].

(4) Packaging

Packaging is a rather collective notion embracing many industries such as glass, wood, metal, plastic and machinery. It can be also categorized from primary packaging which has direct contact with the product to the transportation packaging for such purposes as shipping (containers) and air transportation (palette). Fast growing consumer market with FMCG also provides further opportunities for the packaging industry in Kenya. On the other hand, the industry is mainly based on imported materials. Therefore, the cost as well as availability of the raw materials is an important factor: According to the interviews during the value-chain survey, the respondents cited 40 to 50% as cost incurred by raw materials. The reduction of cost on procurement of raw materials is critical in increasing competitiveness. Depending on the material, transportation, labor, and customs duty imposed on (e.g., paper) are also the burdens. Similarly, the need for quality to conform to the requirement of end-market of both export and import should be also observed.

14 GDS/World Bank (2015)
15 WB/ETG (2015) Kenya Leather Industry: Diagnosis, Strategy and Action Plan
16 Ibid.

4.8.4 Forecast of the Growth Drivers

(1) Consumer goods: Soaps, cosmetics and toiletries

As an example of consumer goods for domestic and regional market, the total weights of exported soaps, cosmetics and toiletries to EAC members and DRC are forecasted. The compounded average growth was used from the assumption used for the EAC Industrialization Strategy which sets 6% as real GDP growth rate of EAC during the period from 2014 to 2032.

It should be noted that economic development of the other countries may change the preference of the product mix which may cause some deviation. At the same time, the consumption in Kenya itself will also grow during this time and the products may be consumed more than exported. In this forecast, the possible influence of local consumption growth is not taken into the consideration. Under this condition, the volume of the export of these goods will be doubled by 2025 and 2.7 times larger in 2030.

The consumers in Kenya as well as EAC markets have been exposed to FMCG with higher quality imported from outside of the region. Locally available products have also diversified (e.g. scented liquid hand wash soap in addition to a bar soap). Under the conducive environment, it is possible to upgrade the types of the products produced in Kenya by segmenting the markets, adding the improved functions and so on.

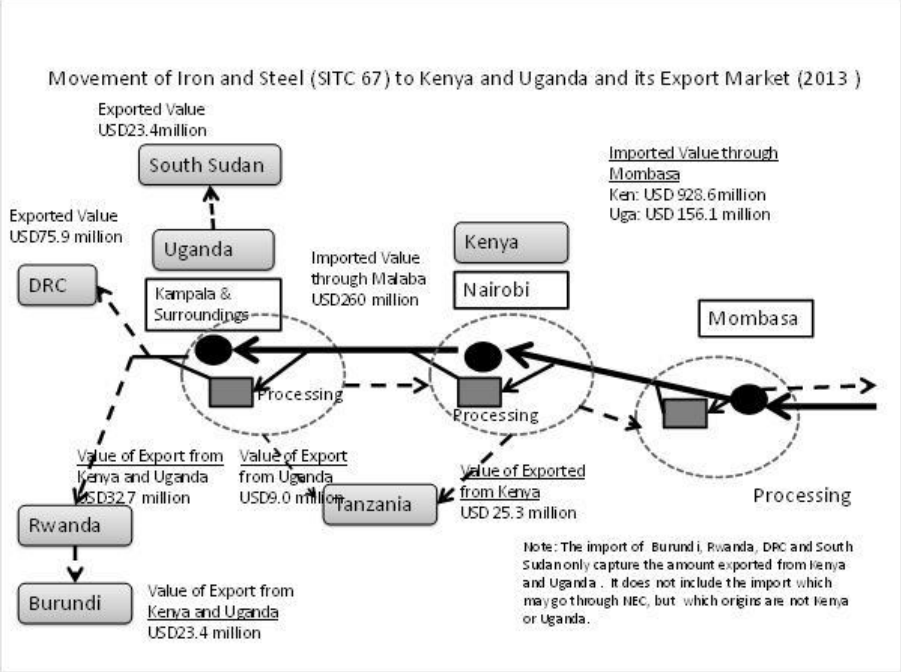
Table 4.8.5: Growth Projection of Soaps, Cosmetics and Toiletries Export of Kenya (SITC 553 & 554)

Year		2014	2020	2025	2030
CAGR 6 %	Volume (Mt)	79,773	113,160	151,433	202,651
	Volume (2014=1)	1.00	1.42	1.90	2.54

Source: JICA Study Team calculation based on UN-COMTRADE

(2) Iron and steel industry

As an example of construction materials for domestic and regional market, current and future trade flow is forecasted. The figure below depicts the flow of import and export by Kenya and Uganda in 2013.



Source: JICA Study Team based on the data of UN-COMTRADE

Figure 4.8.6: Value of Iron and Steel Products Imported and Exported by Kenya and Uganda (2013)

Out of 1084.7 million USD of iron and steel products imported by Kenya and Uganda, 260 million USD is exported to Uganda. Kenya has two major iron and steel processing locations, i.e., Mombasa and the vicinity and Nairobi and the vicinity. While a few large roofing and construction industries are located in Mombasa, Nairobi also has a cluster of industry with supply of scrap metals which can be used for induction furnaces. The semi-processed products are exported partially to Southern African countries, inland Tanzania apart from those going to the west. Uganda also has processing factories. The number exported to South Sudan, DRC, Burundi, and Rwanda captures both exports from Kenya and Uganda. In this case, about 15% of total import value to Kenya and Uganda is eventually earned through export to countries such as South Sudan, DRC, Rwanda and Burundi.

Table 4.8.6: Forecasted Value of Iron and Steel Products Imported and Exported by Kenya and Uganda (2030)

	2013	2030 (Projection)	Index (2013=1)
1) Total amount imported through Mombasa	1084.7	3309.2	3.05
2) Export from Kenya to Tanzania	25.3	75.8	3.00
3) Export from Kenya to westward through Malaba	260	882.5	3.39
4) Export from Uganda to Tanzania	9	27	3.00
5) Export from Uganda and Kenya to Rwanda	32.7	83.6	2.56
6) Export from Uganda and Kenya to Burundi	23.4	49.1	2.10
7) Export from Uganda and Kenya to South Sudan	23.4	60	2.56
8) Export from Uganda and Kenya to DRC	75.9	199.6	2.63

Source: JST based on the data of UN-COMTRADE

The table above shows the projection of the value of iron and steel products in the regional market. The projection was done based on the GDP growth forecast: GDP growth rates for respective

market were applied to project the import/export volume. In total, the import through Mombasa in 2030 may increase by 300% compared to the 2013 value. In terms of distribution in the region, the growth rates of Kenya and Uganda are higher than those of South Sudan, DRC, Rwanda and Burundi. Therefore, in the forecasted period, the ratio of those consumed in Kenya and Uganda may relatively increase vis-à-vis the growth of the value exported to the regional market.

If some conditions are met, more value addition may be taken place in Kenya. Steel production requires energy. If Kenya may have better access to the cheaper energy, the situation may be different. In this analysis, however, only the changes in amount can be forecasted.

(3) Export-oriented light industries: Textile and apparel

As an export-oriented commodity, apparel export is projected. The compounded growth average was used from the projection of the world estimated by the study by McKinsey and Company[17].

Table 4.8.7: Growth Projection of Clothing Export of Kenya (SITC 84)

Year		2013	2020	2025	2030
Case 1: CAGR 4.8%	Value (USD million)	283.16	393.15	497.01	628.31
	Volume (2013=1)	1.00	1.39	1.76	2.22
Case 2: CAGR 3.30%	Value (USD million)	283.16	355.41	418.06	491.74
	Volume (2013=1)	1.00	1.26	1.48	1.74

Source: JICA Study Team calculation based on UN-COMTRADE

Case 1 utilized projection from 2010 to 2025 whereas case 2 utilizes lower rate based on the actual figures during the period from 2004 to 2010.

Due to the fact that items to be traded overtime may change as well as volume depending on the items, it is difficult to predict the quantity to be exported overtime. If Kenya may be able to rightly access the demand, the trade value of apparel export can achieve 1.74 growths in 2030 compared to current value with a lower case scenario.

However, it should be noted that the current Kenya's apparel industry heavily relies on US market, access of which is facilitated by AGOA. Therefore, growth can only be secured and realized by building capacity of the industry for sustainable development.

It is also noted that current apparel industry sources of raw materials mainly are from outside. Inability of procuring locally available materials causes the industry long waiting times for delivery since sourcing materials requires a long time. It also indicates that volume increase in export can cause increase in import of materials. For example, Kenya imported fabrics in 2010 and 2013 as indicated in the table below.

[17] McKinsey & Company, McKinsey's fashion scope: Unleashing fashion growth city by city

Table 4.8.8:Kenya's Import of Fabrics

STIC	Item	Weight (kg)		Value (USD million)	
		2010	2013	2010	2013
652	Cotton Fabrics, Woven	13,801,853	9,378,124	59.38	60.40
653	Fabrics, Woven, of Man-Made Textile Materials	22,008,789	24,184,532	33.95	56.40

Source: UN-COMTRADE

According to the study by the Ministry of Industrialization and Enterprise Development, in order to expand the production, Kenya's apparel industry is required to target strategically on the types of products which can fit to the current labor cost. The degree of value-addition per piece shall be higher than what it is now and the production should focus more on the areas which Kenya has more competitiveness.

(4) Packaging industry

Since packaging comprises wide variety of the products, two categories are selected for the purposes of analysis. The total weights of exported plastic packing and paper packing to EAC members and DRC are forecasted. The compounded average growth was used from the assumption used for EAC Industrialization Strategy which sets 6% as real GDP growth rate of EAC during the period from 2012 to 2032.

Table 4.8.9:Growth Projection of Packaging Export of Kenya

			2013	2020	2025	2030
CAGR 6%	HS 3923 Plastic Packing	Net Weight (t)	10,714	15,219	19,240	24,322
		Volume (2013=1)	1.00	1.42	1.80	2.27
	HS4819 Paper box, bags, containers	Net Weight (t)	11,759	17,681	23,661	31,663
		Volume (2013=1)	1.00	1.50	2.01	2.69

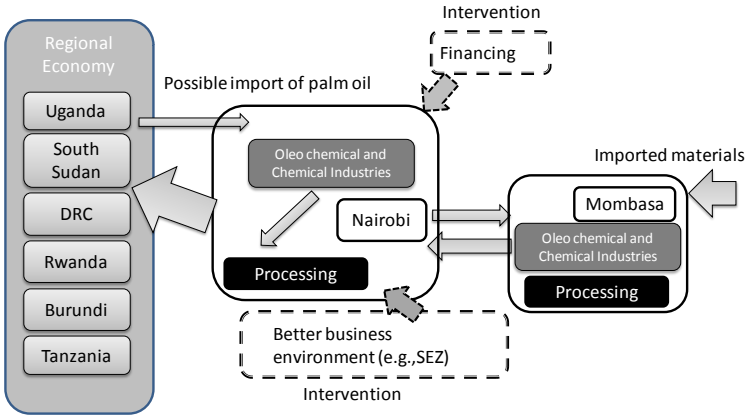
Source: UN-COMTRADE

In order to meet the demand of FMCGs' marketing strategy, the quality of the products should encompass some innovation. At the same time, paper and plastic packages should start looking for the opportunities to produce high-quality products for exported commodities such processed foods from EAC countries.

4.8.5 Necessary Interventions with Priorities

Short to medium growth drivers can be found in the number of industries which exhibit export growth especially to the regional market. Among these industries, two examples are explained in this section. Other sectors as iron and steel can also be expected to grow, but it may require a detailed analysis on the division of production among the nations within the region as well as possible commencement of mineral extraction in the region.

(1) Soaps, cosmetics and toiletries



Source: JICA Study Team

Figure 4.8.7: Soaps, Cosmetics and Toiletries Industry and the Possible Interventions in Kenya

Along the material flows and value chain, necessary intervention can be identified as indicated partially in the figure on the left. The necessary interventions are as listed below.

1) Cost reduction and market access: Transportation development between Mombasa to major production sites as well as from the production sites along major distribution channels in the area along NECs
2) Conducive business environment: Provide better business environment with access to stable and cheap energy and less demand for administrative procedures
3) Value addition: Encourage introduction of new technology through provision of finance.

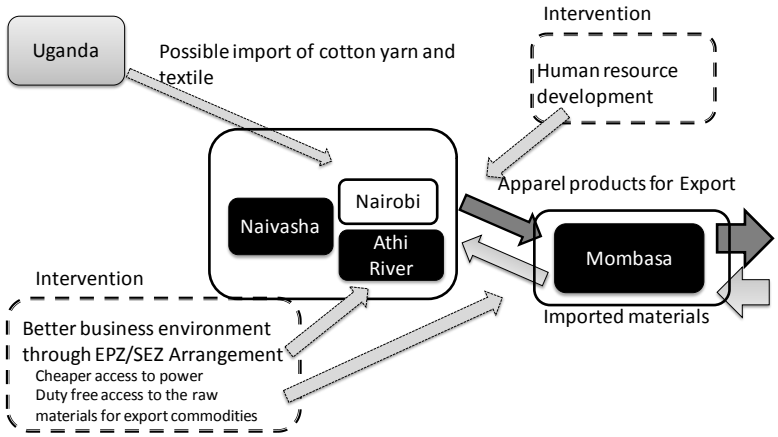
(2) Iron and steel

Necessary intervention identified may be found in the following:

1) Policy formulation: regarding the EAC-wide industrial development policy and current customs arrangement, the policy should be formulated to take necessary actions
2) Cost reduction: Improve trade logistics for smooth importation of raw materials through increased efficiency of customs procedures and port handlings. Infrastructure development to reduce the cost of transportation.
3) Value-addition: Support renewal of facilities and equipment and factory management and operation
4) Support for the market expansion through public procurement for infrastructure development

(3) Export-oriented light industries: Apparel industry

Along the material flows and value chain, necessary intervention can be identified as indicated partially in the figure on the right. The list is as indicated below:



Source: JICA Study Team

Figure 4.8.8:Apparel Industry in Kenya and the Possible Interventions

1) Market expansion to reduce dependency on AGOA/US market: Marketing for Kenyan products to expand the market outlets.
2) Cost reduction: Improve the trade logistics for smooth importation of raw materials through increased efficiency of customs procedures and port handlings
3) Value addition and productivity increase: Assistance targeted for skilled labor trainings.
4) Provision of better business environment with limited administrative process: Export Promotion Zone and Special Economic Zone arrangement
5) Value-chain development of cotton industry

(4) Packaging

Necessary intervention for development of the industry can be identified as indicated below:

1) Review of customs duty arrangement for raw materials
2) Cost reduction: Transportation development between Mombasa to the major production sites as well as from the production sites along the major distribution channels in the areas along NECs
3) Cost reduction: Provide cheaper power
4) Value addition: Encourage implementation of measures to acquire certification as well as quality control mechanism through intensive human resource development and financing
5) Value addition: Encourage introduction of new technology through provision of finance
6) Conducive business environment: Provide a package of good business environment with access to stable and cheap energy, good connection with possible clientele, and less demand for administrative procedures through developing clusters in certain geographical areas (e.g., SEZ)

4.8.6 Suggested Projects/Programs and Implementation Plan

(1) Special Economic Zone Development

The composition of difficulty in business environment which results in the cost burden on industries may be reduced through arrangement of special economic zone. The concept of special economic zone (SEZ) is to provide quality infrastructure as well as good business environment together with fiscal incentives within the designated areas. The 2nd Mid-Term Programme of the Kenya Vision 2030 identified Mombasa, Kisumu and Lamu as locations for SEZs. "Kenya's Industrial Transformation Programme" by MOIED also indicates a few sites for development. 4 Building industrial park can be regarded as a similar approach as SEZ which provides good access to the operational basis with infrastructure. The table below shows GOK's existing and planned SEZ or industrial parks including the Konza Tech Park focusing on business processing outsourcing and IT-related industries.

Table 4.8.10: SEZ and Cluster Development Initiatives under the Kenya's Industrial Transformation Programme

Source of Growth	Potential Industries	Timeframe of the Development
Dongo Kundu SEZ	Trading and distribution hubs for various imported and exported commodities, processing of locally available materials, processing of imported materials for export. Food processing hub may be hosted in the SEZ.	Development shall start after finalization of the regulatory mechanism.
Naivasha Industrial Park	Textile and apparel industries	Preparation starts 2016/17.
Athi River Industrial Park	Heavy industry, agro-processing, manufacturing in general distribution and bulking,	Preparation starts 2016/17
Machacos-Kajiado Leather Industrial Park	Leather processing and leather products	Preparation starts 2015/16.
Konza Tech City	Business Process Outsourcing and Information Technology Enabled services, mixed use of residential and academic areas	Development has started.

Source: JST based on the information in "Project on Master Plan for Development of Mombasa Special Economic Zone Master Plan Report", GOK "Kenya's Industrial Transformation", Konza Tech City Website, MOIED "Concept Note on Athi River Industrial Park"

The SEZ Act was enacted in September 2015. The first batch of regulations with the details for the licensing procedures for SEZ development was further publicized in August 2016. The regulatory body, the SEZ Authority '(SEZA) is in preparation for establishment. While the overall planning and administrative capacity of the SEZA requires being established and strengthened upon its foundation, development of new industrial parks in various locations may be also supported.

In particular, it may be further proposed that agro-processing, soaps and cosmetics and various industries should be included in the Naivasha Industrial Park. Naivasha with its proximity to the major geothermal power plants may be able to tap industrial development opportunities based on good connection to electricity from geothermal source.

(2) Packaging industry development for Agro-processing

Despite the market potentials for processed food both for export and domestic market, existing packaging industries have not fully met the demands in terms of quality. The project is to assist local packaging industries to be able to supply quality packaging materials with functions such as keeping stability of processed foods or with aesthetic appearance. The technology to be introduced is to provide solution for agro-processing industries. The project can comprise trainings for packing industries, research and development institutions, and agro-processing operators. It may also be done in the SEZ development through encouraging the establishment of factories in food processing hubs. The time frame of the project will be 2-3 years.

(3) SME Financing for Processing, Manufacturing and Logistics Sector Development

Despite various efforts including private and public dialogues, the business environment in Kenya still requires improvement. The gradual financial market development and outstanding development of mobile money transaction system may improve access to financial services to some extent. The Bank (amendment) Act on 31 August 2016 caps the lending rate by commercial banks to 4% of the Central Bank Rate. Therefore, the rending rate is much lower than those prior to August 2016. The commercial bank loans still show some differences comparing with the inter-bank rate, which implies high cost of finance. While the nominal interest rate of inter-bank rate is 4.87 %, commercial bank loans and advances are 13.84%[18]. Financing for capital investment as well as working capital is required for smooth operation and expansion of the business.

While policy finance especially targeting industrial sector will be necessary, regarding growth of the banking sector, provision of financial services should be provided through private sector operators in case of actual loan provision.

(4) Project for Building up Competitiveness of Construction Materials and Machinery Industry in Kenya

Planned and on-going infrastructure development projects and growing demand for housing means high potential demand for construction materials. In addition to the domestic market, regional market is also expected to grow. However, it is often observed that the local industries may not be able to fully participate in procurement of the infrastructure development projects due to quality as well as their production capacity. It is therefore, necessary to set the right standards and build technical capacity of construction materials industries in order to fully exploit these potentials.

The project to bolster the growth of the sector comprises of the following components. First, the capacity of the government functions in policy formulation should be strengthened. The standard

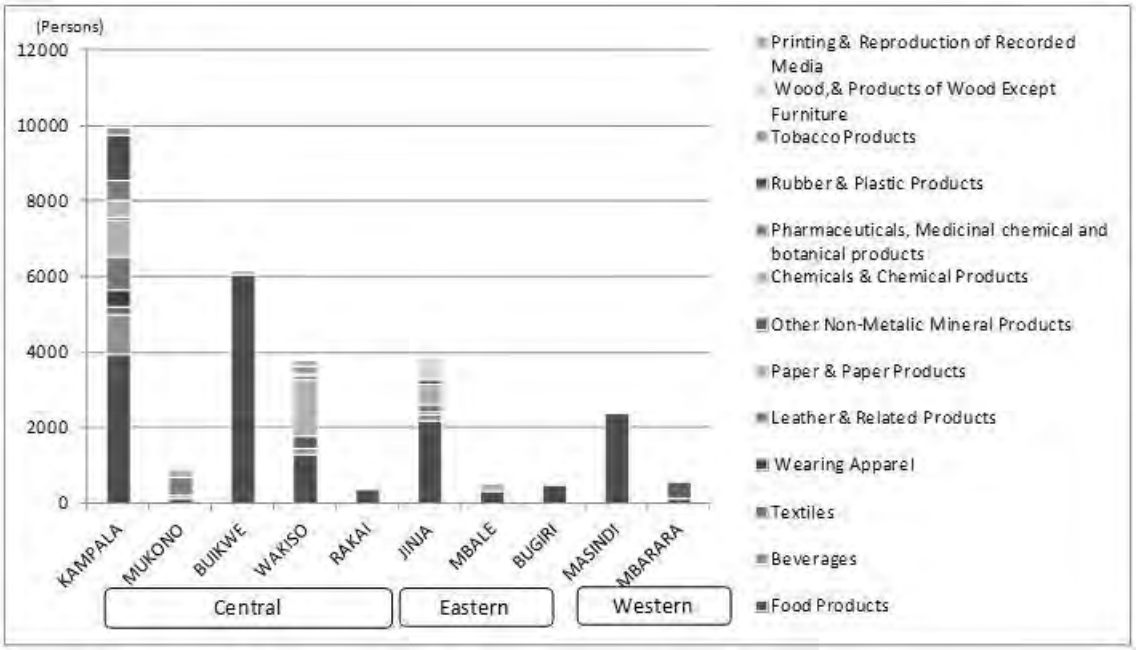
18 Data of Month of September 2016 based on the KNBS Monthly Leading Economic Indicator September 2016

and quality assurance functions within the government should be improved. Secondly, based on the standard assurance guidelines set through the project, the industries should be supported in their technical capacity building. The types of problems faced by manufacturing industries in general are cost of production such as high power price and access to finance for procurement of machinery and equipment to meet technical demand. Thirdly, linking up planned and on-going industrial parks and special economic zone development, the support also envisages a comprehensive approach to respond to the specific issues faced by the industry.

4.9 Manufacturing Sector Development in Uganda

4.9.1 Overview of Current Status

The majority of business establishments in the manufacturing sector in Uganda have less than 10 employees: 51.2% of the businesses have one employee. The concentration of business establishments is found in Kampala and the Central region: both account for 32.3% and 26.8% of the total number of establishments, respectively. The share of food manufacturing is 18.3%. According to samples from the Census of Business Establishment (COBE), there are only very limited number of enterprises categorized as "medium enterprises" with more than 50 employees or large enterprises: Out of about 34,900 samples of manufacturing establishments, only 153 have more than 50 employees. Out of about 30,000 persons are employed by these companies, 33% is found in Kampala. Buikwe, Jinja and Wakiso follow Kampala with 20%, 12.8% and 12.4% respectively. 60% of the employees are in the food processing activities.

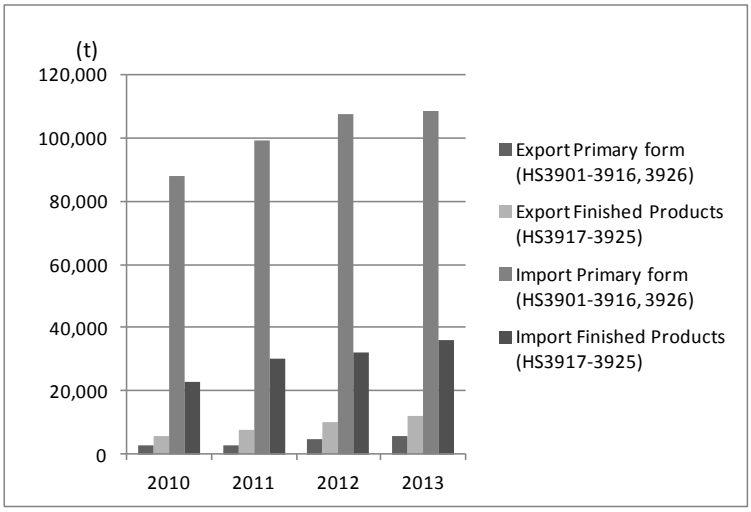


Source: JICA Study Team based on UBOS data

Figure 4.9.1: Distribution and the Types of the Manufacturing Activities of Medium to Large Enterprises in Uganda

The overview of the flow of goods may be glanced through the example of plastic products and iron and steel industry. The net weight of imported plastics in primary form is outstandingly large compared with the finished goods (See the Figure below).

While domestic consumption is so large that it can consume both locally produced and imported finished products, part of the finished goods is also exported. The major partners are Kenya, DR Congo, Rwanda and South Sudan for export and Saudi Arabia, Kenya, UAE, China and Korea for import. It indicates that large flow of raw materials may exist up to Kampala whereas finished goods can divert to Kenya, DRC and Rwanda in the West and to South Sudan in the North apart from those to major consumption areas in country.



Source: Calculated by JICA Study Team based on the data of UN-COMTRADE

Figure 4.9.2: Uganda's Export and Import of Primary and Finished Plastic Products (HS 39)

The table below shows the case of export of iron and steel. While more importation is found, Uganda also exports iron and steel products mainly to the regional market (See the Table below).

Table 4.9.1: Uganda's Export of Iron and Steel Products

(USD '000)

	2012	2013	2014
Burundi	8,921	8,818	9,605
DRC	25,230	34,567	34,829
India	-	-	42
Rwanda	10,437	9,946	13,677
South Africa	8	-	2
Sudan	26,983	24,218	16,515
Tanzania	8,385	8,869	12,525
Total	79,964	86,418	87,195

Sources: ITC calculations based on Uganda Bureau of Statistics

4.9.2 Assessment of Potential Products

Potential products can be identified from the following aspects: a) availability and accessibility to the market and growth trend, regardless of whether export or domestic; b) the available resources in the country and the possibility of their utilization; and c) competitiveness of Uganda as the location regarding sensitivity of respective industry to specific issues such as logistics costs,

energy, labor wage and skills. The long-listed products shown in 4.4.1 are selected from such aspects comprehensively. The table below summarizes potential products per characteristics.

Table 4.9.2: Manufacturing Potential Industries in Future of Uganda

Source of Growth	Potential industries
Market growth	Consumer goods such as soaps and detergent, processed foods Construction materials: Iron and steel, ceramics (under current production, partially re-export), pipes, electricity installation and wires
Resource endowment	Cement, petroleum, fertilizer, leather, agro-processing (sugar, grain milling, palm oil refinery)
Locational factor	Consumer goods, construction materials

Source: JICA Study Team

Locational factor affects such issues as logistics costs naturally borne by trade with outside of the region when considering the distance from deep sea port, i.e., Mombasa. On the other hand, as seen in the track record of export, Uganda can be the hub for the supply of goods to neighboring countries such as DRC and South Sudan. The common products in demand in such market may be a variety of goods regarding their status of industrial development.

4.9.3 Assessment of Key Growth Driver for NEC

The potential products can be categorized according to the natures required for the growth drivers. As explained above, the growth drivers are i) those which can increase productivity and the earning through maximization of trade volume through access to the growing regional and export markets; ii) the kind of industries/products which can provide significant solutions for upgrading of industrial structure; and iii) products and industries with forward and/or backward linkages to lead further economic development in the area. Excluding those products analyzed in the other sections including agro-based and mineral-based products, the potential products are evaluated as summarized in the Table below.

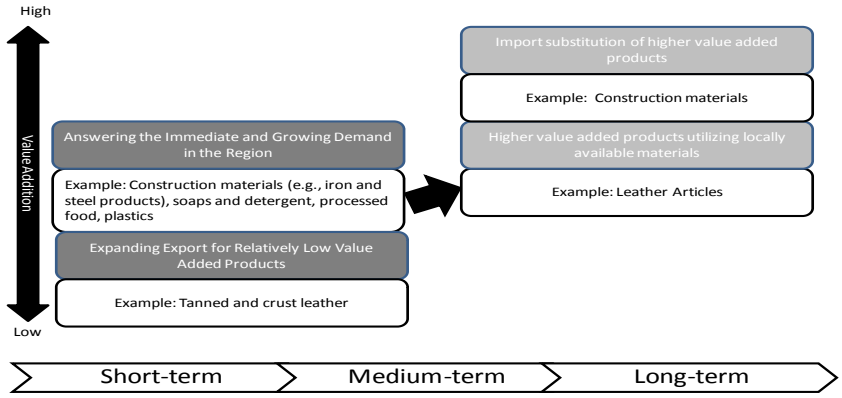
Table 4.9.3: Categories of Uganda's Manufacturing Growth Drivers

Industries	Production and Income Increase	Impacts on Industrial Structure	Linkages with Other Industries
Construction materials (e.g., iron and steel)	The demand in domestic and regional market will provide income through the industry.	Fair	Processing of iron or may have some possibility in future.
Consumer goods (e.g., soaps and detergents)	The demand in domestic and regional market will provide income through the industry.	Fair	Forward: Oil palm production Backward: Packaging industry
Leather	World market is growing.	Fair	Forward: Expected to induce the quality livestock farming Backward: Shoe making, leather goods production

Source: JICA Study Team

It is also noted that certain industries can be developed upon the development of others. It is especially important for Ugandan manufacturing sector which has started to develop step by step. The flow of such a phased approach can be depicted as the Figure below.

First, light manufacturing and construction materials to serve the immediate demand of the regional market can drive the manufacturing growth in the short- to medium-term, whereas industries as leather which require major intervention for upgrading shall be developed slowly (see the figure below).



Source: JICA Study Team

Figure 4.9.3: Growth Drivers and the Time Frame for Development

Based on the model depicted in the above-figure, the growth drivers can be categorized as shown in the table below:

Table 4.9.4: Categories of Uganda's Manufacturing Growth Drivers

Examples of Industries	Description	Timeframe
Construction materials (e.g., iron and steel), consumer goods (e.g., soaps and detergents, processed foods)	Answering immediate and growing demand in the region	Short to mid-term
Leather	Expanding export for relative low value added products	Short to mid-term
Construction materials (raw materials of iron and steel)	Import substitutions of higher value added products	Mid- to long-term
Leather articles	Higher value added products utilizing locally available materials	Mid- to long-term

Source: JICA Study Team

The growth drivers are explained in the following part.

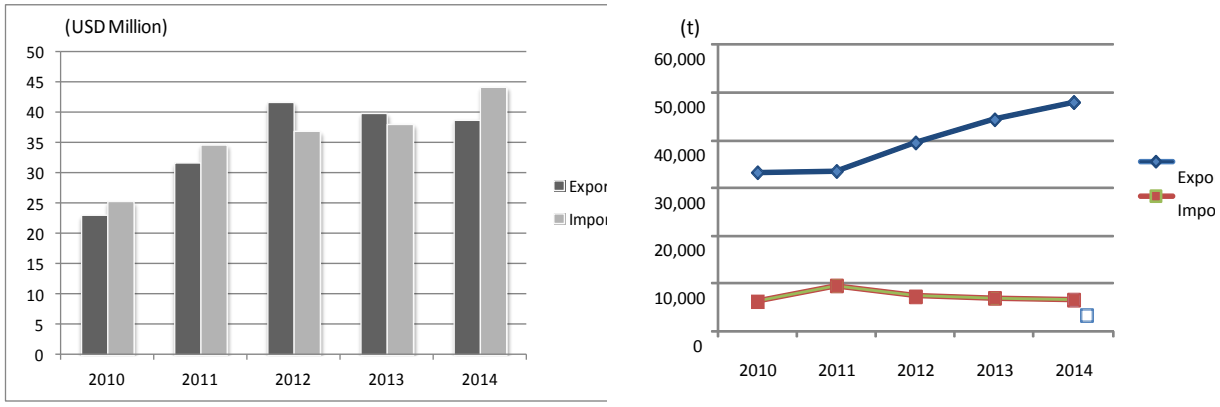
(1) Construction Materials: Iron and Steel

Some items under iron and steel industry are listed as products which exhibit market growth trend. This sector also serves the domestic and regional market. With massive infrastructure and housing development projects, the demand for iron and steel products continue to grow. Despite the fact that the number of mega projects declined by 55% in 2014 compared with 2013, it may be due to the fact that new projects are still in the planning phase[19]. Once these projects begin to be implemented Iron and Steel industry in Uganda may expect to access the increased demand.

19 Deloitte & Touché, Deloitte on Africa: African construction Trends Report 2014

(2) Consumer Goods: Soaps and Detergents

As seen in the figure on the left, Uganda's import and export of consumer goods such as soaps and detergents is almost equal On the other hand, soap applied on the skin shows larger export growth while reducing the import slightly year by year in recent years (see the figure below).

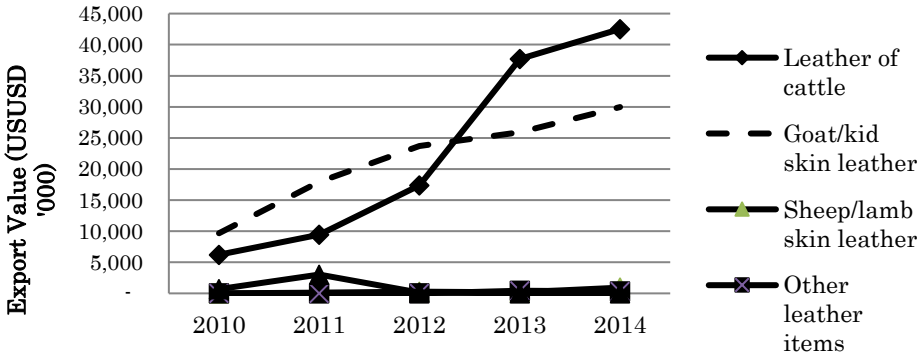


Source: JICA Study Team

Figure 4.9.4: Uganda's Import and Export of Soaps, Detergent, Candles and Molding Pastes and Organic Surface-Active Products and Preparations for Use as Soap (HS 3401) (Right)

It should be noted that products are presumably consumed in the domestic market apart from the ones exported. On the other hand, change in life style requires more manufactured consumer goods. In the short to medium run, Uganda may first target the types of commodities as soap which can have immediate demand in the regional market. On the other hand, Uganda is net-importer of palm oil. While palm oil is not only raw material for soaps and detergent, further development of the industry may stimulate palm oil plantation and utilization of locally available materials as seen in the case of sugar cane which is utilized in manufacturing of ethanol[20].

(3) Resource-Based: Leather



Source: Management Innovation based on the data of UN-COMTRADE

Figure 4.9.5: Uganda's Skins and Hides Export

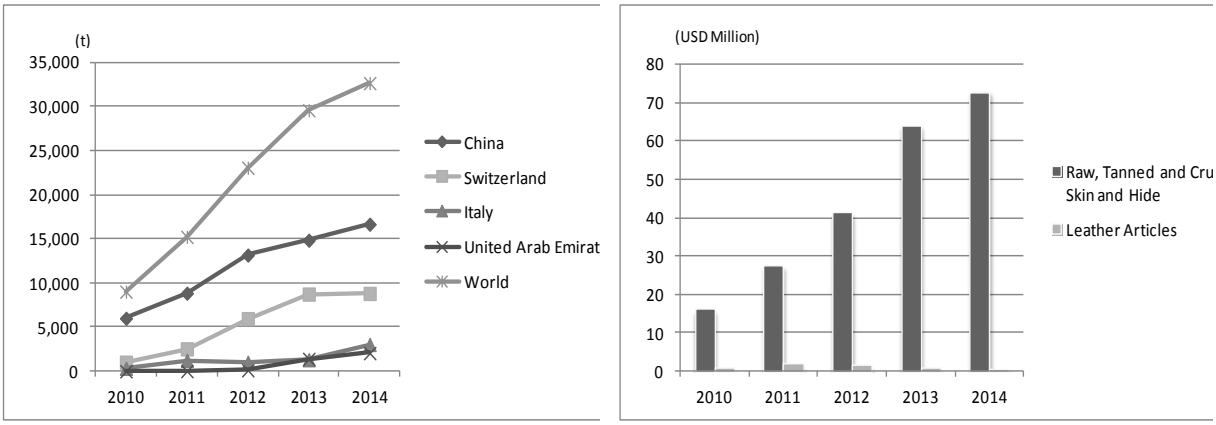
The large increase in the export of cattle and goat/kid skin leather were observed in the recent years. (See the Figure on the left). Uganda's export amounts to USD 73.756 million in 2014. The

20 Japanese company has been manufacturing hand soap utilizing the locally-made ethanol.

total value exported has recorded average 48% growth per annum between the years of2010 to 2014. The destinations are 16 countries: Switzerland, China and Italy being the top 3 and accounting for 36.2, 28.9 and 16.7%, respectively. The large increase was observed on the export value to India.

The export levy on raw hides and skins are imposed in order to promote value addition. However, the bulk of hides and skins exported out of Uganda is in raw or semi-processed (wet blue) form. While the upward market trend will support the growth of the sector, it should also be noted that the export of the semi-finished goods can be regarded as the environmental burden transferred from importing countries where environmental regulation is not sufficiently laid out.

Other areas of industrial potential should be processed products exported outside of the region. As explained in Section 4.2., the market has been growing in the recent years. Ugandan leather industry also shows growth (see the left figure below).



Source: UN-COMTRADE

Figure 4.9.6: Uganda's Export of Skin and Hide (HS 4104 & 4106) (Left) and Export of Semi-Processed and Manufactured Leather Items (HS 4104& 4106 and 42) (Right)

However, the sector's value chain is still not well established. The capacity of producing quality products with a certain quantity is not sufficient. As seen in the figure below, while export volume is increasing, it is mostly exported in raw or semi-finished form (see the right figure above).

(4) Observation and Way Forward

Two natures are attributed to Ugandan growth drivers. First, it is still infantry stage and, therefore, its current level of industrial development cannot support the manufacturing industries supplying various raw materials and semi-finished goods. Before forming a cluster of industry, it is necessary to increase the production and sales of currently available industries. A certain size of the industry can, then, induces the forward and backward linkages to stimulate the development of supplier and supporting industries. It is further indicate growth of import in the short- to medium-term in order to support growth of growth drivers. During this period, reduction of cost factors is the key. The cost reduction should be realized in various aspects such as the production and the importation of the raw materials as well as the overall business environment.

The second nature is its geographical location. Industrial development requires its market of the product. Current level of industrial development as well as the location attract inflow of Kenyan goods or even imported finished goods. The costs involved for production and transportation are critical. In order for the industry to grow, Ugandan industry needs to secure its market. Further inland markets such as DRC and South Sudan have been not fully tapped due to their level of development as well as some security concerns. In the medium to long-run, penetration into these markets will provide the opportunities for Ugandan industries to enjoy the scale of economies.

4.9.4 Development Scenario of Key Growth Drivers

In the following section, a few examples of short- to mid-term growth drivers are analysed as examples.

(1) Construction materials: Iron and steel

With the recently identified mineral deposits, Uganda has two growth paths for manufacturing development: first, the processing of the minerals can be started; and on-going processing of semi-finished materials can also continue to have the potentials. These types of development may be forecasted in iron and steel industry. In this section, the processing of semi-processed materials, the latter case will be focused. As the current level of the steel production not available, the size of growth of export was projected. Assuming that the neighboring countries will be the main market for Uganda, the total weights of exported iron and steel to these countries are forecasted. The compounded average growth was used from the assumption used for the EAC Industrialization Strategy which sets 6% as real GDP growth rate of EAC during the period from 2010 to 2032.

Table 4.9.5: Growth Projection of Uganda's Iron and Steel Export

Year		2014	2020	2025	2030
CGAR 6%	Volume (Mt)	79.773	113.160	151.433	202.651
	Volume (2014=1)	1.00	1.42	1.90	2.54

Source: JST based on ITC data

The result is a seen on the table above. It should be noted that the local consumption is not included into the volume. Therefore, the volume should be influenced also by the local consumption. In terms of the value-addition in Uganda for these products, it may not be seen in the near future. For example, starting mass production of steel using such facilities as blast furnace utilizing the iron ore deposit is depending on the commencement of iron ore extraction, technological improvement, market demand and the accessibility to coal. Therefore, for the time being, it may be more likely to expand the production in volume-wise.

(2) Consumer Goods: Soap and detergent

The export volume of soap and detergent has grown by 9.5% per annum from 2010 to 2014, whereas the import has declined by 11% per annum from 2011 to 2014. The actual production

volume in Uganda is therefore assumed to be growing by even higher growth rate. The projection of the export volume use GDP growth projection of EAC in order to capture long-term economic growth trend of the main export market. Value-addition may be necessary in order to be competitive in the EAC market considering the competition with Kenyan and other exported products. However, for the time being, expansion of the production volume may come first in order to meet the demand in DRC, South Sudan as well as the domestic market.

Table 4.9.6: Growth Projection of Soap Export of Uganda (HS3401)

Year		2014	2020	2025	2030
CAGR 6 %	Volume (Mt)	48,061	68,176	91,234	122,092
	Volume (2014=1)	1.00	1.42	1.90	2.54

Source: JST based on UN-COMTRADE data

(3) Leather products

In the short- to medium-term, the types of products mainly exported may remain as semi-processed products. However, the large constraints are found in the supply chain from livestock producers, abattoirs and tanneries. The constraints in the supply will be the bottleneck. The table below shows two cases of leather export which assume current trends of either global market demand and livestock population growth will be constant overtime. The higher case uses the annual growth rate of global leather import for 5 years up to 2014, and the lower case UBOS's data on annual livestock population growth rate.

In the higher case scenario, the volume of export will reach 96 million metric tons in 2030 which is almost three time larger than 2014. On the other hand, in the lower case scenario, the volume will be more than 150% of the one in 2014 in 2030.

Table 4.9.7: Growth Projection of Leather Products of Uganda

Year		2014	2020	2025	2030
CAGR 6 %	Volume (Mt)	32,649	48,998	68,722	96,386
	Volume (2014=1)	1.00	1.50	2.10	2.95
CAGR 3.2 %	Volume (Mt)	32,649	39,441	46,169	54,044
	Volume (2014=1)	1.00	1.21	1.41	1.66

Source: JICA Study Team calculation based on UN-COMTRADE

4.9.5 Necessary Interventions

(1) Construction materials: Iron and Steel

1) Reduce the cost of the transportation: Transportation infrastructure development is necessary to reduce the cost of transportation. Both raw materials and the products are heavy and bulky increasing the transportation cost.
2) The tariff structure under EAC CET: The industry imports iron and steel products from outside of the region. Under the EAC common customs regime, the intermediary goods attract the second tariff band instead of being zero-rated raw materials. Competing with the finished goods, however, is sometimes difficult with tariff difference between finished goods

and intermediary goods. Such issues as lack of competiveness due lack of economies of scale in Uganda compared with massive production abroad come into play.

(2) Consumer Goods: Soaps and Detergents

1) Increase production volume: The production facilities may be strengthened through financing.
2) Reduce the cost of transportation: Transportation infrastructure development is necessary to reduce the cost of transportation since raw materials are procured from outside of the region.
3) Marketing capacity: Regarding competition within the region with Kenya and imported goods, it is necessary to establish good distribution network both within the domestic market and the regional market. At the same time, differentiation should be sought through marketing, advertisement and improving quality.

(3) Resource-Based Industry: Leather industry

1) Processing infrastructure development: Limited facilities for processing and proper storage facilities in order to maintain the quality of products. The interventions should be to invite private initiatives.
2) Enterprise development for commercialization and streamlining trading of skins and hides: the private enterprises which are able to produce and market the product are necessary to provide market outlets of skins and hides.
3) Quality standards: Quality standards and certifying mechanism is necessary to improve the quality of the marketed products.

4.9.6 Suggested Projects/Programs and Implementation Plan

(1) Industrial Park Development

In order to ease access to land with good infrastructure and business environment, GOU has already developed a 10-year policy for National Industrial Park development in 22 sites nation-wide. Kampala Industrial Business Park (KIBP) has been developed in Mukono with 896ha of the land. Bweyogerere Industrial Park in the suburbs of Kampala with Uganda National Bureau of Standard is also operational. Others such as Luzira Industrial Park also in the suburbs of Kampala allocate land for investors. The preparation for installing industrial parks in key urban centers is also on-going in such cities as Soroti and Mbale.

While GOU has been implementing projects partially supported by the World Bank in the past, as noted in the KIBP, the proper planning and securing financing is necessary in order not only to complete the development but also to provide proper operation and management.

The following projects may be suggested (1) to review the legal framework for the industrial park development, (2) strengthen planning capacity of UIA, and (3) to improve the capacity of operation and management of the site with proper guidelines of operation.

(2) Building capacity of Standard, Metrology, Quality Infrastructure

EAC can provide Ugandan manufactured goods to wider market, but it also introduces competition. EAC member countries have agreed to harmonize the standards in order to ensure free movement of safe goods. However, Uganda's infrastructure for standard, quality and metrology infrastructure are yet to be established in order to meet the demand of EAC. It implies the problems in the aspect of export promotion as well as industrial development. First, it is witnessed by industries that Ugandan products are required to be certified by Kenya's standards when exported. It is partially due to unavailable standards.

Second aspect is capacity building of industries. Some manufacturers may seek to be certified with international standards. Some may be certified by private certification bodies, but the accessibility of various certifications in country is limited. Some measurement categories are not be able to calibrate in Uganda as the proper equipment and facilities are not available.

The institutional capacities with involvement of private sector in the area of standard, quality and metrology are critical issue for Uganda for building up its industrial development.

(3) Leather Industry Infrastructure Upgrading

The leather industry requires upgrading from two aspects: improvement of the level of the processing to a higher level than wet-blue and valued raw material of quality final products; and establishing the functions for manufacturing final goods as shoes in country. While the latter requires extensive investment promotion to attract investors of shoe making, the former would be indispensable for further development of the industry to secure quality raw materials. The scattered nature of the supply chain of these raw materials starting from livestock farming should be streamlined through installation of modern abattoirs and storage facilities in strategic locations. The project should invite private operators for the operation of facilities by providing finance, technical training to upgrade their capacity and facilitating cooperation among key stakeholders.

(4) Border Market Hubs for Regional Market

As mentioned earlier, Ugandan manufactured products requires good access to larger market. While frontier markets such as DRC and South Sudan are with potential, current political situations as well as the conditions of infrastructure and business environment may not be conducive for Ugandan manufactures to extensively explore the market with actual physical presence in major cities in such countries. On the other hand, it is widely observed that the traders dealing with these countries are active in Uganda as well as the trading along NEC. Therefore, formalized border markets with efficient logistics facilities can be established to provide the trading points for Ugandan traders with Ugandan goods.

(5) Project for Building up Competitiveness of Construction Materials and Machinery Industry in Kenya

Planned and on-going infrastructure development projects and growing demand of housing incur high volume of potential demand for construction materials. In addition to the domestic market, regional market is also expected to grow. However, it is often observed that the local industries may not be able to fully participate in the procurement of the infrastructure development projects due to the quality as well as the production capacity. Therefore, it is necessary to set the right standards and building the technical capacity of construction materials industries in order to fully exploit the potentials.

The project to bolster the growth of the sector comprises following components. First, the capacity of the government functions in policy formulation will be strengthened. The standard and quality assurance functions within the government will be improved. Second, based on the standard assurance guidelines set through the project, the industries will be supported for their technical capacity building. The types of problems faced by manufacturing industries in general are cost of production such as high power price and access to the finance for procurement of machinery and equipment to meet the technical demand. Third, linking up the planned and on-going industrial parks and special economic zone development, the support also envisages comprehensive approach to respond to the specific issues faced by the industry.

4.10 Tourism and Service Sector Development in Kenya

4.10.1 Overview of Current Status

(1) Tourists Arrivals and Destination

The number of visitors has been on the decrease since 2012 due to issues of insecurity such as Westgate shopping mall attack, in Somali, and Ebola outbreak in West Africa. Kenya's tourism volumes remain relatively low compared to regional competitors such as South Africa and Egypt (9,537,000 and 9,174,000 in 2013 respectively).

Table 4.10.1: Visitor Arrival in Kenya, 2010-2014

	2010	2011	2012	2013	2014
Visitor Arrival by Mode of Transport					
Air	1,119,971	1,301,156	1,291,842	1,132,785	887,583
Sea	28,382	34,900	5,939	6,047	23,295
Other	460,757	486,829	413,048	380,719	439,488
Total Arrivals	1,609,110	1,822,885	1,710,829	1,519,551	1,350,366
Visitor Arrival by Purpose of Visit					
Transit	139,524	72,876	91,816	86,136	89,172
Holiday/Business	1,329,586	1,552,014	1,455,205	1,293,953	1,143,722
Other	140,000	197,995	163,808	139,462	117,472

Source: Statistical Abstract, 2015

The trend in the number of visitors to national parks and game reserves from 2010 to 2014 is detailed in Table 4.10.2. The number of visitors to these attraction sites has been on a downward trend for the last five years. During the review period, the number of visitors dropped by 7.4% from 2,337,700 in 2013 to 2,164,600 in 2014. The drop was as a result of the continued decline in international visitor arrivals over the same period. Major declines were observed at Nairobi, Nairobi Mini Orphanage, Tsavo West, Lake Bogoria, Lake Nakuru and Amboseli national parks. However, Maasai Mara registered significant increase in the number of visitors from 103,800 in 2013 to 166,000 in 2014. Besides, parks located in Central area such as Meru, Samburu and Hell's Gate have also registered increase in the number of visitors. This can be attributed to the effect of resort city project in Isiolo, as seen later. These areas may offer other alternatives to the coastal beaches, among the major destinations which faced tourist's decrease in the last years.

Table 4.10.2: Visitors to Parks and Game Reserves, 2010-2014

Game Park/Reserve	2010	2011	2012	2013	2014
Nairobi National Park	120,813	135,057	151,111	154,712	131,764
Nairobi Safari Walk	201,061	176,265	147,174	136,001	133,036
Nairobi Mini Orphanage	490,152	402,954	474,600	407,361	361,333
Amboseli National Park	208,999	176,247	141,391	141,217	117,050
Tsavo West National Park	138,073	98,868	70,912	68,816	50,958
Tsavo West National Park	264,180	267,952	176,704	153,178	103,230
Aberdare	42,798	45,815	44,290	50,123	43,817
Lake Nakuru National Park	241,190	245,030	253,520	262,496	225,981
Maasai Mara	187,312	138,199	101,963	103,812	165,959
Haller's Park-Bamburi	120,446	149,844	125,485	121,508	116,159
Malindi Marine	46,853	49,534	40,799	41,887	28,877
Lake Bogoria	94,394	108,273	114,605	91,513	80,540
Meru National Park	20,362	20,164	17,786	14,721	19,226
Shimba Hills	21,233	29,376	26,139	23,229	17,602
Mount Kenya	29,213	33,282	27,489	24,603	20,185
Samburu	13,086	14,170	14,956	13,539	15,401
Kisite Marine	50,556	59,487	48,446	44,687	29,739
Mombasa Marine	37,896	38,341	34,500	36,762	27,429
Watamu Marine	25,388	37,263	36,305	35,109	31,317
Hell's Gate	121,783	133,087	95,417	88,960	114,086
Impala Sanctuary (Kisumu)	195,231	201,649	246,962	222,329	227,628
Other	93,866	103,214	101,573	101,130	103,308
Total	2,764,885	2,664,071	2,492,226	2,337,693	2,164,625

Note: Other includes: Mt.Longonot, Arabuko Sokoke, Ol-Donyo Sabuk, Marsabit, Saiwa swamp, Sibiloi, Chyulu, Ruma National Park, and Mwea
Source: Statistical Abstract, 2015

(2) Organizational Structure

Ministry of East Africa, Commerce and Tourism, especially the Directorate of Tourism is in charge of developing the tourism industry with an additional focus on eco, cultural, sports and conference tourism. On the other hand, the devolution has also been implemented; therefore, a number of institutions are involved to the sector. Kenya Tourism Board (KTB) is charged with the promotion of the country, Tourism Regulatory Authority (TRA) is mandated to register,

license and grade all tourism related activities and services. Kenya Tourism Federation (KTF) on the other hand is an umbrella organization at national level that unites the different bodies and lobbies. It consists of 7 organizations namely Kenya Association of Air Operators, Kenya Association of Travel Agencies, Kenya Association of Tour Operators, Kenya Association of Hotel Keepers and Caterers, Kenya Coast Tourism Association, Ecotourism Kenya, and Pubs, Entertainment and Restaurants Association of Kenya.

(3) Service Sector

Ministry of East Africa, Commerce and Tourism, especially the Directorate of Tourism is in charge of developing the tourism industry with an additional focus on eco, cultural, sports and conference tourism. On the other hand, the devolution has also been implemented; therefore, a number of institutions are involved to the sector. Kenya Tourism Board (KTB) is charged with the promotion of the country, Tourism Regulatory Authority (TRA) is mandated to register, license and grade all tourism related activities and services. Kenya Tourism Federation (KTF) on the other hand is an umbrella organization at national level that unites the different bodies and lobbies. It consists of 7 organizations namely Kenya Association of Air Operators, Kenya Association of Travel Agencies, Kenya Association of Tour Operators, Kenya Association of Hotel Keepers and Caterers, Kenya Coast Tourism Association, Ecotourism Kenya, and Pubs, Entertainment and Restaurants Association of Kenya.

The decrease in the number of visitors to national parks and game reserves observed in 2014 had a direct impact on the number of bed-nights occupied in hotel establishments located in these areas. The number of bed-nights occupied in game lodges dropped from 544,300 in 2013 to 540,400 in 2014. Over two thirds of the total bed-nights occupied were by foreign residents, although the number dropped by 13.8% to 366,500 in 2014. However, bed-nights occupied by East Africa residents increased by 45.9% from 119,200 in 2013 to 173,900 in 2014.

Table 4.10.3: Hotel Bed-Nights Occupied by Zone, 2010-2014 ('000)

Zone	2010	2011	2012	2013	2014*
Coastal-Beach	3,243.0	3,144.6	3,132.6	2,750.3	2,527.7
Coastal-Other	151.1	283.8	260.0	124.0	95.9
Coastal Hinterland	119.6	82.3	88.7	125.5	133.2
Nairobi-High Class	1,123.6	1,155.7	1,145.0	1,175.3	1,119.1
Nairobi-Other	410.7	526.2	490.5	455.7	388.0
Central	463.5	683.3	526.0	622.2	686.3
Maasailand	472.6	418.6	443.7	473.0	479.5
Nyanza Basin	301.2	301.9	252.1	345.3	357.7
Western	364.1	374.9	464.3	454.1	433.3
Northern	12.9	43.9	57.8	71.2	60.9
Total-Occupied	6,662.3	7,015.2	6,860.8	6,596.7	6,281.6
Total-Available	17,161.8	17,419.6	18,849.6	18,292.2	19,877.2
Occupancy Rate (%)	38.8%	40.3%	36.4%	36.1%	31.6%

Source: Statistical Abstract, 2015

TRA is currently updating the business licenses of accommodation facilities and other tourism-related services. Licenses should be applied for each category of tourism related services and be renewed annually to ensure the quality of services and customer satisfaction. Services are categorized as follows:

- Class A (accommodations facilities)
- Class B (restaurants, other food and beverage services)
- Class C (tour operators, travel agencies, balloon operators, local air charters, tourist service vehicle hire, water sports and boat excursions)
- Class D (game fishing outfitters, enterprises offering camps and camping equipment for hire, nature parks, nature reserves, nature trails, game ranches, amusement parks, non-citizen tour leaders/guides)
- Class E (local traditional boat operators, professional safari photographers, curio vendors, private zoos, citizen tour leaders/guides, general vendors and beach operators)

Table 4.10.4: Number of Licensed Service Sector Establishments

	Class A	Class B	Class C	Class D	Class E
Nairobi (Jul 2015)	58	39	358	0	0
Western (Oct 2015)	54	17	7	0	2
Mt.Kenya & Upper Eastern (Jul 2015)	25	4	8	0	19
Lamu (Jul 2015)	65	2	2	0	8
North Rift (Jul 2015)	62	28	3	0	1
South Rift (Jun 2015)	10	1	11	0	33
Kilifi, Tana River and Lamu (Jul 2015)	247	31	48	0	71

Source: TRA

Table 4.10.4 shows the number of licensed establishments per region. As the number varies widely among the regions coupled with the lack of figures for total number of establishments, it's difficult to analyze the distribution of establishments per region. It is however, it can be said that there is more competitiveness among tourism operators in Nairobi and among accommodation service in the Coast.

4.10.2 Policies and Plans for Tourism Development

The planning and management of tourism sector is mainly guided by the overall national development framework, especially Vision 2030. In the Vision, the sector is identified one of the six priority areas with high potential of spurring the country's economic growth and development, and Kenya is expected to be the among the top 10 long-haul tourist destinations globally. Four key tourism products are identified: Coast product, Safari product, Niche products, Conference and business tourism product.

Table 4.10.5: Main Targets over the Second MTP Period

Zone	2013	2017
Arrivals	1.8 million	3 million
Earnings	96 billion	200 billion
Bed-nights domestic	2.8 million	4 million
Beds number		+30,000 high-quality beds

Source: Second MTP 2013-2017

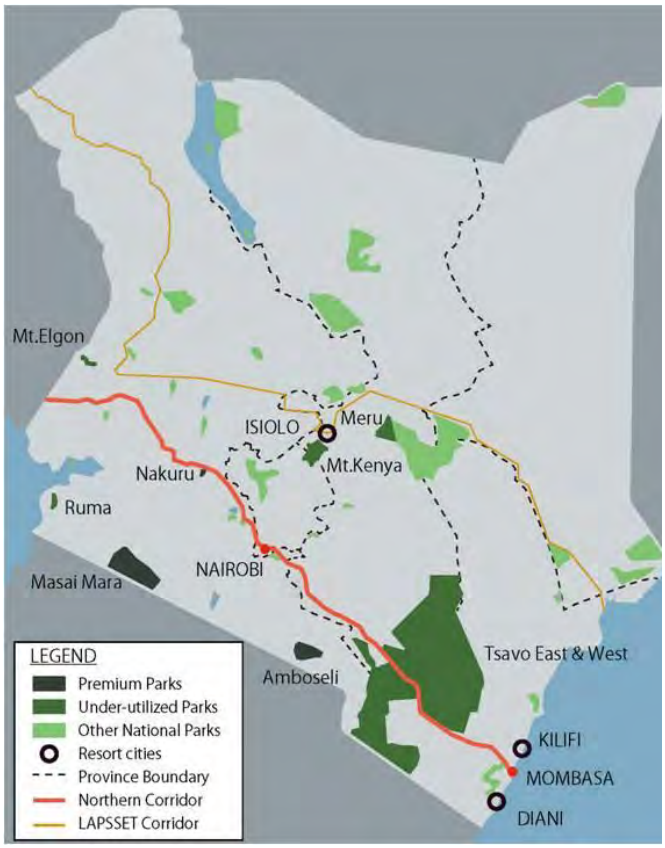
Detailed approaches are showed in National Tourism Strategy 2013-2018, the Second Medium Term Plan (MTP) 2013-2017.

Below are the highlighted plans for the sector.

(1) Premium Parks Initiative and Under Utilized Parks Initiative

Due to poor infrastructure or lack of facilities, visitors concentrate to a few parks such as Nakuru, Masai Mara and Amboseli. These are categorized as "Premium Parks", over-utilized parks which will be branded and the quality of accommodation in these parks will be substantially improved, making it possible to charge premium prices for the facilities.

Both Masai Mara and Amboseli are accessible by road and air. The road condition is in a good condition especially from Nairobi to, except for the access road which is still unpaved. As for Amboseli, it's possible to access it both from Nairobi (toward Namanga border) and Mombasa by road. Here also, the last 50km to the Park is in a bad condition.



Source: JICA Study Team

Figure 4.10.1: Location of Premium Parks, Under-Utilized Parks and Three Resort Cities

Some other parks are categorized as "Under-utilized Parks", where existing facilities and infrastructure should be improved and expanded to attract more tourists. Parks such as Meru, Mt.Kenya, Tsavo East, Tsavo West, Mt.Elgon and Ruma are included in this category.

(2) Development of Three Resort Cities

This is to promote coast product of the country. Two cities are identified with a different concept; Diani as a wellness-focused resort and Kilifi as family-friendly resort. Both cities are accessible from Mombasa, 30km south and 56km north east respectively.

Source: Wikipedia

Figure 4.10.2: View of Kilifi

Source: Wikipedia

Figure 4.10.3: View of Diani

The third one is Isiolo as a resort city, which is not located along the coast, but at the center of a rich tourism potential area presented by Mt. Kenya, Meru N.P., the Aberdares and Samburu N.P. Isiolo is also situated on the LAPSSET Corridor, and therefore it will be its tourism hub once the project is implemented.

Situated in the Upper Eastern sub-region, and lying 285km north of Nairobi, Isiolo is accessible via Nairobi- Isiolo A2 highway, paved and in good condition. Access to proposed resort city site (25km from Isiolo town) is rural road in bad condition.

Locations of the three cities as well as Premium and Under-utilized Parks are as shown in Figure 4.10.1

Source:http://www.nation.co.ke/counties/Plans-for-resort-city-status-in-top-gear/-/1107872/2013502/-/2uc1yv/-/index.html

Figure 4.10.4: View of Isiolo Town

Source: Japan Port Consultants (JPC)

Figure 4.10.5: Map Indicating Location of Isiolo Resource City and Conceptual Layout

(3) Niche Products

Besides the above traditional and major products, several products with potential sites to be developed to attract more tourists have been identified. ,. These are eco-tourism (Kakamega Forest, Ruma, Mt.Elgon, and Mt. Kenya regions), lake tourism (Lake Victoria and Ruma N.P.), cultural tourism (olorgasaille pre-historic site), among others.

(4) Conference Tourism

MICE has also been identified as a key product to generate more visitors to the country. Investment in hotels by international chains is expected in Nairobi, Mombasa, and Kisumu. In Nairobi, 20 hotels will be constructed by 2017.

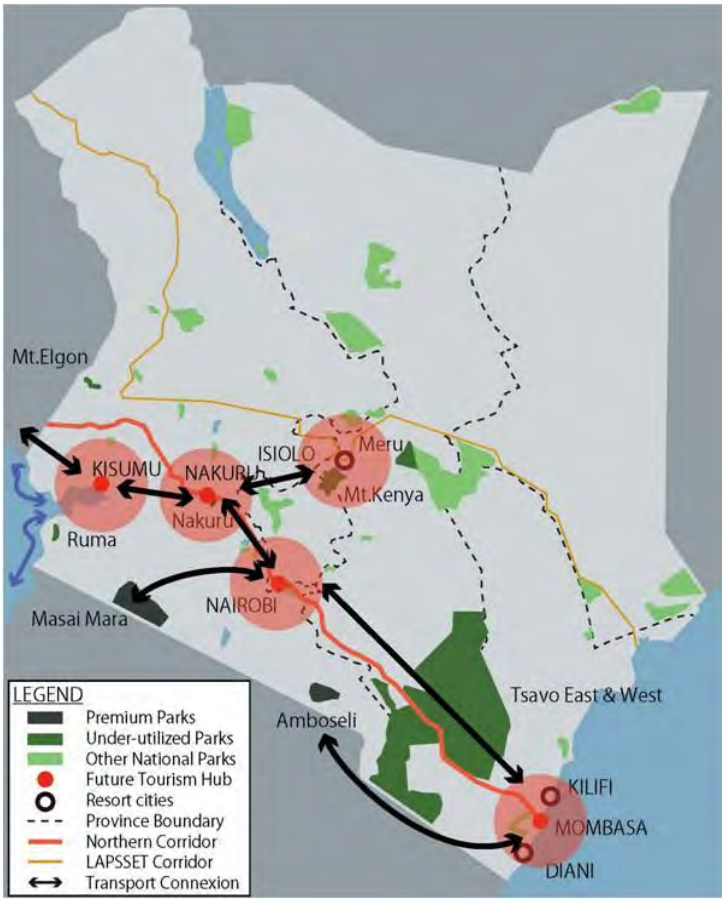
4.10.3 Necessary Interventions with Priorities

Figure 4.10.6 shows an image of future tourism network. There will be various entrance points besides Nairobi by developing and enforcing attractive tourism hubs as well as transport networks. Various projects will be implemented in Central, Western, and Coastal areas despite security issue, which is an external factor and therefore hard to control.

Focusing on the NEC, it is noteworthy that it passes through or by tourist attraction sites, such as Nakuru N.P., Tsavo N.P. or Lake Victoria, which have further potential for tourism. In this context, Nakuru might be a tourism hub within the NEC just like Isiolo is for the LAPSSET Corridor. Connection between these two cities is also possible. The location of Kisumu on the other hand is also suitable as a hub for water-based tourism and for access to Ruma N.P., as well as an entrance from EAC countries through Lake Victoria, if an international waterway transport system is operationalized

Necessary interventions are as follows;

- Complement lacking infrastructure such as the access roads to N.P. (as mentioned for Masai Mara and Amboseli), electricity and ICT network inside and around the Parks;
- Encourage and support investment in accommodation sector in key tourism areas: especially low value investment accommodation (below 4-star hotels) to premium national parks to widen the variety of visitor, and high quality accommodation (4-5 star hotels) with capacities of 30-50 beds each to underutilized parks to have a certain capacity;



Source: JICA Study Team based on Tourism Master Plan 2014-24

Figure 4.10.6: Target Marketing Strategy

- Implement a development plan to the potential tourism hub cities along the NEC;
- Investment in training for the sector: developing national training and testing standards targeted to the hospitality industry.

4.11 Status of Tourism and Service Sector in Uganda

4.11.1 Overview of Current Status

(1) Tourist Arrivals and Destination

Total number of visitors has experienced high growth in recent years. However, since 2011, this growth has been slow and unstable. Between 2010-2014, the sector experienced 22%, 4%, 1%, and 5% in growth respectively and the cumulative growth was about 33.5%.ble: The main source market for foreign visitors to Uganda is regional (78%) with Kenya (380,614 in 2013) and Rwanda (280,431 in 2013) being the two dominant markets. Visitors from America and Asia are also on the increase but on the other hand, Uganda loses visitors from Europe which is one of the key markets. According to the recent World Bank Survey (TEMS, 2012), more than 40% of

international arrivals visit other destinations in Africa, principally Kenya (20%), Tanzania (12%) and Rwanda (10%). These figures would indicate a propensity among tourists to make Uganda part of multi-destination trip.

Table 4.11.1: Visitor Arrivals to Uganda by Region ('000)

Region	2010	2011	2012	2013	2014*	% Change 2010-14	Share (%)
Africa	678	875	930	936	989	45.9%	78.1%
Europe	113	155	108	109	110	-2.7%	8.7%
America	65	59	71	73	77	18.5%	6.1%
Asia	41	45	61	67	70	70.7%	5.5%
Middle East	14	7	8	10	11	-21.4%	0.9%
Oceania	9	6	10	10	8	-11.1%	0.6%
Other & Not Stated	29	4	9	1	2	-93.1%	0.2%
Total	949	1,151	1,197	1,206	1,267	33.5%	

Source: Statistical Abstract, 2015 *Provisional

As for the destination, natural resources are the most tourist attraction feature. Table 4.11.2 presents the details that tourists' visits to Lake Mburo, Kibale, Kidepo Valley, Rwenzori Mountains and Mount Elgon National parks have increased in recent years., However, these are still not the major destinations like Murchison Falls or Queens Elizabeth. As shown in Figure 4.11.1, most of the N.Ps. are located at the periphery of the country.

Table 4.11.2: Visitors to National Parks (Citizens and Foreigners), 2010-14

National Park	2010	2011	2012	2013	2014	Share
Murchison Falls	53,460	60,273	60,803	70,798	68,844	33.7%
Queen Elizabeth	76,037	87,924	58,172	69,193	58,769	28.8%
Lake Mburo	20,966	21,480	22,927	14,068	26,980	13.2%
Bwindi Impenetrable	15,108	17,335	18,259	21,695	20,611	10.1%
Kibale	9,482	10,433	10,372	10,834	12,097	5.9%
Semliki	3,393	3,152	3,591	5,752	4,824	2.4%
Mgahinga Gorilla	3,328	1,899	2,497	8,952	3,033	1.5%
Kidepo Valley	3,208	2,452	2,300	2,890	4,091	2.0%
Rwenzori Mountains	1,529	1,738	1,663	2,724	2,758	1.3%
Mountain Elgon	2,660	2,350	1,565	2,096	2,314	1.1%
Total	189,171	209,036	182,149	209,002	204,321	

Source: Statistical Abstract, 2015

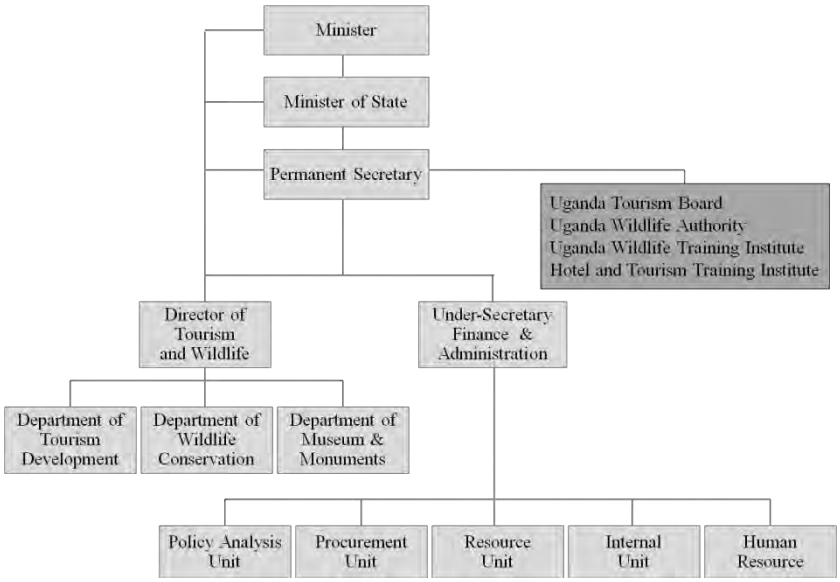
Source: JICA Study Team

Figure 4.11.1: National Parks in Uganda

(2) Organizational Structure

The Ministry of Tourism, Wildlife and Antiquities (MoTWA) is responsible for overseeing, monitoring and coordinating the sector. The Ministry has implementing agencies such as Uganda Tourism Board (marketing), Uganda Wildlife Authority (wildlife conservation), and Hotel and Tourism Training Institute (tourism and hospitality training). The organization structure is shown in Figure 4.11.2. Private sector is considered as the driver of the sector. Uganda Tourism Association is an umbrella association of private organizations and is expected to interact with

the government. However, according to several private travel agencies, the communication level is not sufficient.



Source: Ministry of Tourism, Wildlife and Antiquities

Figure 4.11.2: Organization Structure of Ministry of Tourism, Wildlife and Antiquities

(3) Service Sector

Statistics from UBOS (2011) indicate there were 64,602 enterprises in the accommodation and restaurant sub-sector, of which 36,413 (56%) were restaurants, bars and mobile food services; 3,876 (6%) provided accommodation and 24,313 (38%) provided event and other food services. MoTWA survey indicates there were 3,913 accommodation establishments in 2012. Accommodation facilities are unevenly distributed, with 47% in the central region, 23% in western region, 18% in eastern region and 12% in the northern region. Only 13% of accommodation might be considered suitable for mainstream tourist provision.

4.11.2 Policies and Plans for Tourism Development

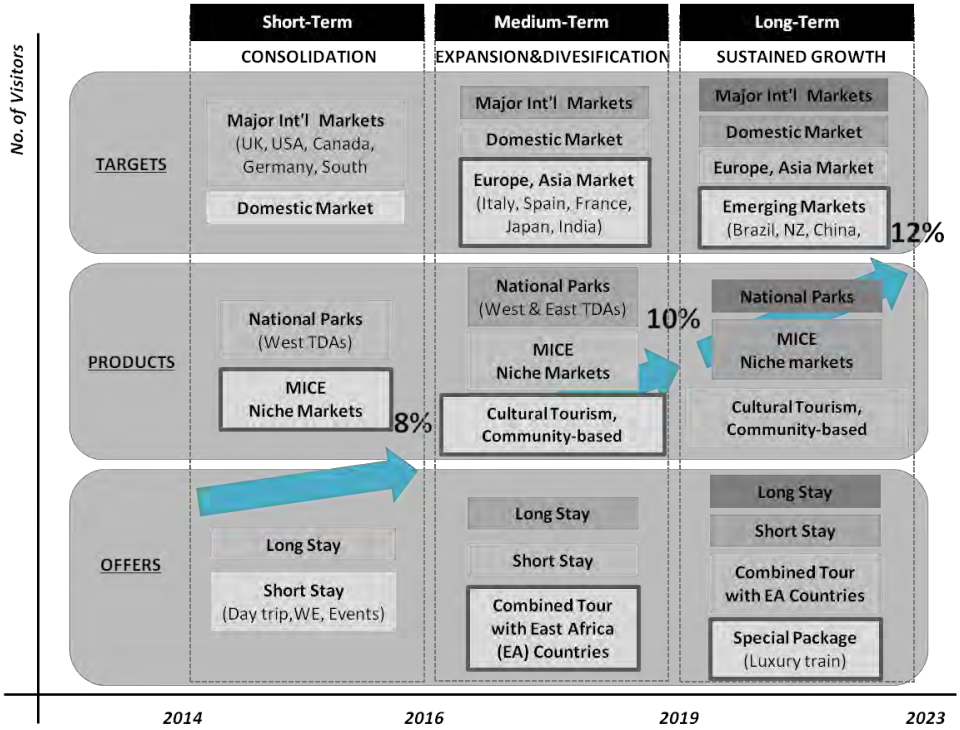
Planning and management of tourism sector is mainly guided by the overall national development framework, especially the NDP 2010-2015 and Vision 2040. In Vision 2040, the sector is expected to play a major role in the economy and a major contributor to GDP. The Tourism Development Master Plan 2014-2024, formulated in 2013, forecasts, by 2024, an increase in foreign receipts to more than 1.4 billion USD per annum, and the creation of over 150,000 additional tourism jobs.

Below are the highlighted plans for the sector.

(1) Phased Marketing Strategy

The marketing strategy follows the phased approach of the master plan strategy, namely consolidation during phase 1, expansion and diversification during phase 2 (focusing on emerging

market, promote new products such as MICE (Meeting, Incentive, Convention, Exhibition), and sustained growth during phase 3. Markets that will be targeted during the different phases are divided into categories according to their potential to attract tourists to Uganda. Through this strategy, number of visitors to the country is expected to grow at 8%, 10%, 12% per annum for each term (Figure 4.11.3), from 5% between 2012/2014.



Source: JICA Study Team based on Tourism Master Plan 2014-24

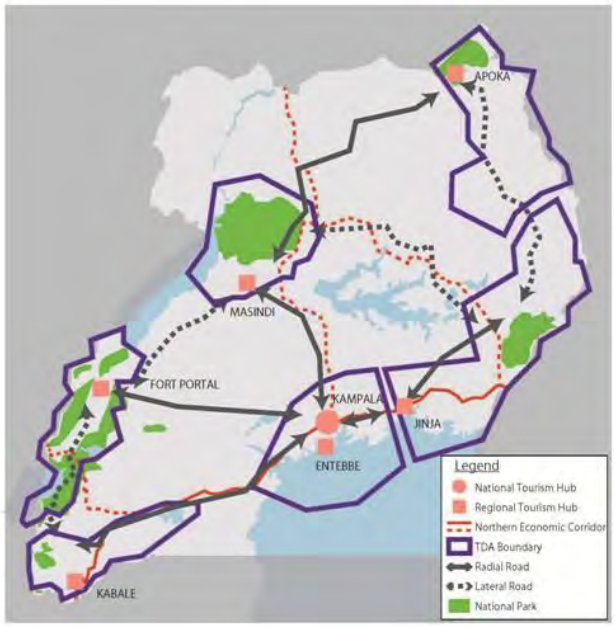
Figure 4.11.3: Target Marketing Strategy

(2) Tourism Development Areas and Infrastructure

Under the regional tourism approach, the MP designated 6 areas as "Tourism Development Areas (TDAs)" according to the current major destination as well as potential destination locations. In each TDA, it is proposed that a Regional Tourism Hub (RTH) be designated in one of the major towns and a Regional Tourism Office (RTO) be set up in each hub to guide the development of the TDA and assist local stakeholders in tourism planning and implementation.

As shown in Figure 4.11.4, TDAs will be connected by the radial roads from Kampala, and by lateral roads between them. 18 roads were identified as priority "tourism roads" by the government in 2012 as shown in Figure 4.11.5. Once established, these connections will form a "Ring road", defined in Vision 2040.

Similarly, five airports (Entebbe, Pakuba, Kidepo, Kisoro, and Kasese) are designated as tourism airstrips/drones which realize a direct access to the major N.P. from Entebbe. Northern Corridors will contribute to connect part of these airstrips by road passing through future key areas notably Mbarara, and Mt.Elgon.



Source: JICA Study Team

Figure 4.11.4: Structure of 6 Tourism Development Areas

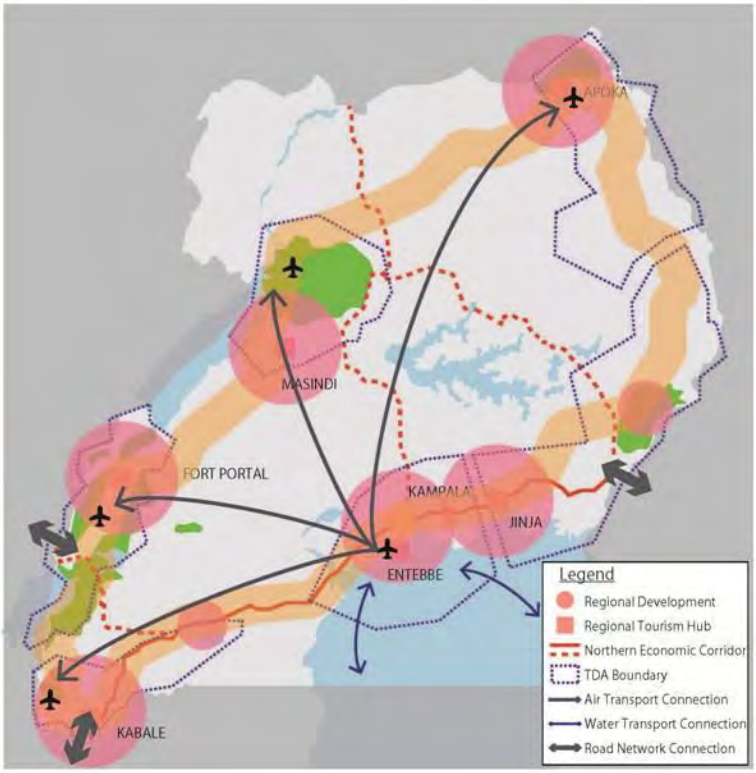
Source: JICA Study Team

Figure 4.11.5: 18 Priority Tourism Roads

4.11.3 Necessary Interventions with Priorities

Figure 4.11.6 shows an image of future tourism network. There will be various entrance points besides Entebbe airport by developing and enforcing attractive tourism hubs as well as transport networks. Regional areas will consolidate the unique character. Necessary interventions are as follows;

- Complement lacking infrastructure such as access roads to N.P. (major Parks like Murchison Falls is even corresponding), electricity and ICT network inside the Parks as well as in neighboring towns;
- Encourage and support investment in accommodation sector (especially in the mid-range and budget) in key tourism areas together with human resources development (HRD) coordinated by proposed HRD Advisory Committee;
- Implement a development plan of RTH together with local industry development, infrastructure development (i.e. interact with related ministries, organizations to formulate a plan);
- Identify the difference/uniqueness of Ugandan products (considering the diversification of tourism products as well as the combined tour within East African countries)



Source: JICA Study Team based on Tourism Master Plan 2014-24

Figure 4.11.6: Target Marketing Strategy

4.12 Logistics Industries in Northern Economic Corridor

4.12.1 Current Situation

(1) Logistics services

The logistics service along NEC consists of first-party (1PL), second-party (2PL) and third-party logistics (3PL)[21]. Industries which import bulk cargo of raw materials operate typically 1PL[22]. from interview results, it was discovered that large food-processing enterprises sometimes rely on 1PL: They arrange and deliver raw materials and the products. Some the companies own trucks in order to meet their quality and other specific needs. A large meat processing company in Kenya, for example, is facilitated with own cold chains and refrigeration trucks.

3PL provide the services like customs clearance, transportation of containers from the Port of Mombasa as well as the delivery from ICD to the customers' premises in case of custom clearance at ICDs. Some international freight forwarders provide even more integrated services including storage, breaking and building bulks as well as some other works as sorting, packing and labeling[23].

21 Cambridge Education/World Bank (2015) Study on Human Resource Needs and Skills Development of the Green Transport and Logistics Sector in Uganda (Draft Final Report)
22 Ibid.
23 Based on the interviews with logistics service providers in Nairobi.

In reality, the availability of 2PL and 3PL operators may consist of two extreme groups. While the majority may be small operators, a few large-scale 3PL or even 4PL operators are available. The dichotomy may be worse in Uganda. Based on interviews with foreign investors in Uganda, it seems difficult to find reliable customs clearance agents and logistics companies to satisfy their demand on both quality and the affordability: if a new investor is new in Uganda, looking for rather small scale services as start-up business, it may be faced with the challenge of finding adequate logistics service[24].

(2) Current Situation of Road Transport Industry in NEC

Road transport industry operation is concentrated within a small number of enterprises in East African countries. According a survey by World Bank in 2013, majority of transporters across EAC countries are small enterprises. 71% of Kenya's road transporters are individual or family-owned. Only 5% of the companies undertake 45% of operation of fleet truck in Kenya and 40% in Tanzania. Uganda's concentration is observed to be even higher[25].

Investment in the road transport is more active in Kenya. The average age of truck owned by surveyed enterprises was 7.5 years in Kenya whereas those in Tanzania and Rwanda were much older with 16.2 years and 12.6 years, respectively. It was also noted that the share of new trucks was high in Kenya: 56% of the trucks were new in Kenya whereas 80% of trucks are second hand in Tanzania[26].

It is observed that Kenyan transporters are preferred even in Uganda. Since Kenya especially the bloc from Mombasa to Nairobi is the destination of the majority of cargo, Kenyan transport industry naturally has more capacity than other countries.

4.12.2 Prospect of Demand and Growth of Logistics Sector

(1) Prospect of Demand

Regarding projected cargo volume, demand for transport and logistics services are expected to increase over time. The growth in logistics services will not only be in terms of volumes, but also the required variety thereby creating business opportunities. Furthermore, industrial development with structural changes may entail the demand for more sophisticated logistics services.

The increase in volume of demand requires more suppliers. A study estimated the number of workers required among various categories of jobs in Uganda in 2030 vis-à-vis 2015 baseline. A few examples are selected and shown in the table below.

24 According to the interview with foreign investors in Kampala, whereas international large-scale freight forwarders may not be interested in serving for the customers with small operation, small-scale operators are not reliable in terms of the time and the quality of handling.
25 Hartmann, O., E. Asebe (2013) Road Transport Industry in East Africa: In Kenya, Rwanda and Tanzania, SSATP, World Bank
26 Hartmann, et al. (2013)

Table 4.12.1: Estimated Number of Employees in Truck Operation and Logistics Services

Types	2015 Baseline	2030 Estimate
Truck drivers	83,130	196,468
Light goods vehicle driver	31,680	74,845
Freight forwarding & customs clearing agents	10,480	24,131
Customer service clerk & advisor	6,250	17,269
Supply chain management	340	2,349

Source: Cambridge Education/World Bank (2015) Study on Human Resource Needs and Skills Development of the Green Transport and Logistics Sector in Uganda (Draft Final Report)

The numbers are expected to increase largely in all categories. Similarly, more sophisticated service areas such as supply chain management indicates large degree of increase. The assumption behind this is that the structural changes in industries should increase business-to-business (B2B), business-to-consumer (B2C) and even consumer-to-consumer (C2C) logistics. Logistic services will require larger workforce to deal with various needs of customers.

Comprehensive logistics services are actually in place. As explained earlier, some forwarders have been started to provide supply chain management services. Sorting, packing and re-packing as well as inventory control are done. Such functions will be more in demand in future.

(2) Problems and Necessary Measures to Overcome the Problems

The introduction of SGR is expected to induce modal shift from road to rail. On the other hand, the delivery from depots along the rail to further inland or feeders require local transportation services. The problems of having such local enterprises may be found in the result of the survey. Kenyan road transportation enterprises perceived the following issues as significant obstacles: i) fuel costs, ii) poor road condition, iii) cost of maintenance and spare parts, iv) vehicle costs, and v) corruption and road blocks[27]. Despite the observed road conditions of the NEC main road, the situation may still not be favorable in the secondary and tertiary roads. 13.5% of labor force in Kenyan road transport enterprise is mechanics. Human resource demand may not only be limiting to the drivers, but also to these auxiliary services.

In addition, business development may be important. One of the issues may be facilitation of access to finance. 62.3% of Kenyan enterprises financed their last trucks through bank loans. The bank loan is short-term and attracts high interest rate. While the interest rate paid for the loan was 17.4% in Kenya, Tanzania and Rwanda, average duration of year of payment is slightly shorter in Kenya with 2.8 year (3.5 years and 3.4 years in Tanzania and Rwanda, respectively)[28]. Financial access may even be more difficult in Uganda: the interest rate for loans to obtain a vehicle is even higher in Uganda[29]. Considering the infantry stage of Uganda's logistics sector, it may require various measures including facilitation of finance to foster the sector.

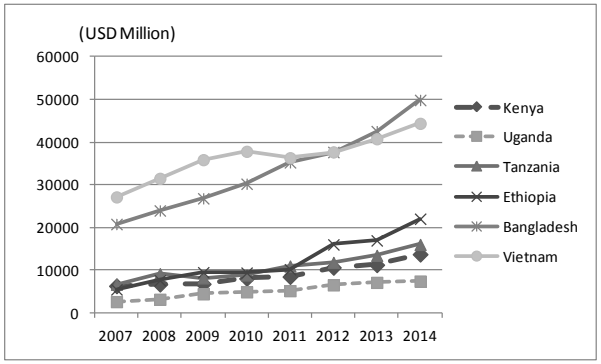
27 Hartmann, et al. (2013)
28 Hartmann et al. (2013)
29 A study indicates that the typical interest rate for Ugandan enterprises to finance logistics equipment is between 20 to24% whereas Kenyans are between 11% to 16% (Source: Cambridge Education/World Bank (2015)).

4.13 Investment Climate in Kenya

4.13.1 Overview of Current Status

(1) Trend of Investment and Foreign Direct Investment

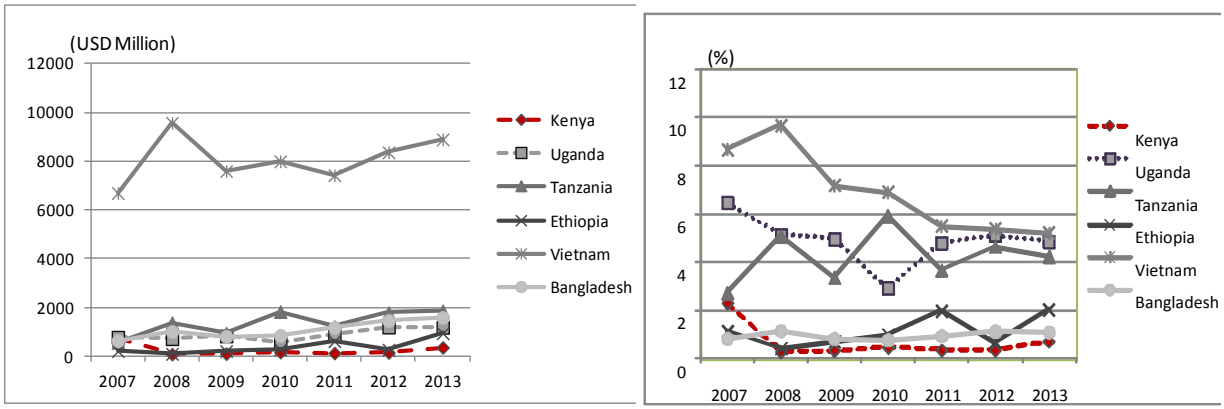
The level of the investment in total of Kenya has been steadily growing though the volume of the growth may not be outstanding comparing with the peer countries: the table below shows gross fixed capital formation over time comparing with regional peers and a few Asian countries. Despite the size of GDP, Ethiopia shows outstanding growth in recent years.



Source: JICA Study Team based on World Development Indicator

Figure 4.13.1: Value of Gross Fixed Capital Formation of Kenya, Uganda and Peer Countries

Kenya's records of attracting FDI inflow have been stagnant for recent years. The left Figure below shows the value of FDI inflow. While Tanzania, Uganda and even Ethiopia in the very recent figure show the same level, Kenya's stagnation is rather noticeable. The ratio to GDP also remains low even comparing with the other East African countries.



Source: JICA Study Team based on World Development Indicator

Figure 4.13.2: Value of FDI Inflow of Kenya, Uganda and Peer Countries (Left) and the Ratio to GDP (Right)

The Table below shows the stock and net inflow of foreign direct investment in 2013. The sectorial breakdown of stock indicates that finance and insurance and manufacturing sector have the largest stock. In 2013, larger net inflow was realized in manufacturing. Other sectors such as electricity and gas, finance and insurance and wholesale and retail also have a large share.

According to the licensed investment project data, the total value of direct investment is estimated to increase by 14.5% due to investment in the construction and real estate sectors. After devolution

following the new constitutional dispensation, investors are not required to register at Ken Invest. Therefore, the actual investment flow is not able to be capture from the licensed number. However, the large increase indicates impact on other sectors as construction materials.

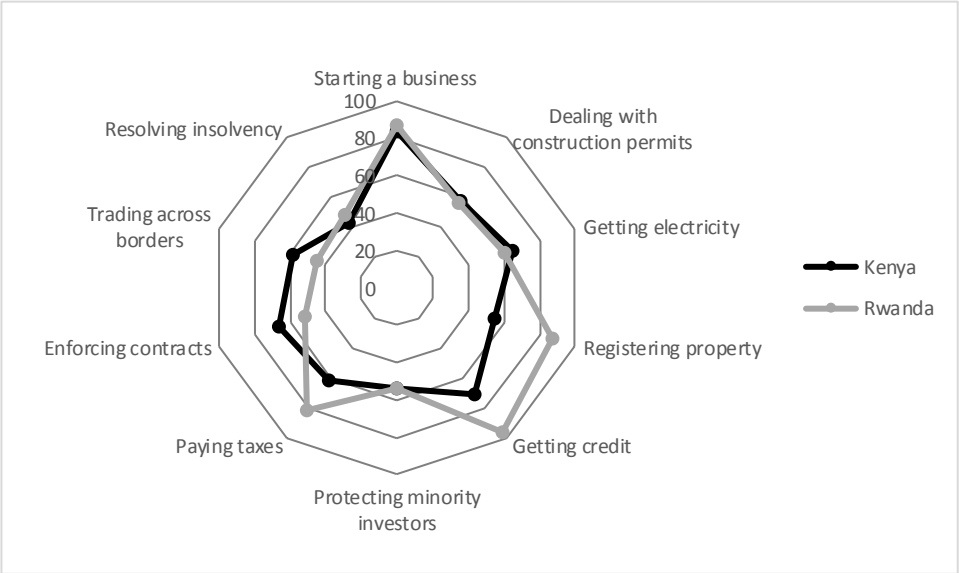
Table 4.13.1: Kenya's Stock and Net Inflow of FDI Liabilities by Sector in 2013

	Stock		Net Flow	
	Value (Ksh million)	Share (%)	Value (Ksh million)	Share (%)
Agriculture, forestry and fishing	20,864.70	4.6	770.82	1.0
Mining and quarrying	19,105.88	4.2	6,550.85	8.3
Manufacturing	101,181.85	22.3	24,141.84	30.6
Electricity, gas, steam and air conditioning supply	18,867.07	4.2	17,182.61	21.8
Water supply; sewerage, waste management	-	-	-	-
Construction	9,062.46	2.0	1,870.32	2.4
Wholesale and retail trade	71,794.41	15.8	9,468.51	12.0
Transportation and storage	300,82.00	6.6	2,179.46	2.8
Accommodation and food service	14,181.30	3.1	956.68	1.2
Information and communication	27,139.06	6.0	-1,183.07	-1.5
Financial and insurance activities	129,252.41	28.4	16,080.45	20.4
Real estate activities	82.24	0.0	22.06	0.0
Professional, scientific and technical activities	541.01	0.1	-358.68	-0.5
Administrative and support service activities	4,292.06	0.9	156.61	0.2
Education	5,613.73	1.2	1,066.53	1.4
Human health and social work activities	53.22	0.0	-5.64	0.0
Other service activities	2,462.30	0.5	-0.29	0.0
Total	454,575.71	100.0	78,908.07	100.0

Source: JICA Study Team based on KNBS "Foreign Investment Survey 2016"

(2) Investment climate

According to the World Bank Group's Doing Business Investment climate has been improving: in 2017, Kenya ranks itself as 92nd, whereas it was 116th in 2016. It was actually almost the same or even higher than Asian middle income countries such as Indonesia (91st) and the Philippines (99th). Comparing the Distance to Frontier indices with those of regional leader, Rwanda, some issues may require further improvement in terms of regulatory environment for business. While Kenya has a natural advantage in "trading across borders" as opposed to land-locked Rwanda, the scores of registering property and paying tax are lower than Rwanda's. It is however noted that Kenya's score of getting credit is actually ranked as 32nd.



Source: JICA Study Team based on Doing Business 2017

Figure 4.13.3: Ease of Doing Business Distance to Frontier Score of Kenya and Rwanda

FDI can encounter the problems differently from the domestic private sector. According to Foreign Investment Survey 2015, the following issues are evaluated as the procedures which are perceived to take long time (percentage indicates the ratio of responding foreign investors):

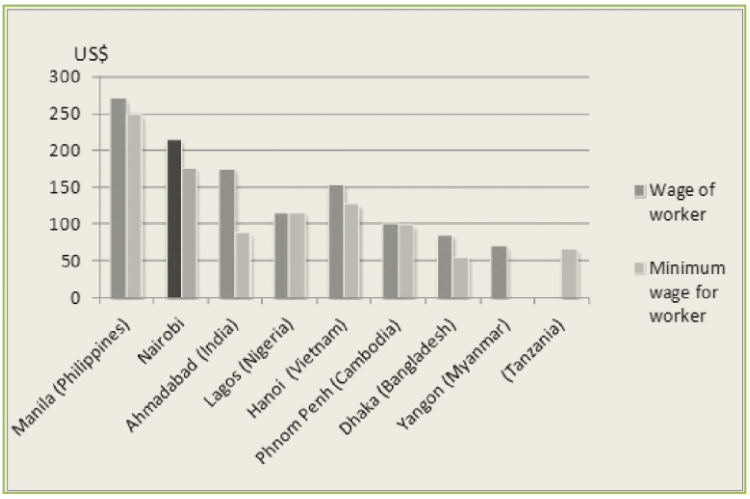
- Registration of Property (e.g., Land) (58.9%)
- Work permit/passes (48.3%)
- Construction permit

It was also noted that the kind of procedures which are perceived as expensive are as follows:

- Business credit (51.3%)
- Electricity (45.4%)
- Work permit/passes (44.3%)
- Registering property (e.g., Land)

The Foreign Investment Survey also asked the question regarding concerns of the business which requires improvement. Insecurity was raised both as a top concern and area for improvement by largest number of respondents. On the other hand, transport and infrastructure was also raised as one of the areas for improvement by many respondents at 15%.

Kenya's investment climate should also be assessed by the cost of doing business. Apart from the cost of freight, labor and power tariff may be relatively higher than other competing countries. The figure below shows the wage level of Kenya and other countries.



Source: JICA Study Team based on the data of JETRO and www.afriapay.org/ (Tanzania)

Figure 4.13.4: Wage of Workers and Minimum Wage of African and Asian Cities

Another concern is the electricity cost. As seen in the table below, Nairobi's electricity cost may require improvement comparing with the Asian peer.

Table 4.13.2: Comparison of Electricity Cost

(Unit: USD)

	Kenya (Nairobi)	South Africa (Johannesburg)	Vietnam (Hanoi)
Electricity (per kwh)*	0.08 + fixed charge (USD 196) and Demand Charge (USD 2.53/kVA)	0.066 + fixed charge (USD 223.59)	0.05-0.12

Note: *: In case of large-scale business
Source: JETRO "Cost of Doing Business (2013)"

4.13.2 On-going Effort by GOK

In order to better the business environment, Kenya has been providing package of incentives through Export Promotion Zones (EPZ). EPZ enterprises can enjoy 10 years of tax break and duty-free import of raw materials and machinery as long as they export the products to outside of the EAC areas. Currently, 52 zones are registered and 84 enterprises are operating[30]. GOK also provide 100% of deduction for hotel building and capital investment on manufacturing.

GOK is further preparing a scheme for Special Economic Zone (SEZ). It is to encompass wider economic activities. The locations of SEZs planned in the Mid-Term Program of Kenya's Vision 2030 are Mombasa, Lamu and Kisumu.

4.13.3 Necessary Interventions

Regulatory environment should be further improved. The analysis together with the value-chain survey hinted that devolution has created confusion on licensing and taxation. It is also difficult to capture the detail of investment due to change in licensing requirement which does not have mechanism of centrally compiling data.

30 KNBS, "Economic Outlook 2015"

Continuous infrastructure development for improvement of the situation of the cost of doing business should put in place. For, some sectors which utilize high amount of power it may be hesitant to invest in Kenya with the prevailing high cost of energy.

4.14 Investment Climate in Uganda

4.14.1 Overview of Current Status

(1) Trend of Investment and Foreign Direct Investment

The total level of investment in Uganda is still low comparing with neighboring economies. As seen in Figure 4.13.1 in the previous section, the trend of gradual growth of gross fixed capital formation over time is observed, bit still in the low level. Uganda, however, has been showing a sizable inflow of FDI relative to its size of GDP (see Figure 4.13.2 in the previous section).

In order to analyse the sector trends, the data on registered value of investment were further reviewed. Table 4.14.1 shows the value of registered investment at Uganda Investment Authority (UIA). It includes foreign, domestic and joint venture. It should be noted that the figure shows the licensed investment at UIA only, while BoP-based FDI in the Figure 4.13.1 covers entire flow of money regardless being licensed or not. Planned value registered at the time of license and the actual invested value monitored and confirmed by UIA has a large discrepancy. Construction and manufacturing takes large shares in the actual investment. The sectorial breakdown of 5-year cumulative number of FDI project also indicates that manufacturing is the leading sector of FDI. Similarly, total investment in the latest data also shows manufacturing as the key driver. The table below shows the value of actual investment where manufacturing's share is 37.1%.

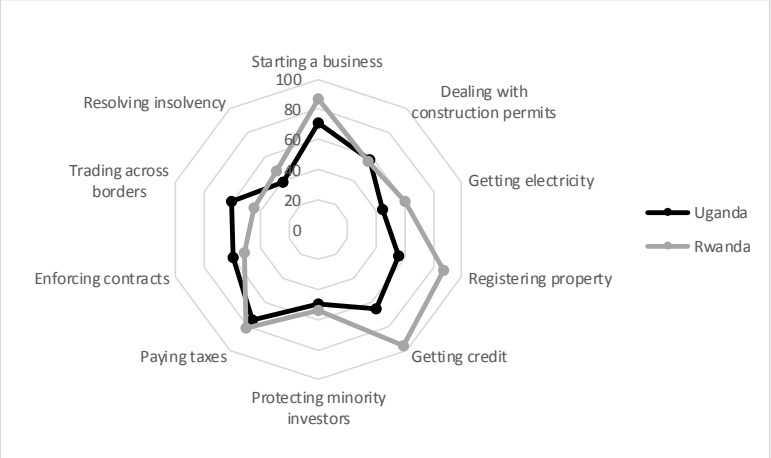
Table 4.14.1: Uganda's Actual Investment Value in 2013/2014 and the Share

	Planned 2014/2015 (USD '000)	Actual 2014/2015	
		(USD '000)	Share
Agriculture, forestry and fishing	65,448	57,637	12.6%
Community and Social Services	41,902	6,029	1.3%
Construction	466,800	153,527	33.7%
Financial and insurance activities	113,511	9,570	2.1%
Electricity, gas, steam and air conditioning supply	317,824	27,071	5.9%
Manufacturing	274,620	170,773	37.4%
Mining and quarrying	24,702	5,130	1.1%
Transportation and storage	25,871	22,996	5.0%
Wholesale and retail trade	76,300	3,376	0.7%
Total	1,406,978	456,110	100.0%

Source: UIA Investment Abstract Fiscal Year 2013/14

(2) Investment Climate in Uganda

Uganda has been making efforts to improve its investment climate specifically targeting a higher rank in the Doing Business of the World Bank Group. The rank of the latest survey was 115th out of 190 countries. Comparing with the score of the regional leader, Rwanda, the regulatory environment may require some further improvement. On the other hand, "dealing with construction permit", "enforcing contract" and "trading across borders" marked higher scores than Rwanda.



Source: JICA Study Team based on Doing Business 2017

Figure 4.14.1: Ease of Doing Business Distance to Frontier Score of Uganda and Rwanda

According to the Investor Survey 2011, 70.65% of respondents replied tax regulation and registration as obstacles for their businesses followed by foreign currency/exchange, bureaucracy and business, customs/ foreign trade and environmental regulations at 67.8%, 67.7%, 56.7%, and 50.2% respectively.

68.4% of the businesses may be operating with low utilization of the capacity of their facility (less than 70%) due to such reasons as the low demand, unreliable production input and lack of working capital. On the expansion of business, energy infrastructure including electricity was raised as obstacles by most of the respondents (85.7% of respondents). On the other hand, regional level expansion of transportation infrastructure is regarded as a problem (45.3% of respondent).

Uganda's investment climate should also be assessed by the cost of doing business. As mentioned earlier, infrastructure issues are major constraints for the expansion of the business. Apart from the cost of freight, power tariff may be relatively higher than other African and Asian countries.

Another concern is the electricity cost. As seen in the table below, Uganda's electricity cost may require the improvement comparing with Asian peer.

Table 4.14.2: Comparison of Electricity Cost

(Unit: USD)

	Uganda	Kenya (Nairobi)	South Africa (Johannesburg)	Vietnam (Hanoi)
Electricity (per kwh)*	0.10	0.08 + fixed charge (USD 196) and Demand Charge (USD 2.53/kVA)	0.066 + fixed charge (USD 223.59)	0.05-0.12

Note: *: In case of large-scale business. Uganda's tariff is average of 3 categories calculated by USD1=UGS3400.
Source: JETRO "Cost of Doing Business (2013)", Uganda: UMEME

4.14.2 On-going Effort by GOU and Necessary Interventions

GOU has developed and launched activities to improve business climate under "Competitiveness and Investment Climate Strategy". Currently, World Bank is supporting land administration reform, business registration and business licensing reforms under "Competitiveness and Enterprise Development Project (CEDP)".

Under the Investment Code Act (Cap. 92), investors with more than USD 500,000 for foreign investors and USD 50,000 for domestic investors are granted for reduced rates for the duty for importation of machinery, equipment, vehicles and the construction materials for the invested project.

4.14.3 Necessary Interventions

Regulatory environment should be further improved. Problems related to the tax issues and customs duties can impact not only when attracting the investors, but for existing investors for re-investment.

Development of the infrastructure is also important, but the attention should be paid to the network and outreach to internal areas as securing supply of the raw materials may be influenced largely by the transportation network.

Although it may require further review, proactive marketing of the country may be also necessary regarding the landlockedness and relatively small presence of the existing foreign investors' community.

4.14.4 Regional Integration and the Impact of the Investment Climate

Investment climate of the countries along NEC is influenced by the progress of regional integration through. More smooth movement of goods and services, workers and capital is facilitated through the establishment of harmonized regulatory environment together with infrastructure development. Among the regional economic communities (RECs) in Africa, EAC has been promoting deeper integration. The EAC Common Market Protocol (EAC CMP) has been in force since 2010 ensuring freedoms of four factors of production and two rights: free movement of goods, free movement of persons, free movement of labor/workers, right of establishment, right of residence, free movement of services, and free movement of capitals.

(1) Establishment of Customs Union and Streamlining of Trade Logistics

Free movement of goods is facilitated through formulation of the customs union. Prior to EAC CMP, the custom union was established by the EAC Customs Protocol originally signed by Kenya, Uganda, and Tanzania, later by Rwanda and Burundi. The details of the customs procedures were further stipulated in the EAC Customs Management Act (EACCMA) and the EAC Customs Procedures. EAC further adopted the Single Customs Territory (SCT) Framework in 2014 to

minimize the border transactions of goods. Together with customs regime within EAC, the establishment of SCT is expected to streamline the movement of goods.

Smoother movement of goods and services still faces some challenges. A significant challenge is to streamlining the procedures which requires coordination with various domestic and regional stakeholders. It may be further elaborated in the framework of the single customs territory (SCT) especially for inland countries where customs clearance and transit arrangement will be streamlined. Each country has been working on simplifying the trade logistics through establishing a single window[31].

Although smooth physical movement of goods will be realized through the improvement of trade logistics, the issue may be found in facilitation of the efficient trade flow through reduction of tariff and non-tariff barriers. Kenya, Uganda, and Tanzania concluded process of exempting the duties on the goods mutually, however, with exceptions. Different challenges and barriers may be experienced by the private sector of partner states. The table below shows some issues raised during the interviews with the private sector operators and other stakeholders.

Table 4.14.3: EAC Tariff and Non-Tariff Barriers Experienced by Kenya and Uganda

Partners	Kenya	Uganda	Tanzania
Kenya		Rules of origin (ROO): the calculation of the value addition of exported goods to be certified as "EAC product" is sometimes questioned.	ROO: the interpretation of "EAC product" may be different. Products from other countries are not granted with equal treatment with domestic products.
Uganda	Problems of standard. UNBS may not have the specific standards for certain products. Kenyan side demands the certification of KEBS.		(not able to access to the information)

Source: JICA Study Team based on the interview with enterprises and private sector

While the member countries have been working for harmonization of the standard and certification mechanism, it may require bottom-up. The legal frameworks of harmonization of standard, quality assurance, metrology and testing (SQMT) have been laid out for setting for the institutional buildings and adjustments at the partner state level. However, it is noted that the difference in the level of industrial development as well as the SQMT institutional and physical infrastructure may act partially as non- tariff barriers. It is especially observed the trade between Kenya and Uganda in the study. SQMT system is fundamental infrastructure for industrial development. Therefore, partner states are required to respond the harmonization requirement and to consider domestic interest of the level and vision of industrial development simultaneously.

31 Kenya has established their National Single Window System in 2015. Kenya Trade Network Agency administers KenTrade. The system is administered managed by an international private contractor. Some examples of the documents which are to be submitted electronically via KenTrade system are the following: manifest, import declaration form, sanitary and phytosanitary certificates, import/export permits by technical agencies for specific fields as agriculture, health, pharmaceuticals etc, and KEBS inspection approval (ref. Public Notice on 3 July 2015 by the National Treasury). Uganda is also setting up it National Electronic Single Window: NEWS) with the support of TMEA.

With the improvement of the institutional capacity, the trade barriers will be reduced to some extent, which is expected to facilitate intra- and extra regional trade with larger volume of traded goods and services.

(2) Free Movement of Persons

In terms of free movement of persons, EAC CMP has a few provisions to facilitate free movement of persons. It includes workers and labor, and specialized professional as well as tourists. In order to ensure the implementation of the free movement of workers, EAC CMP further stipulates that the partner states recognize and harmonize the professional certificates of other partner states and provide equal treatment both for their own nationals and those from the partner states. The citizens of the partner countries are required to obtain work permits in case of having contracts of more than 90 days in other partner countries. The fee for the permits is exempted for the citizen of the partner countries.

Free movement of the workers and labor may entail the impact in two ways: efficient resource allocation may be able to increase the efficiency of economic activities in the region. At the same time, it may cause some imbalance. Talented workforce may be concentrated in a few certain attractive locations. As envisaged in EAC CMP, it is important to harmonize the policy and implementation of labor policies as well as human resource development in order to ensure fair and balanced development.

(3) Free movement of capital

Although EAC has commenced negotiation toward forming a monetary union, the discussion has yet to be concluded. In the meantime, integration of financial sectors is observed gradually. The banking sector in the partner states have started to open its subsidiaries in other partner states: Kenyan banks including Kenya Commercial Bank (KCB), Equity Bank, and Commercial Bank of Africa (CBA) have established subsidiaries or been a part of the group of banks in other partner states[32]. In the statistics in 2010, the access to formal financial services in EAC countries is still limited. In 2010, whereas Kenya achieved 40%, Uganda, Tanzania, and Rwanda were below 30% with 28%, 17% and 21%, respectively[33]. However, the financial access may be outstandingly improved in the region. In Kenya, 75.3% had access to formal financial services in 2015[34]. Kenyan insurance sector also shows the expansion in the region. The access to the finance is expected to increase overtime through free movement of financial resources.

(4) Expansion of Regional Integration

32 EAC website (http://www.eac.int/sectors/financial/banking)
33 Sanya, S,, M. Gartner(2012), Assessing Bank Competition within the East African Community, IMF Working Paper, WP/12/32, IMF
34 KNBS (2016) Economic Survey 2016

It should be also noted that the countries along NEC are members of other RECs: Apart from COMESA, Tanzania and DRC are members of Southern Development Community (SADC) which is led by South Africa. The table below shows the plans and progress of integration of three major regional economic communities (RECs) related to NEC countries. The situation with multiple RECs in NEC with differences among them has caused complexity for the progress of integration of EAC. However, these three RECs have further launched the Tripartite Free Trade Area (FTA) in 2015 to form an even larger REC. The expansion of economic growth in wider REC may provide wider access to the market for the industries along the corridor. On the other hand, it may also introduce competition among other regions in the larger FTA. The efficiency of the production and market system in the area along NEC should be enhanced in order to exploit better market access in the region and to compete with other regions.

Table 4.14.4: NEC Countries in the Regional Economic Communities

	Membership of Countries along NEC							Customs union	Common Market	Monetary Union	Free movement of persons
	Kenya	Uganda	Tanzania	Rwanda	Burundi	DRC	South Sudan				
East African Community (EAC)	○	○	○	○	○	Under negotiation	Under negotiation	Customs Union established. Single Customs Teritory (SCT) with the Common External Tariff (CET) and zero tariff within the region.	Established under EAC Common Market Protocol. Trade facilitation, harmonization of standard and certification	Envisaged. The negotiaion on the Monetary Union Protocol has been held.	EAC CMP ensures free movement of persons. Establishment of single tourist visa Introduction of common passport
Common market for Eastern and Southern Africa (COMESA)	○	○		○	○	○		Customs Union established and agreement of forming FTA (14 countries)	Established	Envisaged.	Protocol on the free movement of people.
Southern African Development Community (SADC)			○			○		Preferential treatment agreement (PTA) in effect (except DRC), working for forming the Customs Union	Efforts in reducing NTBs, but detailed rules on ROO. Problems in the free service trade.	Envisaged.	Citizens of member countries can stay without visa for 90 days.

Source: JICA Study Team

CHAPTER 5 TRANSPORT AND LOGISTIC INFRASTRUCTURE DEVELOPMENT

5.1 Current Situation

5.1.1 Overview

The current situation of transport and logistics on Northern Economic Corridor can simply be said that movement of cargo heavily relies on condition of road traffic, Mombasa Port operation and cross border operation. In this regard three crucial agendas are worth considering: how to reduce road congestion, Mombasa port operation, and cross border operation. These three can be referred to as main bottlenecks.

To begin with, heavy road congestion is experienced around Mombasa, Nairobi, Nakuru, Eldoret, Kisumu and Malaba in Kenya and also around Jinja, Kampala and Entebbe in Uganda. The congestions around these points are caused not only by cargo traffic but also passenger traffic. Traffic demands for both cargo and passengers have been increasing rapidly due to population and economic growth within the countries of the Northern Economic Corridor. Although improvement of existing road networks and construction of new ones have been aggressively implemented, road congestion still remains a serious problem. In addition, traffic safety is emerging as one of serious issues on Northern Economic Corridor. It is also closely related to the traffic congestion.

Secondly, Mombasa port is the only international seaport on the Northern Economic Corridor via which most import and export pass through. The port of Mombasa has implemented projects with capacity expansion and efficiency improvement. However, these developments have not matched the 10% average annual growth rate in demand for import cargo registered in the past five years. New container terminal construction and cargo handling improvement cannot catch up with the rapid increase in cargo demand. The net effect translates to longer time at the port. In addition to the congestion of Mombasa port, Mombasa city is characterized by inadequate road capacity and inappropriately sited container freight stations. These factors make Mombasa to be the most heavily congested section by trucks on the Northern Economic Corridor.

Thirdly, as far as cross border operation is concerned, One Stop Boarder Project (OSBP) is expected to have great contribution to improve operation efficiency, but most of the projects are still under construction. Great improvement of efficiency has not been confirmed yet. At Malaba border located between Kenya and Uganda always have very long queues, sometimes as long as more than 3km, which are commonly witnessed during daytime. Malaba border can be seen as the busiest and highest congested border on Northern Economic Corridor. Furthermore, just like Mombasa port, the demand for cross border traffic has been on the increase. In addition,

custom clearance procedures are still inefficient due to lack of human capacity, electricity, internet communication, parking lots and access road among others.

On a wider scope for efficient global logistics on Northern Economic Corridor in future, other important issues such as how the corridor interacts with both central corridor and LAPSSET, how to deal with an increasing demand in logistics of minerals from Uganda, DRC and South Sudan to the port of Mombasa, how to develop local industries and promote local products for export have to be considered. In this regard the following proposals should be considered:

Promoting Modal shift; Modal shift from truck to railway, pipeline and other modes is the key issue for next 15 years until 2030 because Standard Gauge Railway project will be completed between Mombasa, Nairobi, and Kampala. Freight demand can be categorized by a number of criteria like weight, quantity, distance, lead time, value and so on. Multimodal transport system should be built for a variety of freight demand.

Building International Road infrastructure for logistics; Road network is the most fundamental requirement for logistics from short to long distance transport. It is therefore necessary to build international road network and constantly maintain good road condition.

Assigning Inland logistic hub; in order to promote export and import for inland countries, sufficient inland container depots, logistic centers and warehouse functions are indispensable. Such kinds of functions can also attract other industrial functions such as manufacturing, trading, market, convention and so on. These functions should be more efficiently connected with logistic infrastructure such as standard gauged railway, highway, port and airport.

5.1.2 Current Freight Traffic Demand

Traffic survey relating to the current road freight movement by truck on the Northern Corridor in Kenya and Uganda was conducted by JICA Study Team in 2015. This survey focused on the international freight movement or cross border traffic from Mombasa Port to Kenya, Uganda, Rwanda, Burundi, South Sudan, DRC and Tanzania. Here, important results obtained from the survey are mentioned and analysed.

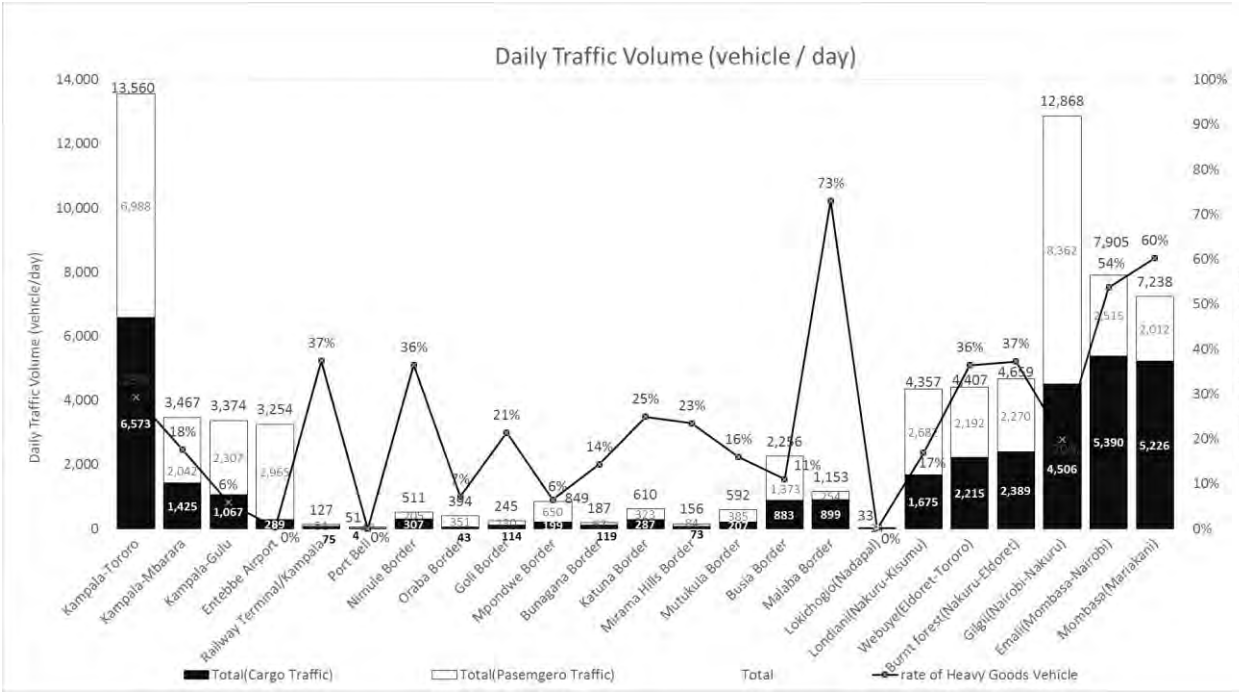
(1) Characteristics of Freight Traffic on the Road

(a) Traffic Volume

- Highest traffic volume in Kenya is 12,868 vehicles/day between Nairobi and Nakuru.
- Highest traffic volume in Uganda is 13,560 vehicles/day between Kampala and Tororo.
- Highest Cargo Ratio is 72% at Mombasa. Cargo traffic volume is 5,226 vehicles/day. (Cargo volume breakdown: LGV&MGV: 862vehicles/day, HGV and trailer: 4,364vehicles/day, Ratio of HGV is 83% of total cargo traffic.）

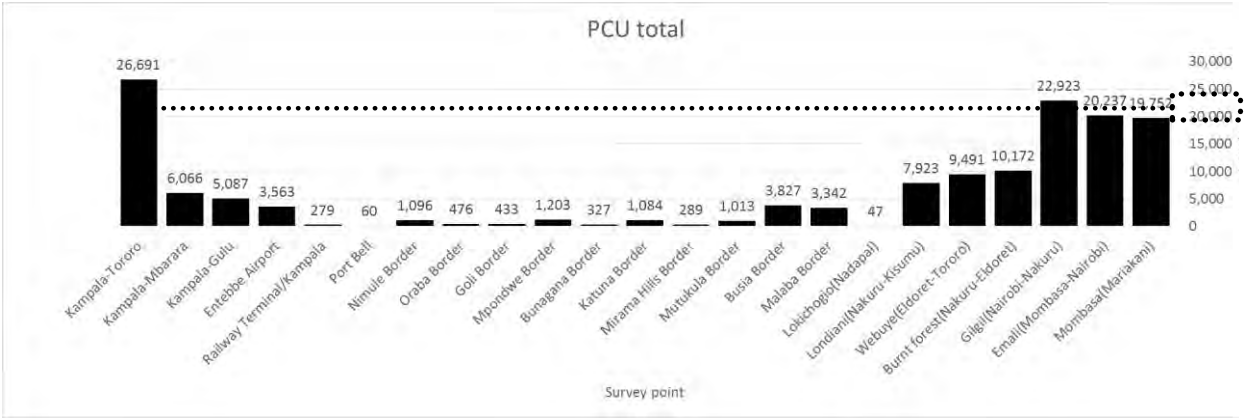
- Cargo traffic volume at border post between Kenya and Uganda : Malaba (78%) > Busia (39%), However, total traffic volume at Malaba is 1,153vehicles/day which is less than the total traffic volume at Busia (2,256vehicles/day).
- Traffic Volume at other border posts
  Nadapal (Kenya/South Sudan): 9vehicles/day (27%),
  Katuna (Uganda/Rwanda): 287vehicles/day (47%)

*Notes; HGV: Heavy Goods Vehicle, LGV: Light Goods Vehicle, MGV; Medium Goods Vehicle



Source: JICA Study Team

Figure 5.1.1: Traffic Volume on the Survey Sites (Vehicles/day)



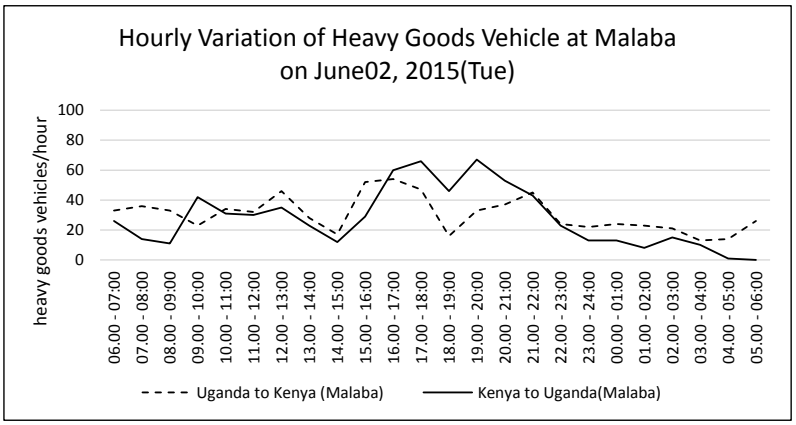
Note: PCU equivalent factor：passenger car (1.0), minibus (1.4), medium bus (1.8), large bus (2.2), medium goods vehicle (2.5), heavy goods vehicle/trailer (3.5) （based on the road design manual in Kenya/Tanzania and Uganda）
Source: JICA Study Team

Figure 5.1.2: PCU on the Survey Sites (pcu/day)

If traffic volume is converted to passenger car unit, the volume of sections between Mombasa and Nairobi, Nairobi and Nakuru, and Tororo and Kampala are greater than or nearly the same as 20,000 pcu/day. This means that these sections, with two lanes road, are already are deficient in capacity.

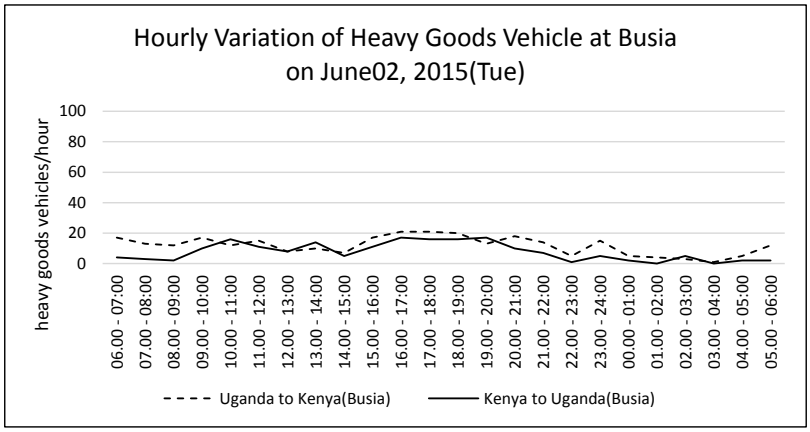
Hourly variation of heavy goods vehicles traffic volumes which consist of heavy goods vehicles, semi-trailer, trailer and Lorries at Malaba (Uganda side) and Busia (Uganda side) are shown in Figure 5.1.3 and Figure 5.1.4 respectively. Peak hour of the direction from Malaba to Kampala was from 16:00hrs to 20:00hrs. Peak hours of the direction from Kampala to Malaba were 15:00hrs to 18:00hrs. On the other hands, peak hours of the direction from Busia to Kampala were from 16:00hrs to 20:00hrs. Peak hours of opposite direction were from 16:00hrs to 19:00hrs.

Hourly variation of heavy goods vehicles at Mariakani are shown in Figure 5.1.5. Peak hours of the direction from Mombasa to Nairobi were from 11:00hrs to 21:00hrs. During night time from 21:00hrs to 01:00hrs as midnight, heavy goods vehicle traffic was counted. Peak hours of the direction from Nairobi to Mombasa were from 5:00hrs to 8:00hrs, from 9:00hrs to 12:00hrs and from 18:00 to 19:00hrs.



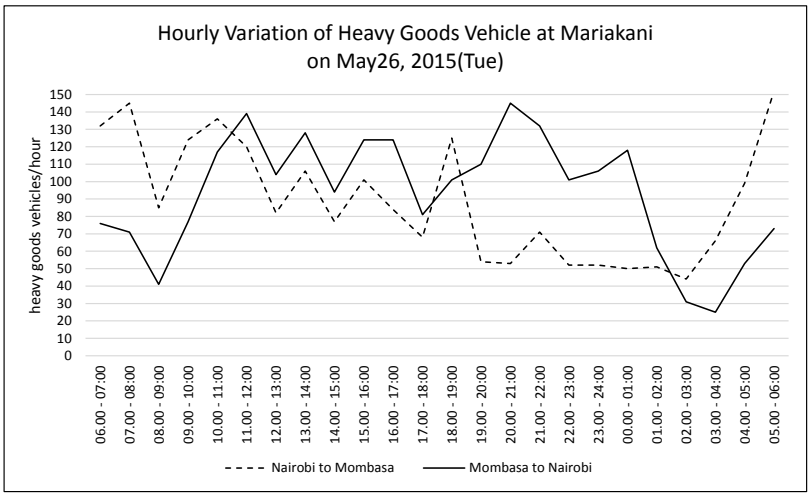
Source: JICA Study Team

Figure 5.1.3: Hourly Variation of Heavy Traffic Volume at Malaba



Source: JICA Study Team

Figure 5.1.4: Hourly Variation of Heavy Traffic Volume at Busia

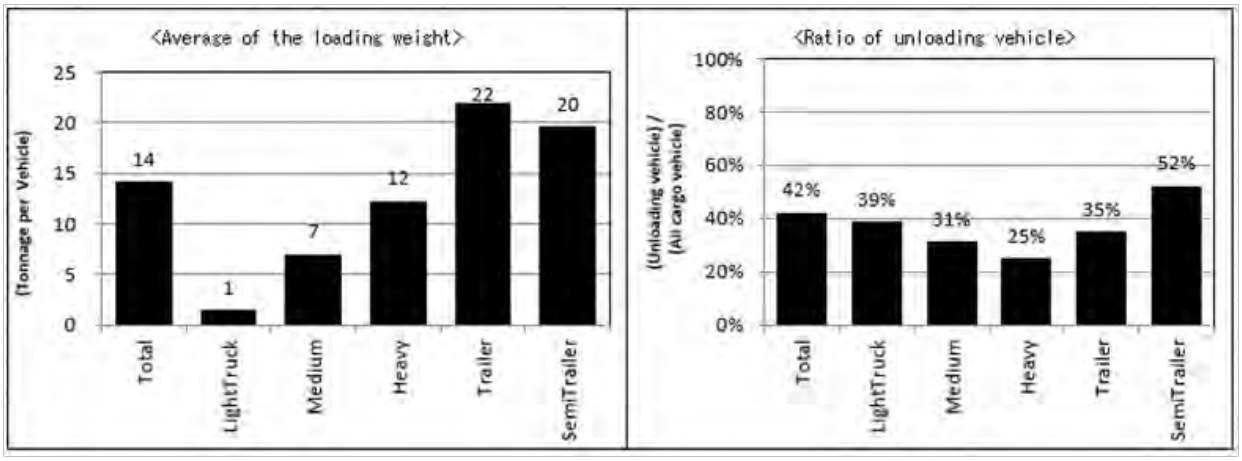


Source: JICA Study Team

Figure 5.1.5: Hourly Variation of Heavy Traffic Volume at Mariakani

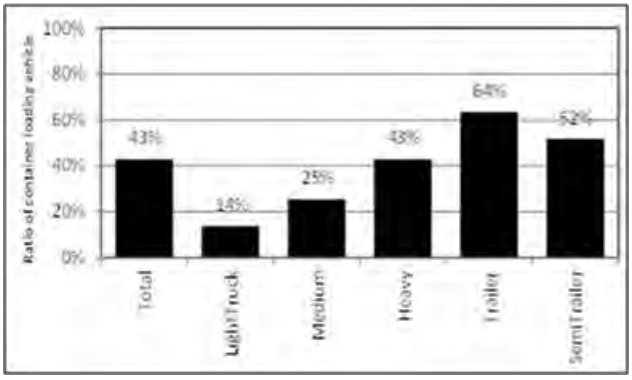
(b) Loading Weight

The average loading weight of truck is 14 tons/vehicle based on the survey for cross border cargo trucks including Mombasa survey point. This figure excludes unloading track data. Those for Trailer and Semi- Trailer are 22 tons/vehicle and 20 tons/vehicle respectively. The ratio of unloading of trucks is 42%. The figure of semi-trailer is 52%



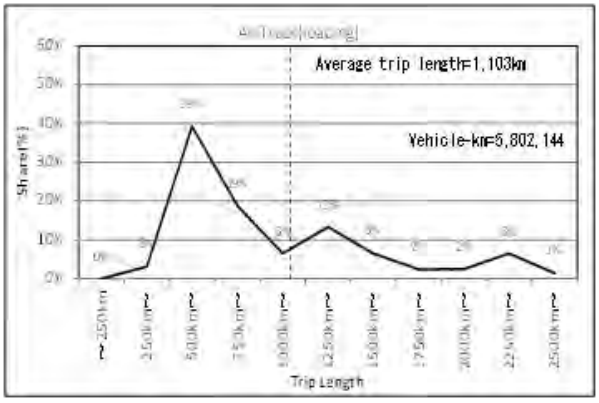
Source: JICA Study Team

Figure 5.1.6: Average of the Loading Weight and Ratio of Unloading Vehicle



Source: JICA Study Team

Figure 5.1.7: Ratio of Container Loading Vehicle



Source: JICA Study Team

Figure 5.1.8: Trip Length

(c) Ration of Container Loading

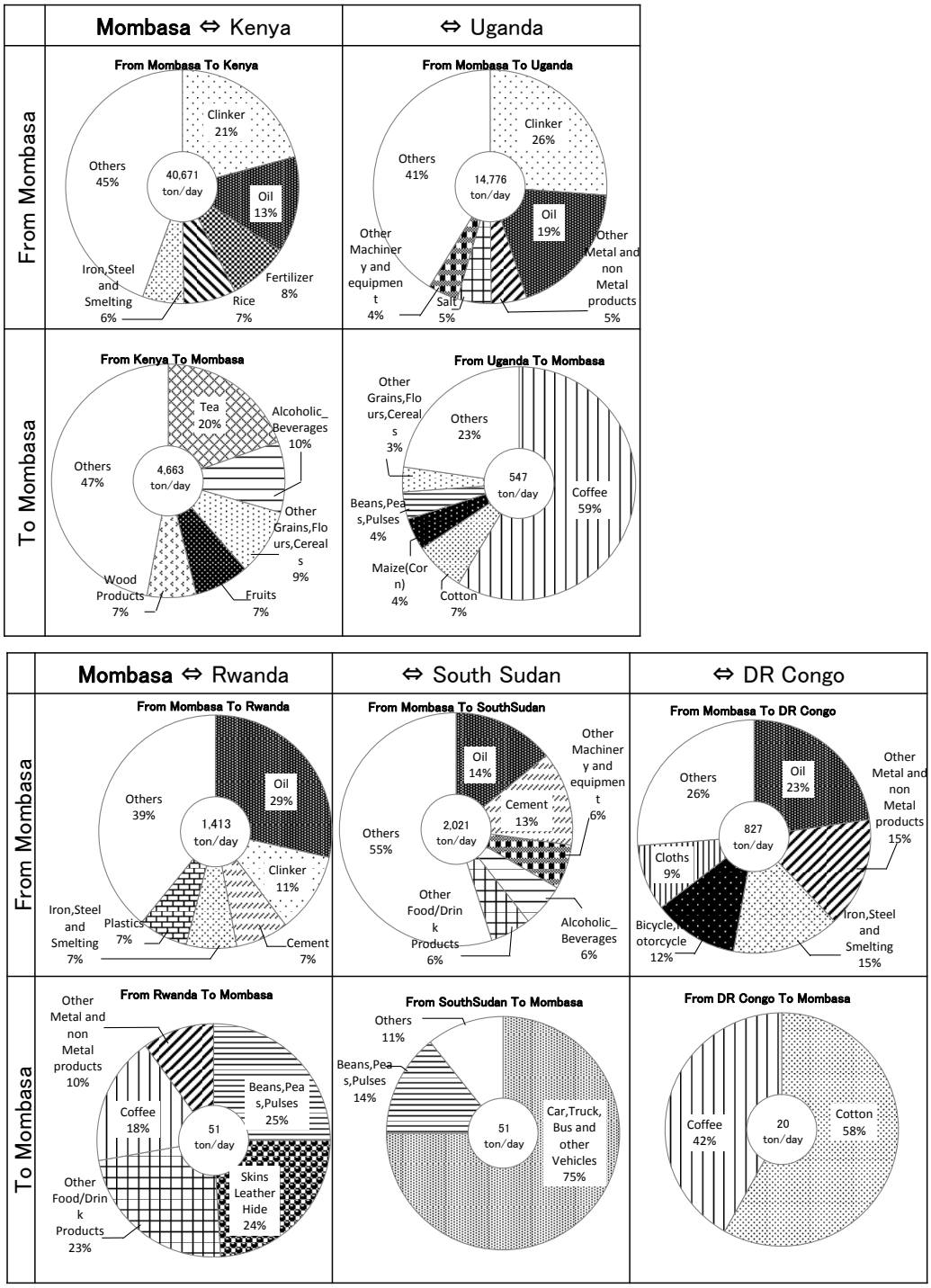
Ratio of container loading trucks is 43%. Those for Trailer and Semi-Trailer are 64% and 52% respectively.

(d) Trip Length

Average trip length of loading trucks is 1,103km. The dominant trip length exists in 500-750km and 1,250- 1,500km, which are the trips from Mombasa to Nairobi and from Mombasa to Kampala respectively.

(e) Contents of Cargo Traffic on the road

The charts in Figure5.1.9 show content of cargo in truck by nation. The cargo from Mombasa to the hinterland Kenya is mainly Clinker, Oil, Fertilizer and Rice. Major cargo from the hinterland of Kenya to Mombasa is tea, which has a share of 20% of the total. The other major items are Alcoholic Beverages, Grains & Cereal, Flowers, and Fruits. The cargo from Mombasa to Uganda is mainly Clinker, Oil and “Other Metal and non-Metal products”. The cargo from Uganda to Mombasa is mainly Coffee which has a share of 59% of the total.



Source: JICA Study Team

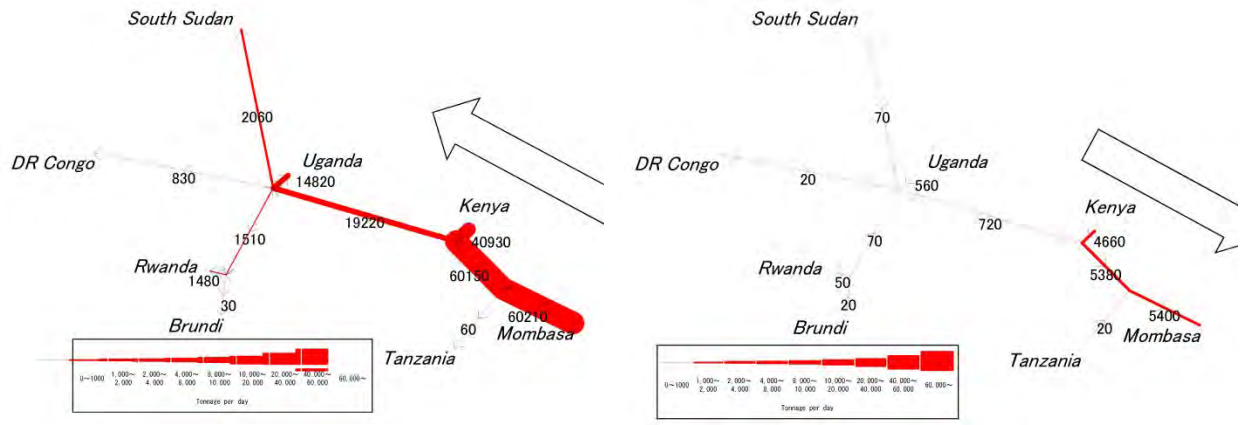
Figure 5.1.9: Contents of Cargo Traffic

(2) Current Freight Movement by Truck

Road cargo traffic from Mombasa to hinterland Kenya and EACs is about 60,000 tons/day and the share of cargo that ends within Kenya is about 41,000 tons, a figure that translates to 68% of total traffic from Mombasa. The cargo traffic toward Uganda is 15,000 tons/day, representing a share of 25% of the total volume from Mombasa. On the other hand, Cargo traffics on the road

toward Mombasa from EACs are about 5,400 tons/day. This is about 9% of total traffic volume from Mombasa to EACs. There is a significant gap between the two directions.

< From Mombasa to Seven Countries> **< From Seven Countries to Mombasa >**



Source: JICA Study Team

Figure 5.1.10: Cargo Traffic Flow on the Road (Tonnage per Day)

5.1.3 Logistics Service

(1) Survey Result by JICA Study Team

Although the JICA Study Team (JICA STUDY TEAM) captured the total transit time through a GPS survey, GPS survey can only cover the portion ranging from cargo dispatch from the port to the final destination. On the other hand, the data of transit time at port area (port arrival to cargo dispatch from port including customs procedure time) were collected based on the interviews and port charter performance data.

1) Kenyan Case

Import containers have to attach Container Freight Station (CFS) and are basically stored until the cargo clearance is completed. The survey result indicated:

- Although it took a long time (over 10 days) for berthing in past, current berthing/discharging period has been reduced to three days.
- Container transfer to CFS is available from next day of container discharge at port. The latest NCTTCA report "Impact Assessment of Northern Corridor Performance Improvement Activities" indicates that port dwell time is two days for local import, based on KPA interview.
- According to CFS association interview survey (May, 2014), an average of 2.7 days is necessary ranging from cargo arrival/dispatch at CFS including customs procedure time. Basically, cargo dispatch is initiated only after customs clearance has been completed. Although customs procedure can be started before cargo arrival at CFS, there remains the possibility that customs clearance time is longer than 2.7 days.
- Transit time for Nairobi (one day) is based on the GPS survey.

- As a result of the above, the total lead time is estimated between 6.7-7.7 days as shown below.

Table 5.1.1: Imported Lead Time in Kenya

Mombasa port	Arrival to CFS	CFS dispatch	To Nairobi	Estimated total lead time
2-3 days	1 day	2.7 days	1 day	6.7-7.7 days

Source: JICA Study Team

2) Ugandan case

Apart from Kenyan imports, containers for transit country do not use CFS exclusively for specific cargo like vehicles. The survey result indicated:

- Containers' free time for import goods at Mombasa port is two days for CFS and seven days for transit; this implies that the transit procedure takes a longer time.
- According to an interview survey, it is possible to reduce the current transit procedure to within 2 days if all the processes are properly done. Transit procedure can be conducted in parallel with port side operation so that there is a possibility that transit time for transit procedure covers port operation time. However, a perfect case is very rare and in most cases it takes 4-6 days. NCTTCA survey indicates that port dwell time is five days for transit container, based on the KPA interview.

The GPS survey shows that Malaba border crossing takes around 1.5 days and this is considered to be a long time. The current waiting time on Kenyan side (over 1 day) is longer than Uganda side (7 hours). This difference is due to the ongoing development of parking space to reduce congestion on the Kenyan side of the border as compared to the Ugandan side where such development has been already completed.

The total transit time is estimated to be 7.5-8.5 days from vessel arrival to cargo delivery to Kampala as shown below.

Table 5.1.2: Import Transit Time

Activity	GPS Survey Result
From vessel arrival to cargo dispatch	4-6 days for transit & dispatch
Mombasa to Malaba	1day and11h44m (incl.1h07m night time sleep)
Malaba(Kenya)	1day and12h49m (incl.1-night sleep)
Malaba (Uganda)	
Malabar-Kampala	0day and 15h35m (incl. 5h56m night sleep)
ICD clearance	0day and 3h05m
Total	7.5day -8.5 day (after dispatch at Mombasa, it takes 3.5 days)

Source: JICA Study Team

JICA STUDY TEAM GPS survey found no serious bottleneck in the transport portion excluding Mombasa port. In addition, no-congestion at the weighbridges was observed. Therefore, it seems that transporters carry out speedy delivery as much as possible so that drivers' rest time up to Malaba border arrival is relatively short. As a result, it can be

concluded that the JICA STUDY TEAM survey result represents the transit time of "direct delivery" pattern.

(2) Observatory Report by NCTTCA

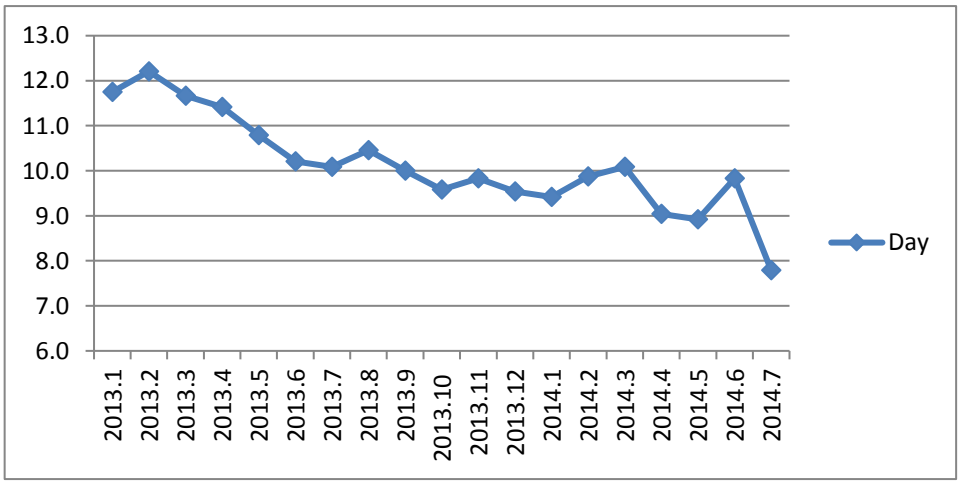
Apart from JICA STUDY TEAM survey, NCTTCA also carried out similar transit time survey, namely, "Northern Corridor Transport and Transit Observatory report (hereafter: Observatory report). The survey shows longer transit time than the JICA STUDY TEAM survey. It is therefore valuable to compare both sets of data in order to identify bottlenecks.

Although NCTTCA observatory report did not specify the Kenyan import or transit import, the following 3 transit time data were applied:

- Customs electronic time data (from the time the cargo exits the port of Mombasa to the time export certificate is issued at the Malaba border)
- GPS survey time data (from the time the travel starts at Mombasa to the time of arrival at Malaba)
- Ugandan transport time data (from the time dispatched at Malaba border to Ugandan destination)

Customs Electronic Data

The data from October 2013 to July 2014 were utilized. The average transit time to Malaba has been reducing over the survey period. In the month of July 2014, the transit time to Malaba was 187 hours (about 8 days). It should be noted that this time includes delays, approximately five days longer than JICA STUDY TEAM's survey results. JICA STUDY TEAM's survey indicates 1-1.5 days from Mombasa port to Malaba excluding transit time procedure at the port (JICA STUDY TEAM's survey approximates 4-6 days for transit procedure at the port).



Source: Observatory report (2014.Dec) NCTTCA

Figure 5.1.11: Transit Time from Mombasa to Malaba

The reason of additional time in this "customs electric data" is that the time includes the delays after custom release at the port whereby most transporters keep their cargo at their yard before starting their travel. It means that the cargo is temporarily delivered to truckers' site and direct delivery is not practiced. On the other hand, JICA Study Team GPS data shows such extra time-consuming operation is not required and transporters could deliver cargo without extra stop-over.

Source: Observatory report (2014.Dec) NCTTCA

Figure 5.1.12: Cargo Pick up Time at Mombasa Port

Another reason of delay as pointed out by the observatory report is long waiting time required for container pick-up from the port. This data is based on T812 procedure which is for transit cargo and not for Kenyan import. According to the Observatory Report figures, it took on average 40-90 hours to pick up cargo after customs release. This delay is attributed to transporters/traders not taking the initiative to load their cargo from the port immediately. Transporters, especially those with large fleet, are likely to prefer to pick up cargo at designated time and day of the week to allow close monitoring of trucks while on transit. This is a factor that transit time of NCTTCA GPS data puts at 2-3 days longer than JICA Study Team survey result.

GPS Survey

A total of 200 GPS kits were used from the month of February to September, 2014. Only 68 kits were switched by transporters from Mombasa port as the start point while the rest were activated at or after Mariakani weighbridge. The result showed that it takes 3.2 days on average from Mombasa to Malaba. Even in the same NCTTCA data, there is a big gap between customs electrical data and GPS data. According to the observatory survey analysis, the delay can be attributed to the following reasons.

- Traders do not commence their travel immediately after the cargo was released from the port. In most cases, cargo is consolidated at the yards before transportation.
- Clearance process at the border is sometimes done manually whereby all entries are recorded manually and later on entered on the system when the track has already crossed the border.

JICA Study Team study also indicates that bond cancellation procedure remains a manual process excluded from electric processing time.

Ugandan Transport time

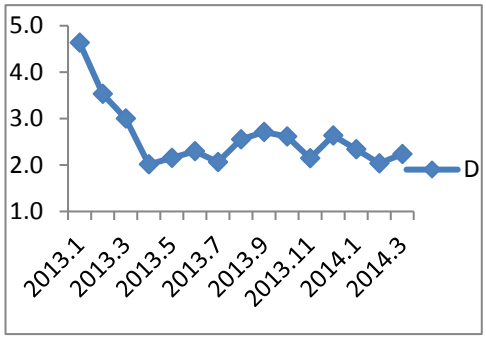
Transport time in Uganda has been improved in the period between January-April in 2013 and since then the performance has been maintained. Travel time from Malaba to Kampala was 2.3 days in March 2013. JICA Study Team survey indicated 1.1 days in March 2015, approximately one day shorter, without serious congestion and less waiting time at weighbridge.

Observatory report points out that construction of a major road is in progress and some bridges need to be re-constructed. In addition, road blocks/border crossings and weighbridges are causes of delays. It is noted that JICA Study Team survey also showed the long waiting time at border, approximately over one day.

Discussion with NCTTCA

The study team discussed transit time data with NCTTCA in January 2016. The results of discussion are summarized below.

- The size of NCTTCA samples is larger than JICA study team's one, including various cargo types, transporter, origin/destination, driver's quality experience and their rest time. The driver's rest time heavily impacted to the transit time even though night time driving is basically prohibited in Kenya. On the other hand, JICA Study Team's data does not show break time up to Malaba border even during night time driving.
- Although NCTTCA adopted several measures for calculating transit time, they can cover only limited portion. Therefore, it is difficult to calculate door-to-door transit time along with respective procedures and time from origin to destination as "Standard case". The most reliable transit time data calculation is GPS data from Origin to Destination as JICA Study Team conducted,
- The JICA study team data is considered as most feasible case. NCTTCA also emphasizes that shorter transit time delivery case is observed in their survey



Source: Observatory report (2014.Dec) NCTTCA

Figure 5.1.13: Transit Time from Malaba to Kampala

(3) Conclusion

JICA Study Team's survey result seems to
represent the performance of "direct delivery pattern", aiming at speedy delivery. On the other hand, transporters in Observatory report shows various wasting time factors and a lot of trucks spent their time even after customs clearance was finalized. This seems to be the main reason of the gap between JICA Study Team's and NCTTCA surveys in terms of transit time. The result was finalized through discussion with NCTTCA in January 2016 that JICA Study Team survey time is EXIM the case for "Direct delivery pattern".

5.1.4 Transport and Logistic Infrastructure

(1) Road

1) Overall Road Condition

There are five major roads on the Northern Economic Corridor. The main route called NEC1, connecting Mombasa Port with four nations' capital cities is the longest at a distance of 1,900 km. Four branch routes connecting to DRC and South Sudan have a total distance of 2,930km.

In Kenya, there are increasing traffic demand and bottlenecks of road traffic around urban areas of Mombasa, Nairobi, Nakuru, Eldoret, Kisumu and surrounding areas as well as around the borders, Mombasa Port and railway stations. On the other hand, the trunk road network with high capacity is very limited. Road sections with four lanes are limited to some parts of Mombasa, Nairobi and Nakuru.

Heavy trucks cause road surface deterioration over relatively short periods. A road surface condition which can be said to beat a satisfactory level must be less than 4 of IRI (which is International Roughness Index). In Kenya road surface on the main route is generally good although many pot holes have been observed in Mombasa County during the survey conducted by JICA Study team in July, 2015. As such therefore the road network should be continuously improved for increasing traffic demand and well maintained for safe and efficient logistic transport as well as passenger transport.

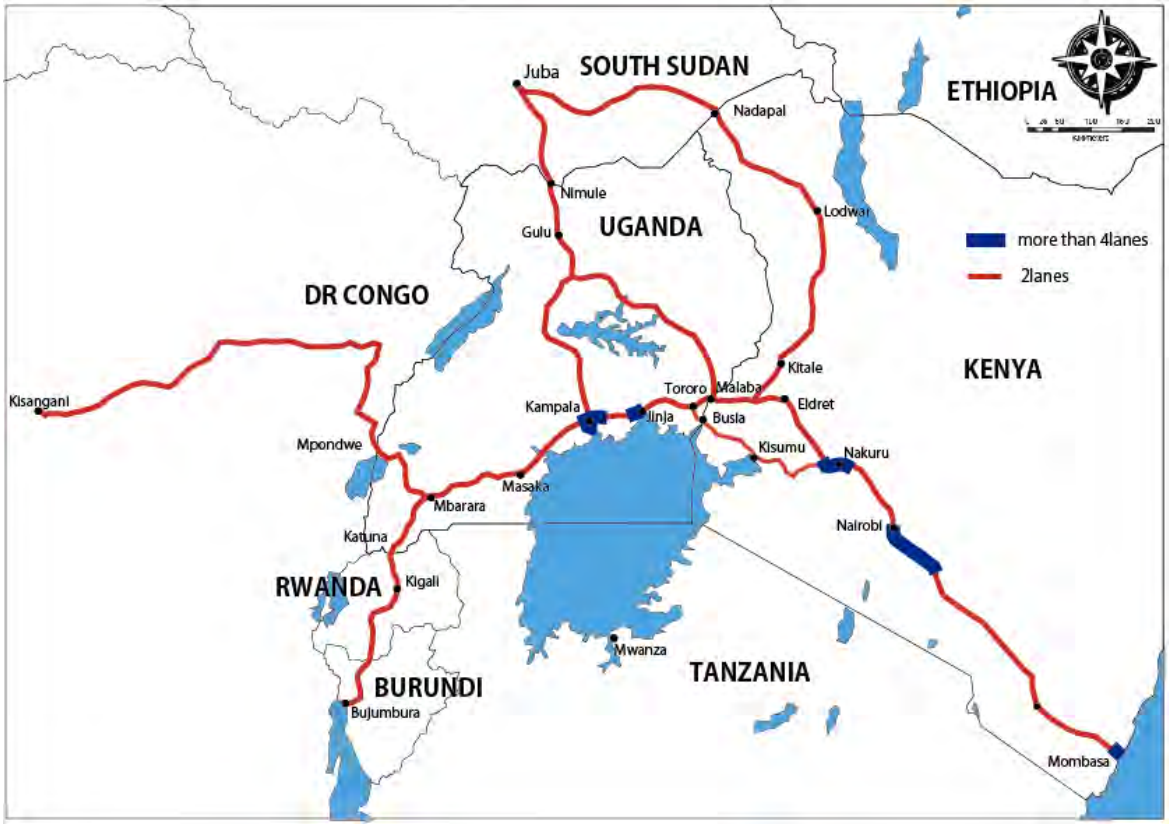
Table 5.1.3: Existing Five Major Roads on the Northern Corridor

Roads		Major Towns on the Routes	Length (km)
NEC 1	Northern Corridor	Mombasa-Nairobi-Malaba-Tororo-Kampala-Masaka-Mbarara-Kigali (Rwanda)-Bujumbura (Burundi)	Approx. 1,900km
NEC 2	Northern Corridor Branch Line (Access to South Soudan)	Eldoret-Nadapal-Juba (South Soudan)	Approx. 920km
NEC 3	Northern Corridor Branch Line (Access to South Soudan)	Tororo-Gulu-Nimule-Juba (South Soudan)	Approx. 690km
NEC 4	Northern Corridor Branch Line (Access to South Soudan)	Kampala-Gulu- (Nimule-Juba (South Soudan))	Approx. 270km
NEC 5	Northern Corridor Branch Line (Access to South Soudan)	Mbarara-Mpondwe-Kisangani (DR Congo)	Approx. 1,050km
Total of Five Routes			Approx.4,830km

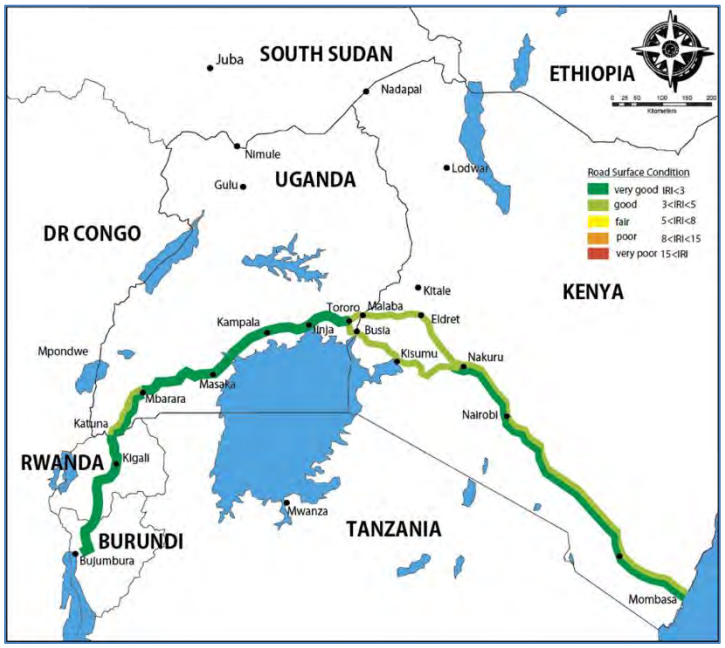
Source: JICA Study Team

Source: JICA Study Team

Figure 5.1.14: Photo at Malaba Border in Kenya, on 16th of July 2015 by JICA Study Team



(Number of lanes)



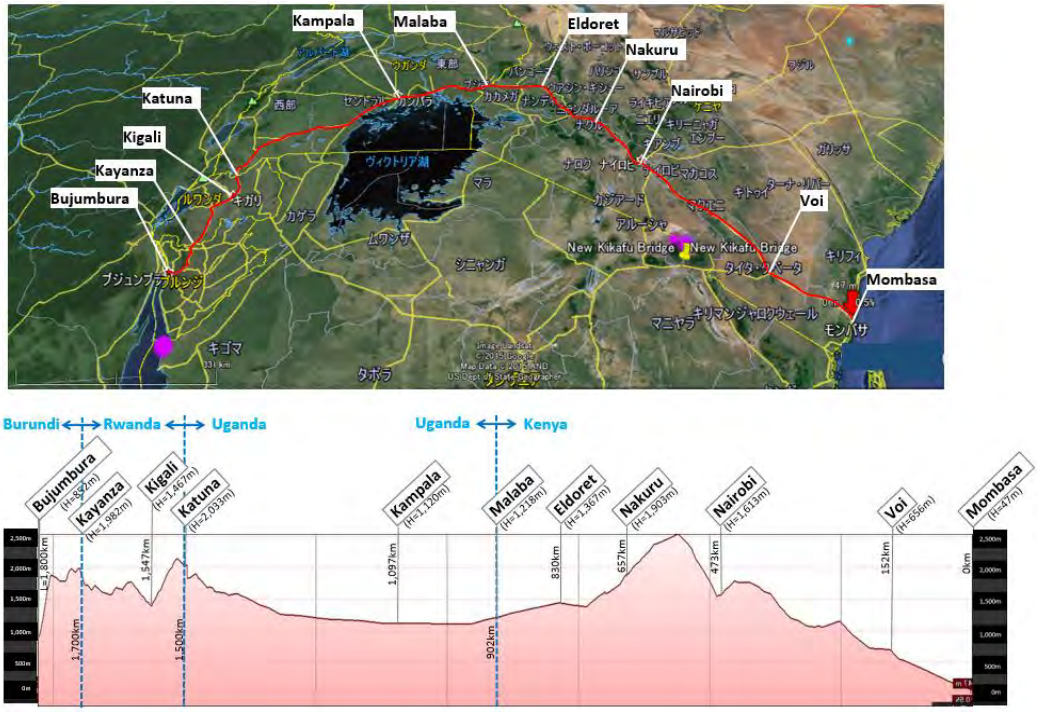
(Road surface condition)
The Results of IRI survey using DRIMS (VIMS) by KeNHA from Feb 01 to 14, 2015
IRI: International Roughness Index
DRIMS: Dynamic Response Intelligent Monitoring System

Source: JICA Study Team, KeNHA

Figure 5.1.15: Existing Road Condition

Profile of the Northern corridor between Mombasa-Kenya and Bujumbura-capital city of Burundi is shown in the following figure. The highest elevation is around 2,600m between Nakuru and Nairobi. The lowest elevation is nearly at sea level in Mombasa, Kenya.

Approximately 86% of total distance is over 1,000m high. Steep gradient sections exist between Nairobi and Nakuru, at the border between Rwanda and Uganda, and around Bujumbura. There are climbing lanes incorporated along the Northern Corridor in both Kenya and Uganda. However, there are no climbing lanes on the section within Rwanda.



Source: JICA Study Team, Google Earth

Figure 5.1.16: Profile of Northern Corridor between Bujumbura/Burundi and Mombasa/Kenya

2) Traffic Accident

Traffic safety on Northern Corridor is very serious issues in Kenya and Uganda. The number of traffic accidents in Kenya and Uganda is shown in Table 5.1.4. Number of traffic accidents has decreased in Kenya and Uganda. However, number of fatalities has not decreased. Around 1,000 fatalities which is 30% of total fatalities in Kenya are happened on Northern Corridor in Kenya. On the other hand, around 1,100 fatalities which is 43% in average for five years from 2010 to 2014 are happened on Northern Corridor in Uganda. Rate of fatalities on Northern Corridor in Uganda is higher than in Kenya. Number of fatalities in Kenya and Uganda are shown in the following tables.

Safe Way Right Way, an NGO financed by World Bank Group, indicates that the danger spots are evenly distributed along Northern Corridor in Kenya. The NGO has uploaded an interactive map of the black spots on its website to guide motorists (Interactive map of the black spots on its website is shown in Figure 5.1.17). A total of 160 accident black spots on the Kenyan section of the Northern Corridor have been highlighted on an interactive map, making it easier for motorists to pinpoint the car crash areas before they drive. There are

160 black spots on 1,000km along Northern Corridor in Kenyan side. This means that traffic accident points are located each 6.3km intervals in Kenya. Traffic safety measures and data management of traffic accident are required not only for the reduction of traffic accident but also for the smoothly traffic flow on Northern corridor.

Table 5.1.4: Number of Traffic Accidents in Kenya

ROAD TRANSPORT

TRAFFIC ACCIDENTS, 2005-2014

Table 129 — Number

Description	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014*
Total Number of Reported Accidents	12,399	12,201	12,470	11,209	12,369	9,771	8,193	6,917	6,205	5,672
Persons Killed and Injured:										
Killed	2,531	2,715	2,921	3,158	4,072	3,055	3,302	3,141	3,191	2,907
Seriously Injured	7,899	8,722	8,932	9,206	10,644	9,327	8,647	7,434	6,299	5,140
Slightly Injured	12,341	11,828	13,735	12,162	11,906	9,739	7,144	5,037	4,834	3,971
Total	**22,771**	**23,265**	**25,588**	**24,526**	**26,622**	**22,121**	**19,093**	**15,612**	**14,324**	**12,018**
Vehicles Primarily Responsible:										
Motor cars	3,800	3,813	4,018	3,521	3,432	3,157	2,184	2,123	2,024	2,331
Lorries, buses and taxis	2,639	2,812	3,126	2,442	2,655	2,327	2,078	1,649	1,475	1,382
Motor cycles	363	346	432	688	1,292	852	622	496	505	318
Pedal cycles	1,146	1,193	927	925	810	554	760	589	360	298
Animals/Hand Carts	151	199	224	112	68	48	36	32	47	67
Matatus	1,786	1,749	1,463	1,484	2,099	1,025	905	587	488	581
Others	2,456	2,089	2,280	1,879	2,013	1,808	1,608	1,441	1,306	695
Persons Primarily Responsible:										
Drivers (Incl Motor Cyclists)	5,444	5,646	5,433	5,087	6,075	5,284	4,259	3,486	3,124	3,038
Pedestrians	3,035	2,676	3,089	2,577	2,450	947	1,071	725	620	659
Pedal Cyclists	1,545	1,408	1,288	1,343	1,257	1,159	936	912	819	548
Passengers	466	400	601	376	415	401	423	401	421	286
Other causes	1,909	2,071	1,790	1,826	2,172	1,980	1,504	1,393	1,221	1,141
Times of Accidents:										
Day	7,999	7,417	7,752	6,981	7,337	6,429	5,125	4,028	4,005	3,354
Nights	4,400	4,784	4,718	4,228	5,032	3,342	3,068	2,889	2,200	2,311

Source: Kenya National Police Service

* Provisional

Source: Statistical Abstract 2015, Kenya National Bureau of Statistics

Table 5.1.5: Number of Fatalities by Traffic Accident on Northern Corridor in Kenya

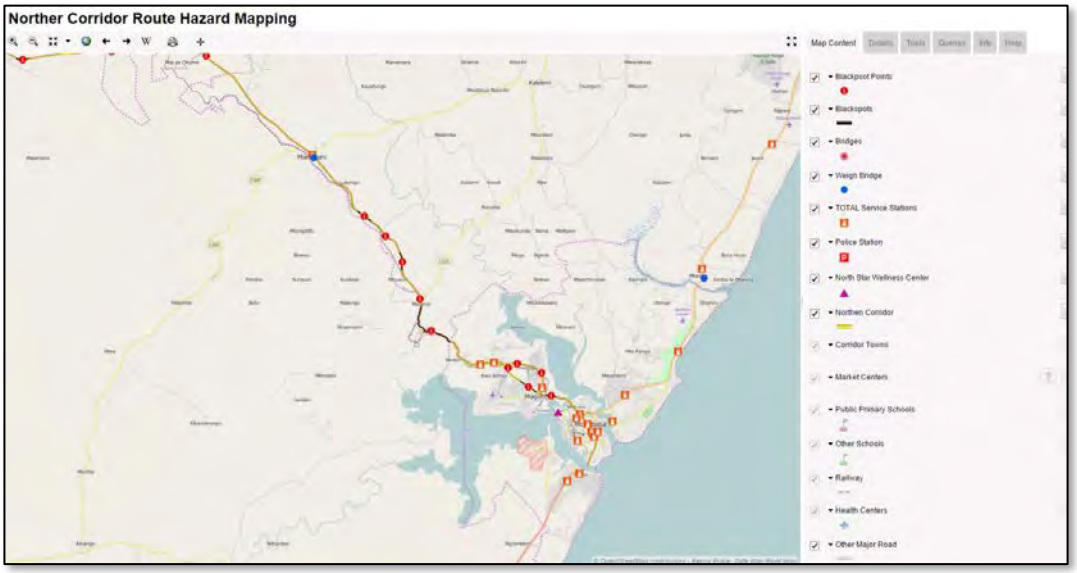
Traffic Accident in Kenya	2010	2011	2012	2013	2014
Total of Fatalities on Northern Corridor in Kenya	937	949	1,004	924	880
Total of Fatalities except Northern Corridor in Kenya	2,118	2,353	2,137	2,267	2,027
Total	3,055	3,302	3,141	3,191	2,907
Northern Corridor / All in Kenya	31%	29%	32%	29%	30%

Source: Statistics Abstract 2014, Traffic Police Kenya

Table 5.1.6: Number of Fatalities by Traffic Accident on Northern Corridor in Uganda

Traffic Accident in Uganda	2010	2011	2012	2013	2014
Total of Fatalities on Northern Corridor in Uganda	1,259	1,256	1,136	1,083	940
Total of Fatalities except Northern Corridor in Uganda	1,361	1,587	1,475	1,318	1,578
Total	2,620	2,843	2,611	2,401	2,518
Northern Corridor / All in Uganda	48%	44%	44%	45%	37%

Source: Statistics Abstract 2015 and Traffic Police Uganda



Source: http://www.swrw.org/Northern_Corridor_Route_Hazard_Mapping/index_svg.html, Safe Way Right Way web site

Figure 5.1.17: Accident Black Spot on Northern Corridor

(2) Railway

The meter gauge system operated by Rift Valley Railways (RVR) spans the entire Northern Economic Corridor (NEC) from Mombasa to Kampala. RVR operates the system under a Concession awarded by Kenya and Uganda in 2006. The system includes approximately 1,320 km of track in Kenya. The mainline of about 1,185 km connects Mombasa to Malaba on the Ugandan border passing through Nairobi. Active branch lines to Thika and Nanyuki and an inactive line to Kisumu complete the system. The Ugandan meter gauge system operated by RVR includes approximately 1,176 km of track. The mainline consists of about 240 km from Malaba to Kampala and 344 km between Kampala and Kasese. An approximately 525 km branch line extends from the mainline at Tororo to Gulu and from Gulu to Pakwach. Additional segments are a 9 km lead to Port Bell, 12 km spur to Port Jinja, 6 km line to the workshops at Nalukolongo, and a 55 km branch between Tororo and Mbale. When the Concession was awarded in 2006 closed sections of track were excluded. Kampala-Kasese (344kms) and Tororo to Pakwach (525kms) were closed at the time. The Tororo-Pakwach branch was added to the Concession in 2013 after RVR reopened it in anticipation of traffic related to oil discoveries in the Lake Albert area. After operating a commercial train to Gulu in September 2014 RVR has not operated over the branch.

Source: RVR

Figure 5.1.18: Current Condition of Meter Gage System

The project to implement a standard gauge railway serving the NEC continues. The line between Mombasa and Nairobi is expected to be in operation by June 2017. Construction contracts have been awarded for segments to Naivasha Kenya and from Kampala to Tororo Uganda. For other segments feasibility studies have been completed or are in progress.

The table below lists the currently active operating facilities in place on the meter gauge system, including marshalling yards, inland container depots, locomotive and wagon depots and locomotive fueling stations. Facilities that are out of service are not shown.

Table 5.1.7: Inventory of Operating Facilities (Meter Gauge System)

Marshalling Yards	Inland Container Depot	Locomotive Depot	Wagon Depot	Locomotive Fueling
Mombasa	Mombasa (port container train yard)	--	--	--
Kipevu	--	--	--	--
Changamwe	--	Changamwe	Changamwe	Changamwe
Nairobi	Nairobi	Nairobi	--	Nairobi
Nakuru	--	Nakuru (not operating)	Nakuru (not operating)	Nakuru (not operating)
Eldoret	Eldoret	Eldoret	Eldoret	Eldoret
Kisumu (not operating)	Kisumu (not operating)	--	--	--
Malaba	--	--	--	--
Jinja	--	--	--	--
Kampala	Kampala	Kampala (Nalukolongo)	Kampala (Nalukolongo)	Kampala
Port Bell (not operating)	--	--	--	--

Source: JICA Study Team based on publicly available information and interviews of stakeholders

There is a small marshalling yard at Port Bell. The yard is not operating because the port's rail wagon vessels are out of service. A project is in progress to create a new, larger port at Bukasa. Port Bell is to be refurbished and function as a temporary port while the Bukasa port is implemented. At this time, it is not expected that rail wagon ferry service will be reinstated.

There is a small marshalling yard and ICD at Port Kisumu. The port has in the past operated railway service on Lake Victoria but currently its rail wagon vessels are out of service and the marshalling yard and rail ICD are not operating. As part of the SGR project, a new port with initial throughput capacity of 600,000 tons per year is to be developed. The new port will be served by a branch line from the SGR mainline that will pass through Kisumu[1].

RVR has struggled to meet the performance targets stipulated by the Concession contract and has lost money each year of operation. Service and cargo volumes are hampered by a lack of available wagons and locomotives. In 2014 and in 2015 it appears that RVR's performance has improved somewhat. Investments made in track, structures, locomotives and wagons may have begun to make a difference.

The following table lists investments made by RVR:

Table 5.1.8: RVR Investments

Investment	Description	Timing	Approximate Value	Objective
Locomotive purchase	20 second hand GE locomotives	20 units in service as of August 2015	USD 23 million	Increase capacity and reliability
Track maintenance equipment	Plasser ballast regulator & tamper	January 2014	USD 887,000	Accelerate pace of track maintenance
Mukono ICD	New ICD established near Kampala to increase container cargo	Commenced operation July 2015	Approximately USD 8.6 million	Container cargo to and from Mombasa
Technology	GPS based train control system	June 2013	USD 9.5 million	Increase capacity, improve safety
Track	Replace 73km between Mombasa and Nairobi	June 2013	USD 20 million	Reduce transit time; improve reliability
Maritime service	Reinstate service at Port Bell	September 2012	USD 3.5 million	Resume service on Lake Victoria
Maintenance workshops	Rehabilitate Nalukolongo Workshop		USD 410,000	Bring workshop up to standard
ROW	Repair 9 major culverts between Tororo and Jinja	Contract awarded March 2012	USD 4.9 million	Improve reliability and safety
Branch line	Reopening of Tororo-Gulu-Pakwach	October 2013	USD 2 million	Reopen line in anticipation of crude oil cargo from Albertine region
Rail wagons	Purchase 400 heavy duty[2]	On-going	Approximately USD106,000 per wagon[3]	Purchased 300 wagons in 2014/2015

Source: JICA Study Team

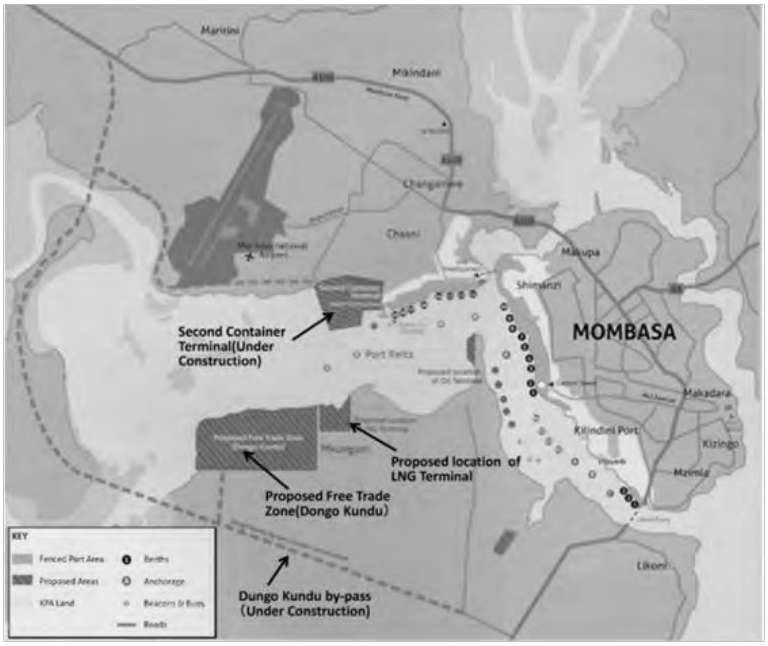
1 Information received from KRC
2 Capable of accommodating loads of two fully loaded 20' containers or one fully loaded 40' container (up to 50 tons)
3 Based on Railways Africa, Issue 5 2015, Africa Update, page 11, Rift Valley Orders More Wagons; http://issuu.com/railwaysafrica/docs/ra407_5-2015_final_web

RVR is likely to continue to invest in the meter gauge track as it seeks to continue stabilizing and strengthening the network. Notable improvements in performance reported by RVR include[4].

- Q2 2015 (April-June), NTK (Net Tonnage Kilometers) increased 10% over Q2 2014 to 369 million
- Q2 2015, tons increased 2% over Q2 2014 to 413 thousand
- First half of 2015 successfully achieved 1,987,000NTK, concession target for the 21-months ended March 2015
- Q2 2015 Mombasa-Nairobi-Mombasa transit time reduced 11% versus Q2 2014 to 2.3 days
- Q2 2015 Mombasa-Kampala-Mombasa transit time reduced 4% versus Q2 2014 to 9.2 days
- Q2 2015, tons increased 2% over Q2 2014 to 413 thousand
- Awarded ISOH Railway Group International Award 2015 for reducing injuries in Nairobi area workshops by about 90%[5].

(3) Port

Mombasa port is the only major seaport facing the Indian Ocean on the Northern Economic Corridor. The seven countries; Kenya, Uganda, Rwanda, Burundi, D.R.Congo, South Sudan and Tanzania, rely on their cargo being shipped through Mombasa Port. The port has mostly dealt with cargo traffic in the East Africa region. In 2015 Mombasa Port recorded the highest out through cargo with 26.7 million tons including 1.1 million TEUs of containerized cargo. The year of 2015 was a monumental year in which the port has firstly surpassed one million TEUs. The annual growth rate of container traffic has been 9% approximately in the past five years due to the rapid economic growth of the East Africa Region as shown in Table 5.1.9. Roughly speaking, 70% of cargos go to Kenya and the remaining 30% of cargo goes to inland countries. Uganda has a share of 78% in transit cargo as shown in Table 5.1.10. In order to improve port capacity, Mombasa Port Master Plan study is ongoing by JICA.



Source: KPA HANDBOOK 2014-2015

Figure 5.1.19: Existing and Proposed Facilities in Mombasa

4 Qalaa Holdings Business Review 2Q-1H15
5 Institution for Occupational Safety and Health (IOSH) website, accessed 23 September 2015, http://www.iosh.co.uk/News/Kenyan-firm-wins-inaugural-IOSH-Railway-Group-international-safety-award.aspx

Almost all cargo for importing and exporting from Mombasa port are carried by truck and trailer. It is estimated said that railway has a modal share of 8 % in recent years. On the other hand, the standard gauge railway project from Mombasa to Nairobi and the further western nations is now on going. The SGR project from Mombasa to Nairobi and towards Uganda is now on-going with financial support by the Chinese EXIM bank, and expected to significantly increase the use of the railway

Several kinds of important issues relating to cargo logistics are found. Firstly, it still takes too long a time for importing cargo to clear custom and move out of the port area although dwell time and loading/unloading time have recently improved. It also takes time for exporting cargo. Secondly the roads inside the urban area of Mombasa are so heavily congested that cargo traffic is usually stuck during the day time. Thirdly, the Northern Corridor Logistics should be operated by comprehensive multimodal transport infrastructures consisting of road transport, railway, airway, waterway and pipeline in order to deal with the increasing cargo demand. In this regard several issues on the modal shift at Mombasa Port are remaining.

Table 5.1.9: Import, Export & Transshipment Cargo Volume between 2011 and 2015

Port Performance (000'DWT) 000'DWT

Year	2011	2012	2013	2014	2015	Annual Growth rate
Imports	16,938	18,732	19,150	20,777	22,680	7.6%
Exports	2,788	3,045	2,983	3,366	3,534	6.1%
Transshipment	227	143	174	732	518	22.9%
Total	19,953	21,920	22,307	24,875	26,732	7.6%
Including Transit Traffic	5,596	6,626	6,709	7,199	7,667	8.2%
Ratio of Transit Traffic	28.0%	30.2%	30.1%	28.9%	28.7%	0.6%

Port Performance (CONTAINER TRAFFIC) TEUs

Year	2011	2012	2013	2014	2015	Annual Growth rate
Imports	392,647	444,772	449,389	488,672	520,056	7.3%
Exports	358,230	446,624	428,342	462,476	513,372	9.4%
Transshipment	19,927	12,067	16,269	60,854	42,690	21.0%
Total	770,804	903,463	894,000	1,012,002	1,076,118	8.7%

Source: Annual Review and Bulletin of Statistics 2015, Kenya Ports Authority

Table5.1.10: Transit Traffic by Nation in year 2015 (1,000 DWT)

Import & Export 000'DWT

Year	2015	Ratio
UGANDA	5,977,332	78.0%
SUDAN	702,531	9.2%
D.R.CONGO	396,132	5.2%
RWANDA	291,924	3.8%
TANZANIA	204,778	2.7%
BURUNJI	75,811	1.0%
SOMALIA	11,697	0.2%
OTHERS	6,973	0.1%
TOTAL	7,667,178	100.0%

Import 000'DWT

Year	2015	Ratio
UGANDA	5,592,914	78.0%
SUDAN	652,513	9.1%
D.R.CONGO	362,976	5.1%
RWANDA	273,815	3.8%
TANZANIA	190,880	2.7%
BURUNJI	75,690	1.1%
SOMALIA	11,697	0.2%
OTHERS	6,973	0.1%
TOTAL	7,167,458	100.0%

Export 000'DWT

Year	2015	Ratio
UGANDA	384,418	76.9%
SUDAN	50,018	10.0%
D.R.CONGO	33,156	6.6%
TANZANIA	18,109	3.6%
RWANDA	13,898	2.8%
BURUNJI	121	0.0%
OTHERS	-	-
SOMALIA	-	-
TOTAL	499,720	100.0%

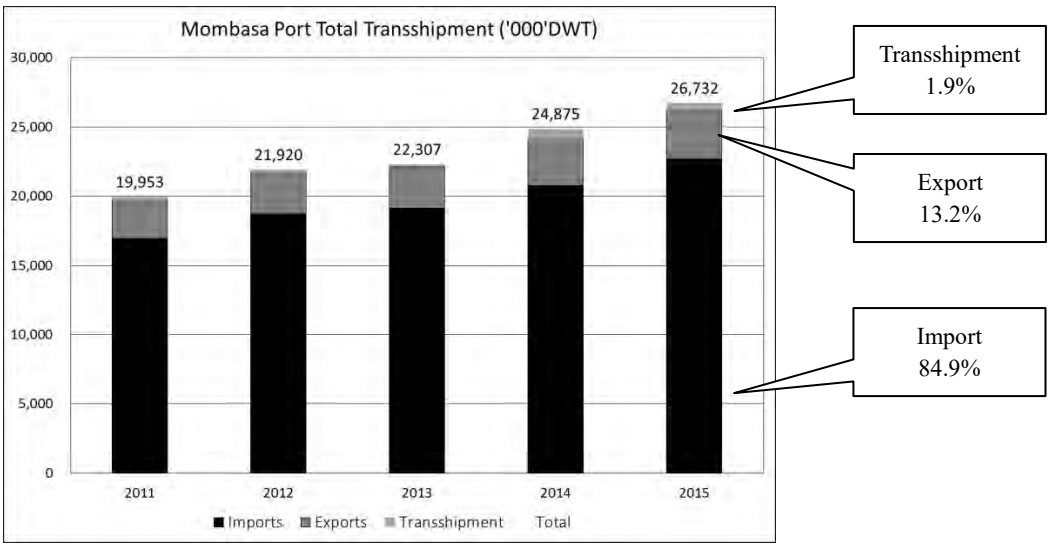
Source: Annual Review and Bulletin of Statistics 2015, Kenya Ports Authority

The port of Mombasa is fully developed with modern equipment making it the principal port in the East Africa Region. The port is equipped to handle a wide range of cargos including dry bulks such as grain, fertilizers, cement and soda ash and liquid bulks such as crude oil and oil products as well as bagged products (coffee, tea, sugar, etc.), break-bulk (iron and steel, timber), motor vehicles, machinery – and containerized cargo.

After the opening of Berth 19 in 2013 which increases the port's capacity by some 250,000 TEUs a year, the Mombasa Container Terminal has a total length of 840m. The terminal can now handle three panamax vessels of 250m length at the same time. In addition, the new terminal has been equipped with three ship-to-shore gantry cranes, eight new reach stackers and 27 terminal tractors. The Second Container Terminal is a further expansion of the port's capacity. It will have three additional berths totaling 900m with a depth alongside of 15.0m. Funding for this new terminal project is being provided by JICA. Freight volume at Mombasa Port from 2011 to 2015 is shown in the following figure. Mombasa Port container traffic volume has increased with 9% of annual growth rate over the past 5 years.

Source: JICA Study Team

Figure 5.1.20: Current Mombasa Port Photos on July 2015



	Year	2011	2012	2013	2014	2015
Port Total Throughout ('000' TEUs)	Imports	16,938	18,732	19,150	20,777	22,680
	Exports	2,788	3,045	2,983	3,366	3,534
	Transshipment	227	143	174	732	518
	Total	19,953	21,920	22,307	24,875	26,732
Container Traffic ('000' TEUs)	Full	517	572	583	666	673
	Empty	254	331	311	346	403
	Total	771	903	894	1,012	1,076

Source: Annual Review and Bulletin of Statistics 2015, Kenya Ports Authority

Figure 5.1.21: Freight Volume at Mombasa Port (2011-2015)

(4) Airport

Nairobi's Jomo Kenyatta International airport handled the largest cargo volume within the EAC at 279 thousand tons per year by 2012. Entebbe airport ranked second, with a total volume of handled cargo at 81 thousand tons per year by 2012. Air cargo handling both at Nairobi and Entebbe airports have not increased in recent years whereas cargo handling at Addis Ababa International Airport have increased rapidly. Compared to Dubai international airport, the volume of cargo handled at Nairobi is a paltry 12% of that of Dubai.

Airport cargo volume at Jomo Kenyatta International airport and Moi International Airport in Kenya and at Entebbe International airport in Uganda is shown in following figure. Airport cargo in Kenya has fluctuated in the past 5 years. Airport cargo in Uganda has also fluctuated in the past 5 years.

Table 5.1.11: Cargo Volumes (Unloaded & Loaded) at Airport

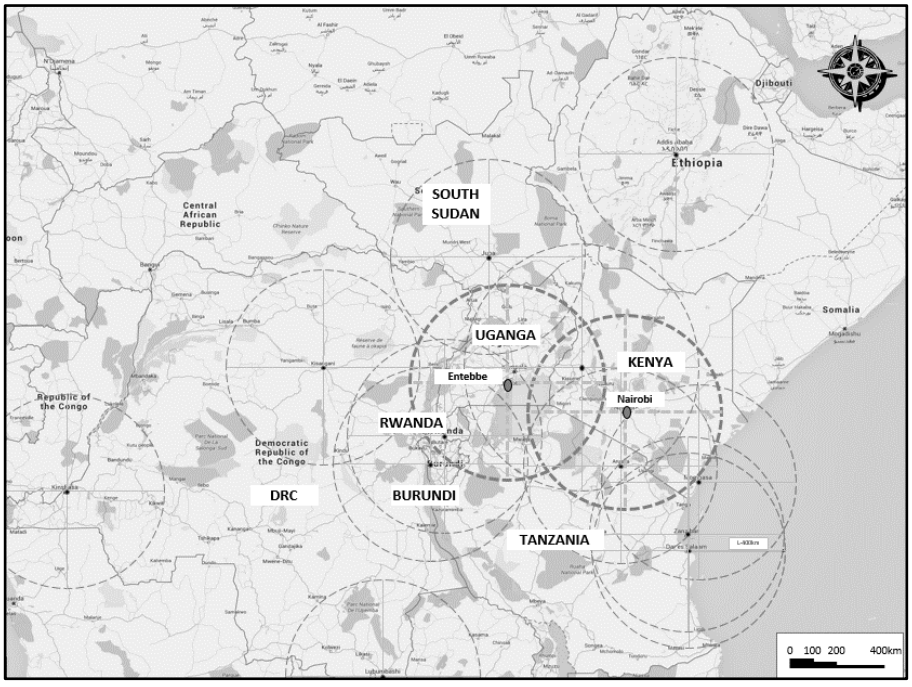
	2008	2009	2010	2011	2012	Compound Average Growth Rate
JKIA Int'l Airport	299	262	228	286	279	-1.7%
Moi Int'l Airport	6	6	8	8	4	-9.6%
Entebbe Int'l Airport	80	75	72	72	81	0.3%
Dar es Salaam Int'l Airport	23	19	20	24	25	2.1%
Kigali Int'l Airport	No data		6	No data		-
Bujumbura Int'l Airport	3	No data from 2009 to 2012 Cargo volume data from 2000 to 2008 are as follows; 3.6 (2000), 3.4 (2001), 2.5 (2002), 2.3 (2003), 3.3 (2004), 3.3 (2005), 2.9 (2006), 2.6 (2007), 2.9 (2008)				2.8% (2000-2008)
Juba Int'l Airport	It is difficult to ascertain the total cargo handling figures for JIA. JIA is however the main destination for, and origin of cargo transported by air within South Sudan. The airport has neither a dedicated cargo terminal nor bulk cargo handling facilities.					
Addis Ababa Int'l Airport	73	101	134	160	181	25.5%
Hong Kong Int'l Airport	3,627	3,347	4,128	3,938	4,062 (Ranking No.1)	2.9%
Dubai Int'l Airport	1,825	1,927	2,270	2,270	2,267 (Ranking No.1)	5.6%

Source: JICA preliminary study report, Wikipedia, AfDB website

Table 5.1.12: Runway in Airport

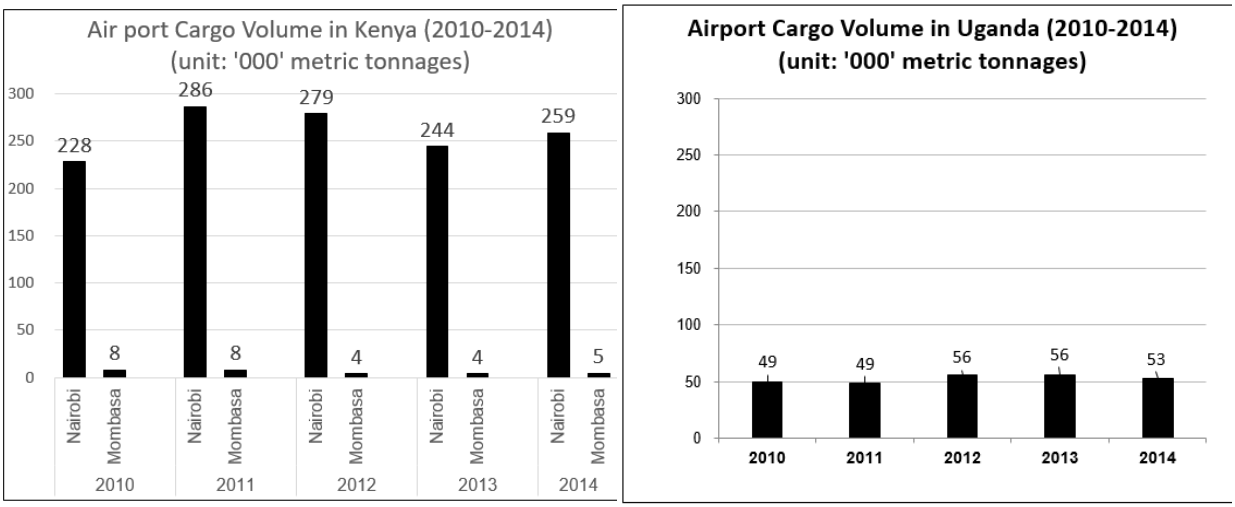
Airport	Runway
Nairobi International Airport (Jomo Kenyatta International Airport)	Runway 1: 4,117m
Mombasa international Airport (Moi International Airport)	Runway 1: 3,356m Runway 2: 1,359m
Entebbe International Airport	Runway 1: 2,408m Runway 2: 3,658m

Source: JICA preliminary study report, Wikipedia, AfDB website



Source: JICA Study team

Figure 5.1.22: Airport Coverage Area(R=400km) in EAC countries

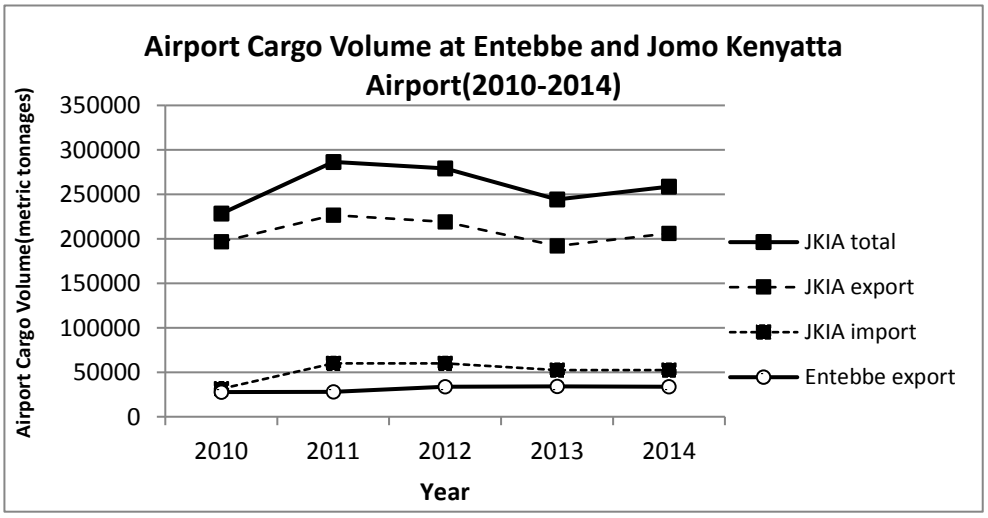


Source: Statistical Abstract in 2015, Kenya, Statistical Abstract in 2015, Uganda

Figure 5.1.23: Airport Cargo Volume in Kenya and Uganda

Entebbe airport export performance and Jomo Kenyatta International Airport (JKIA) export/import performance for 5 years are shown in below. Both airports have base export cargoes; major commodities are fish for Entebbe and cut-flowers/fresh fruits for JKIA.

However, Entebbe's performance has not been active due to the reason that fishery exports cannot show significant progress due to the limitation of resources in Lake Victoria. On the other hand, JKIA has turned growing stage from 2011-2013 decline trends. JKIA has been recorded 4 times larger export performance than Entebbe in current 5 years, cut flowers and fresh fruits are the target export goods not only for air cargo but also for Kenyan industry.



Source: Entebbe Civil Aviation Administration and Kenya Economic Survey 2015

Figure 5.1.24: Air cargo performance at Entebbe and JKIA (Unit: ton)

This positive background at JKIA has a potential to attract airlines. Airlines willingly try to attach and load export cargo with the demand of avoiding empty carriage for returning. As the

result of it, JKIA has the potential to become the air cargo hub based on the rich export potential. This enables to emphasize the concept the JKIA becomes the African regional Air-Air hub.

In addition, cargo facility development has developed and has been approaching to world standard. JKIA has already 5 cargo terminals and they are already privatized. Users (air carrier) can choose cargo terminals depending on service standard and cost performance. Their facilities are advanced and secured.

According to site survey at Swiss port at 2014, the followings are suggested;

- It has export and import warehouse facilities with temperature-controlled facilities.
- Warehouse installs rack management system with barcode inventory control
- Security check is mandatory for exit/entry of facilities

Above service standards can meet world standard level and qualified cargo handling operation is absolute key factor to become an Air-Air cargo hub in this region.

	
Entebbe cargo terminal There are 3 warehouses for transit export and import. The warehouses don't have enough space for cargo loading/unloading and operation from/to trucks. Therefore, it will be difficult to carry out speedy cargo loading/unloading operation. The slow operation is serious constrain for air cargo handling.	**JKIA Signon cargo terminal** This terminal is equipped with advanced facilities such as rack system for cargo storage and IT inventory systems.

Source: JICA Study Team

Figure 5.1.25: Cargo Facilities at Entebbe and JKIA

Table 5.1.13: JKIA Current Cargo Terminals

Name	KAHL (Old cargo terminal)	Kenya airways cargo center	Swiss port	Signon	AFS (Operated by customs agent)
Main customer	Courier	Air France, KLM Lufthansa	British air, Swiss world cargo, Qatar	-	Emirates. Lufthansa

Source: Airfreight Forwarder

(5) Waterway

1) History of Lake Transport at Port Bell

Up to mid-2005, the management of both ports and ships at Port Bell was under Uganda Railway Corporation (URC). The railway and marine services were conceded to RVR in 2005. RVR took over management of both ports and ships from 2005 to 2011 after which the Government returned the management of ports to URC by 2012. URC had three rail-wagon ferries until 2005.

These ferries were well operated on a part of the Central Corridor between Dar as Salaam and Kampala. However, one of the three rail-wagon ferries (MV Kabalega) had an accident and sank on Victoria Lake in 2005, and another one (MV Pampa) also stopped operating due to maintenance issue and currently only one ferry (MV Kaawa) is operational.

As a result, railway connection to Port Bell is out of service at the moment and ferries are not operated as rail-wagon ferries. By 2005, when ships were operated as a rail-wagon ferry, loading could be finished within an hour, but currently it takes four days to load because cargos are manually loaded due to lack of large-scale loading facilities both at Port Bell and Jinja Port which are part of URC. URC loads ships and handles cargo at the port and RVR operates on Lake Victoria.

Only one boat, not as a wagon ferry but a general cargo ferry or break-bulk service operated between Port Bell and Mwanza in Tanzania by URC. Very few boats come to Port Bell from Kisumu port. Furthermore, after 2005 Port Belle rail ferry could have to contend with competition from smaller vessels that entered the market and offered lower costs.

2) Record of Total Cargo Throughput at Port Bell

The date of cargo was provided to JICA Study Team between 1996 and 2014, namely, 2002: 478,115 tons, peak year - 2005: 126,000 tons - 2013: 42,300tons - 2014: 8,100 tons. Cargo throughput at Port Bell in Uganda has rapidly declined since 2005, currently only 8,100 tons is carried as at 2014. The peak was recorded at 478,115 tons in 2002. Currently cargo types include:

Currently 70% of the Cargo through Port Bell is wheat grain as the only sea cargo and the remaining 30% is comprised of inter-regional cargo between Port Bell and Mwanza mainly comprised of the following commodities:

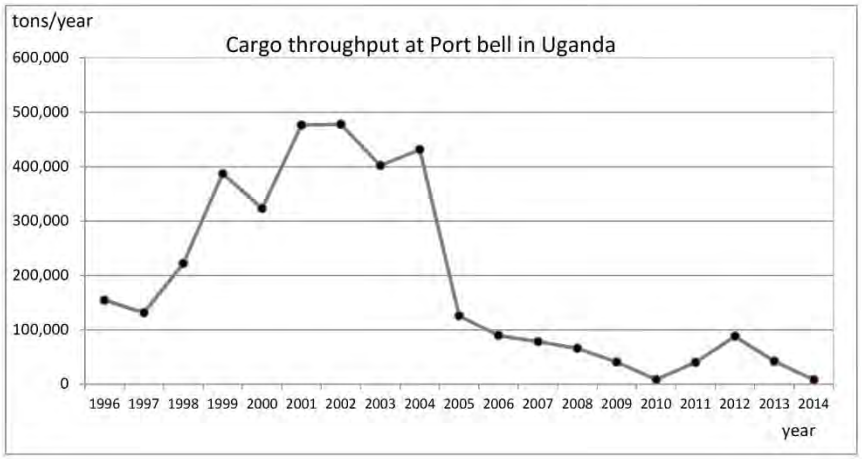
- Cotton seeds/cake
- Mineral water (Port bell to Mwanza)
- Building material
- Soap and cooking oil

- Sugar and rice
- Tobacco
- Other agricultural products
- Marine trade is 85% between Port Bell and Mwanza but there are few sailings to other ports of Musoma and Kisumu comprising 15%
- Fuel and transmission poles are seasonal products
- The Port employs 22 staffs including security guards

Cargo throughtput at Port bell

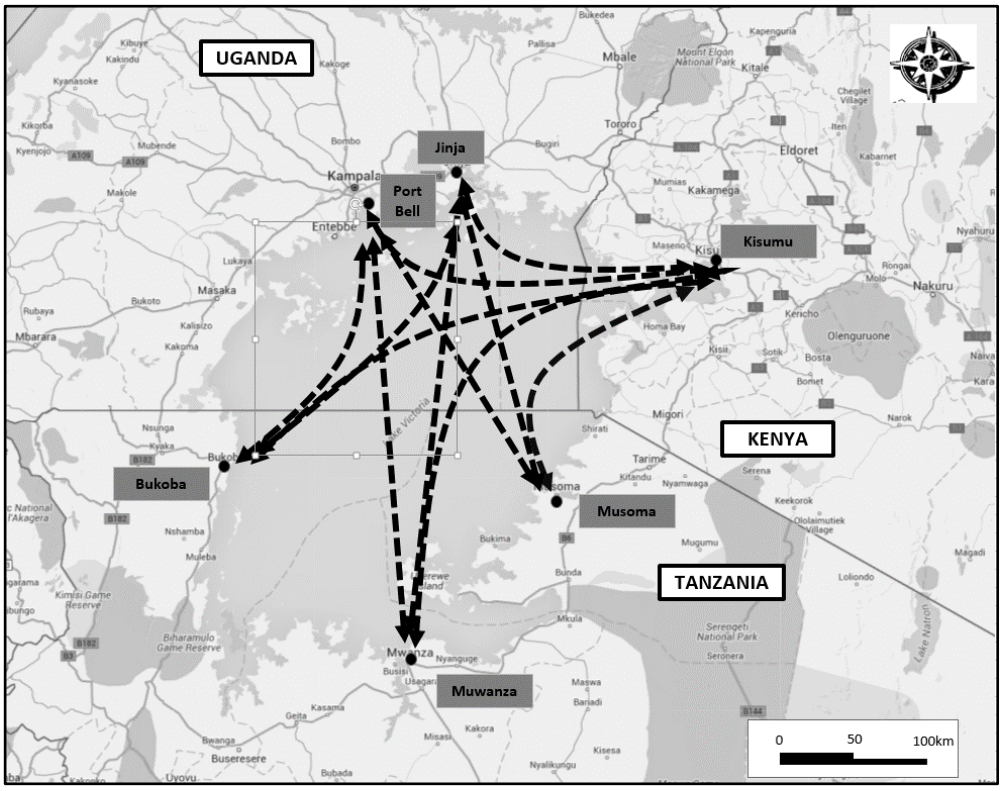
year	tons
1996	154,691
1997	131,363
1998	222,232
1999	387,234
2000	323,498
2001	476,726
2002	478,115
2003	402,426
2004	431,335
2005	126,000
2006	89,600
2007	78,500
2008	65,797
2009	40,677
2010	8,634
2011	40,200
2012	88,200
2013	42,300
2014	8,100

source: Uganda Railway Corporation



Source: Uganda Railway Corporation

Figure 5.1.26: Cargo Throughput at Port Bell between 1996 - 2014



Source: JICA Study Team

Figure 5.1.27: Lake Transport in Lake Victoria

3) Existing Inventory and Maintenance Condition

i) Ferries

Until recently, public services from Ugandan, Kenyan, Tanzanian side with five rail-wagon ferries shown in Table 5.1.14 was available. Among them, one ferry sank after an accident in 2005 and one ferry is awaiting for major repairs. Two ferries are currently being rehabilitated and are expected to be put back into operation soon. Therefore, there is only one ferry that is now being operated.

Table 5.1.14: Current Condition of Existing Ferries

	Name	Owner	Capacity (tones)	Functionality Status	Notes
1	MV Kaawa	URC	850	○	Repaired between 2011 -2012
2	MV Pampa	URC	850	―	Awaiting major repairs
3	MV Kabalega	URC	850	―	Sank after an accident in 2005
4	MV Uhuru	Kenya Railway Corporation	1200	△	.
5	MV Umoja	Tanzania Marine Service Company Limited (MSCL)	1200	△	currently being rehabilitated and are expected to be put back into operation soon

Source: URC, KRC

Apart from those public ferries, more than 20 ships are operated by private companies, which are mainly RoRo vessels.

ii) Ports

Port Bell

Port Bell is located at the head of the Murchison Bay, south-east of Kampala. The rail-wagon terminal is constructed on artificial (reclaimed) land at the head of which is a pier some 65m long and 20m wide, which acts as a causeway to the RoRo rail wagon loading dock. The latter consists of a link-span and hoisting towers (designed to raise and lower the bridge depending on the freeboard of the ferry and differences in water levels), guide walls, and berthing dolphins for mooring the ferries in Mediterranean fashion for stern loading/offloading. The pier is a sheet piled wall construction with a reinforced concrete deck, the eastern part of which can be used for loading/offloading ships using a LoLo arrangement. Although this area is used mainly to berth a small floating dock.

Jinja Port

Jinja port is located 80km east of Kampala on the north shore of the Nile River. The rail-wagon terminal is of similar construction to that at Port Bell, except that the concrete pier is some 40m long and 14m wide.

Kisumu Port

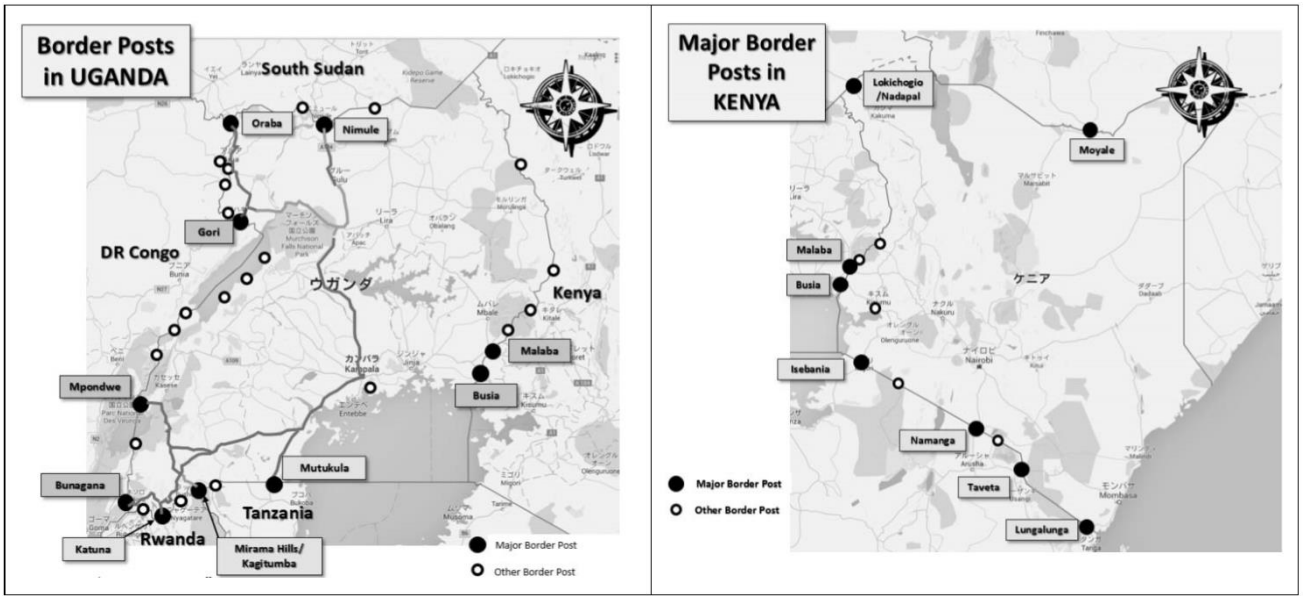
Kisumu is located in the north-eastern corner of Lake Victoria, on the southern shore of a small sheltered bay, fronting Kenya's third largest city. Port facilities are grouped in a wide area of land some 20 ha in size. Most of this area is occupied by dockyard facilities and rail sidings, the latter which run to the main-quay or the rail-wagon terminal located its western end. The main quay is some 260m in length with an apron about 12m wide. A single warehouse of 80m by 16m is provided on the main quay, behind which is a paved open storage are of approximately 3,000 m2. The rail wagon terminal is constructed on artificial (reclaimed) land almost perpendicular to the main quay. It, like those developed in Mwanza, Port Bell and Jinja consists of a link-span bridge, hoisting towers, guide walls and inner and outer mooring dolphins (connected by a suspended walkway). Whilst all the lake ports need regular dredging because of sedimentation, in Kisumu there is the additional problem of water hyacinth, which currently hinders vessel movement in and out of the port.

(6) Oil Product Pipeline

The first petroleum product pipeline from the oil terminal of Mombasa Refinery to Nairobi (450 km) was commissioned in 1978. The pipeline was extended to Sinendet (282.8 km) and further to Eldoret (47 km) in 1994. A branch line from Sinendet to Kisumu was also constructed at the same time period. Demand for petroleum products has increased significantly and further increase is forecast. In addition, transit oil products to inland countries adjacent to Kenya, including Uganda, S Sudan, DRC etc. are also increasing. Majority of these transit oils are transported via Kenyan pipeline system. In order to meet the increasing demand, pipeline capacity needs to be expanded. The Line 4 from Nirobi to Eldred was constructed to increase the capacity of the Line 2 from 1.8 to 3.2 million cubic meter annum in 2008. The Line 5 form Mombasa to Nairobi is under construction to increase the capacity, replacing old Line 1 system.

(7) Border Post

Location maps of major border posts in Kenya and Uganda are shown in the following figure. Many border posts between countries have been improved and further be improved to OSBPs as shown in table below. Nevertheless, OSBPs for the borders between Uganda and DRC are not yet planed so far.



Source: JICA Study Team

Figure 5.1.28: Border Posts in Kenya and Uganda

Table 5.1.15: Major Border Posts in Kenya and Uganda

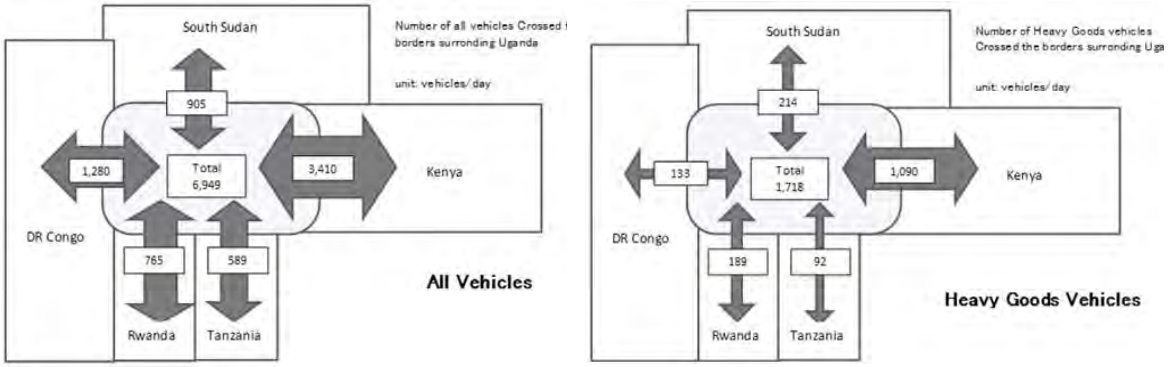
No.	Major Border Post	Border	OSBP	Road Condition to access to the border
1	Malaba	KE/UG	KE side ongoing/ UG side completed/ WB	Fair (Paved)
2	Busia	KE/UG	Not yet/ TMEA	Fair (Paved)
3	Taveta/Holili	KE/TZ	Completed/TMEA	Under construction(Paved)
4	Namanga	KE/TZ	Ongoing/AfDB-JICA	Fair (Paved)
5	Lungalunga/Horohoro	KE/TZ	Completed/WB	Fair (Paved)
6	Isebania/Sirare	KE/TZ	Ongoing/WB	
7	Loitokitok/Tarakea	KE/TZ	Ongoing/	
8	Lokichogio/Nadapal	KE/SS	No Plan	
9	Moyale	KE/ET	No Plan	
10	Mutukula	UG/TZ	UG side ongoing/ TZ side completed/ TMEA	Fair (Paved)
11	Mirama Hills / Kagitumba	UG/RW	Under construction/ TMEA	Under construction/ TMEA
12	Katuna/ Gatuna	UG/RW	Not yet/ WB	Fair (Paved)
13	Bunagana	UG/DRC	No Plan	Good (Paved)
14	Mpondwe	UG/DRC	Not yet/ AfDB	Fair (Paved)
15	Goli	UG/DRC	No Plan	Bad/ Gravel Road
16	Oraba	UG/SS	No Plan	Good (Paved)
17	Nimule	UG/SS	Next Year	Under construction/ JICA/WB

Source: OPBP source book, EAC web site, JICA Study Team

Number of vehicles crossing the borders per day surrounding Uganda is shown in following figures based on the results of the traffic survey. Several findings are summarized as follows:

- The traffic is the most on the border between Kenya and Uganda, secondary most on the border Between Uganda and DRC and thirdly most on the border between Uganda and South Sudan.

- The highest ratio of heavy goods vehicles is 32% on the screen line between Kenya and Uganda. In contrast, the lowest ratio is 10% between Uganda and DRC.
- Malaba on the border between Kenya and Uganda has overwhelmingly has the most heavy-goods-vehicle traffic of the all borders surveyed in 2015. It is currently the key border in logistics of the Northern Economic Corridor. Malaba border's efficiency in traffic movement has a great influence on realizing smooth traffic on the Northern Economic Corridor as a whole.



Source: JICA Study Team

Figure 5.1.29: Number of Vehicles Crossing the Borders surrounding Uganda

Table 5.1.16: Number of Vehicles Crossing the Borders surrounding Uganda

Number of Vehicles Crossing the Borders surronding Uganda — vehicle/day

Country	Border Name	Passenger Car	Light & Medium Goods	Heavy Goods	total
Uganda－Kenya	Malaba	254	58	842	1,154
	Busia	1,373	635	248	2,256
	sub-total	1,627	693	1,090	3,410
Uganda－Rwanda	Mirama Hills	84	34	37	155
	Katuna	323	135	152	610
	sub-total	407	169	189	765
Uganda-DRC	Goli	130	62	52	244
	Mpondwe	650	145	54	849
	Bunagana	67	93	27	187
	sub-total	847	300	133	1,280
Uganda-SouthSudan	Nimule	205	120	186	511
	Oraba	351	15	28	394
	sub-total	556	135	214	905
Uganda-Tanzania	Mutukula	385	112	92	589
	sub-total	385	112	92	589
Total		3,822	1,409	1,718	6,949

Source: Traffic Survey conducted by JICA Study Team in 2015

Ratio of Coposition byType in the Vehicles Crossing the Borders surronding Uganda — unit: %

Country	Border Name	Passenger Car	Light & Medium Goods	Heavy Goods	total
Uganda－Kenya	Malaba	22%	5%	73%	100%
	Busia	61%	28%	11%	100%
	sub-total	48%	20%	32%	100%
Uganda－Rwanda	Mirama Hills	54%	22%	24%	100%
	Katuna	53%	22%	25%	100%
	sub-total	53%	22%	25%	100%
Uganda-DRC	Goli	53%	25%	21%	100%
	Mpondwe	77%	17%	6%	100%
	Bunagana	36%	50%	14%	100%
	sub-total	66%	23%	10%	100%
Uganda-SouthSudan	Nimule	40%	23%	36%	100%
	Oraba	89%	4%	7%	100%
	sub-total	61%	15%	24%	100%
Uganda-Tanzania	Mutukula	65%	19%	16%	100%
	sub-total	65%	19%	16%	100%
Total		55%	20%	25%	100%

Source: Traffic Survey conducted by JICA Study Team in 2015

From the above borders by traffic and field survey, the findings can be summarized

1) In most of borders, OSBP installation and road improvement are ongoing except for DRC borders. However, some OSBP' projects have reportedly delayed because of the need for additional money, relevant government commitment to pay for better access roads, delayed compensation payments and procurement.
2) East/West side borders have more problems than North/South side borders. The most serious bottleneck is the east side border between Kenyan and Uganda, especially on Malaba border where the largest number of heavy goods vehicles and the longest queues were seen. Related issues are as follows;
   - how to effectively utilize two borders, Malaba and Busia
   - how to shorten custom clearance time
   - how to expand the capacity for access road and entrance/exit gate
3) Projected future candidates of bottlenecks may be DRC borders, such as Mpondwe and Goli, where border's infrastructure are not sufficient although the future cargo demand will most probably increase because DRC's great potential of exporting minerals and timber.

Source: Site Survey by JICA Study Team on October, 2015

Figure 5.1.30: Current Condition of Border Posts and Access Roads to Border Posts

(8) Inland Depot

In Kenya, Inland Continent Depot (ICD) is operated by KPA to connect inland and gateway by railway. The Kenyan ICD aims at providing "modal shit" function spearheaded by the public sector. In contrast, Uganda has 2 types of ICD: one has the same concept with Kenya and is operated by RVR as the rail/truck modal facility while the second one is operated by the private sector.

i) ICD in Kenya

Although KPA currently operates two ICDs, one in Nairobi (Embakasi ICD) and the other in Kisumu, their performance is relatively low. Embakasi ICD for instance has a handling capacity of 180 000 TEU's annually but only less than 10% is utilized. Kisumu ICD, on the other hand, has almost stopped its operations due to the collapse of the railway service since 2011. The low performances of ICD, is mainly due to poor railway performance, delay, unreliable service, low frequency among other factors. Their low service standard prompts customers to give up using railway.

Table 5.1.17: ICD Performance

Embakasi ICD

	2,010	2,011	2,012	2,013	2,014
Import full	14,185	14,494	15,319	14,811	10,263
Export full	5,157	4,607	4,848	5,261	5,319
Empty	18,659	21,830	19,737	26,816	22,138
Total	38,001	40,931	39,904	46,888	37,720

Kisumu ICD

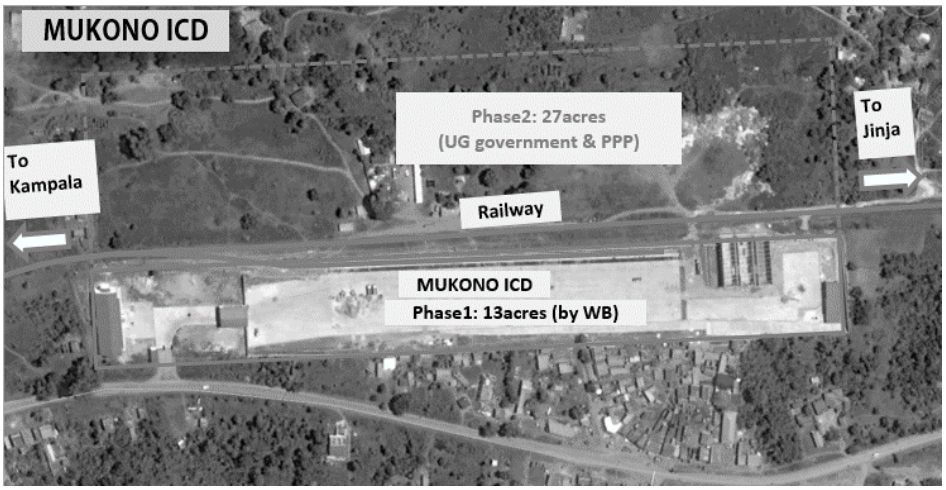
	2010	2011	2012	2013	2014
Import full	131	66	102	111	32
Export full	2	-	-	-	1
Empty	95	74	55	93	41
Total	228	140	157	204	74

Source: Kenyan Port Authority(KPA)

ii) ICD in Uganda

Private ICD: Privately-operated ICDs are likely to focus on customs clearance and cargo movement between Mombasa and Uganda for containerized cargo. Some private ICDs have railway side line, most of which is currently not optimally used. On the other hand, some advance ICDs try to provide processing services such as repacking, storing among others, under the bonded storage status.

Mukono ICD: New Mukono ICD has just been completed in July 2015 and all container cargo handling will be shifted from the current Kampala railway terminal from the beginning of 2016. The land area is 13 acres with 6,000 TEU handling capacity. The location is strategic for both Kampala city area delivery and the industrial area along the Kampala-Jinja highway.



Source: JICA Study Team based on the information collected from Mukono ICD

Figure 5.1.31: Mukono ICD

5.1.5 Current Gap

(1) Road

1) Kenya

Road is the most fundamental infrastructure for logistics in Kenya. In fact logistics of cargo from Mombasa Port to Kenya's hinterland and six other countries which include Uganda, Rwanda, Burundi, D.R.Congo, South Sudan and Tanzania, rely significantly on road transport by heavy trucks and trailers. The dominant share of road transport is estimated to be 71% among road, railway and pipeline for import and export tonnage basis from or to Mombasa port.

In future, due to the standard gauge railway and pipeline projects, road network will increasingly have a great role in integrating multi transport infrastructure as a link between multiple modes such as railway, airway, waterway and pipeline. Usually the last mile of cargo trip is done by road transport.

JICA Study team conducted Traffic Survey, Data Collection Survey and Road Inventory in Kenya, Uganda and Rwanda and the based on the surveys the following problems should form part of the agenda that should be dealt with:

i) In Kenya generally, road improvement has progressed rapidly. In particular, the section between Nairobi and Eldoret can be said to have good surface with a well-balanced capacity. Nevertheless, bottleneck spots for road traffic is witnessed in the city centers of Mombasa, Nairobi, Nakuru, Eldoret, Kisumu and their surrounding areas as well as around the borders of Malaba and Busia, Mombasa Port and railway stations. Currently very long queues of trucks and trailers of more than 2km can be seen in both Mombasa urban area and Malaba's border area during the day. Although the introduction of One Stop Border Posts (OSBPs) have contributed to time savings, trucks still take a lot of time around the borders of Malaba and Busia. These bottlenecks are clearly generated by cargo traffic. In addition, cargo traffic is estimated to increase up to three times by 2035 based on Mombasa Port Master Plan Study. How to deal with such increase in demand is one a crucial of agenda.

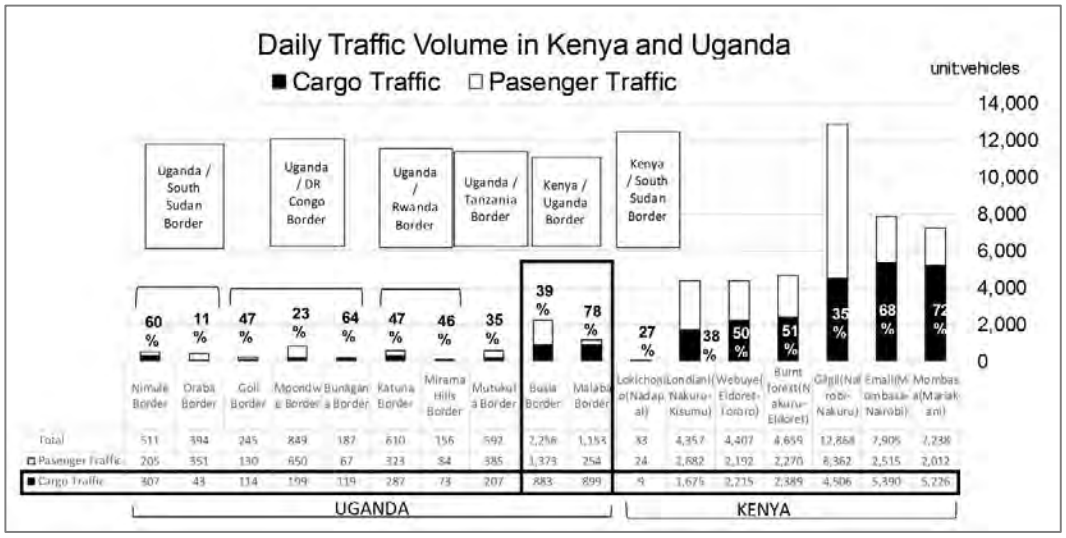
ii) More than 5,000 cargo trucks per day corresponding to 15,000 pcu per day are reported in Mombasa. This means that the demand for cargo traffic is enough to create traffic jam for a two-lane-capacity road and therefore difficult to deal with the volume on a one carriage way.

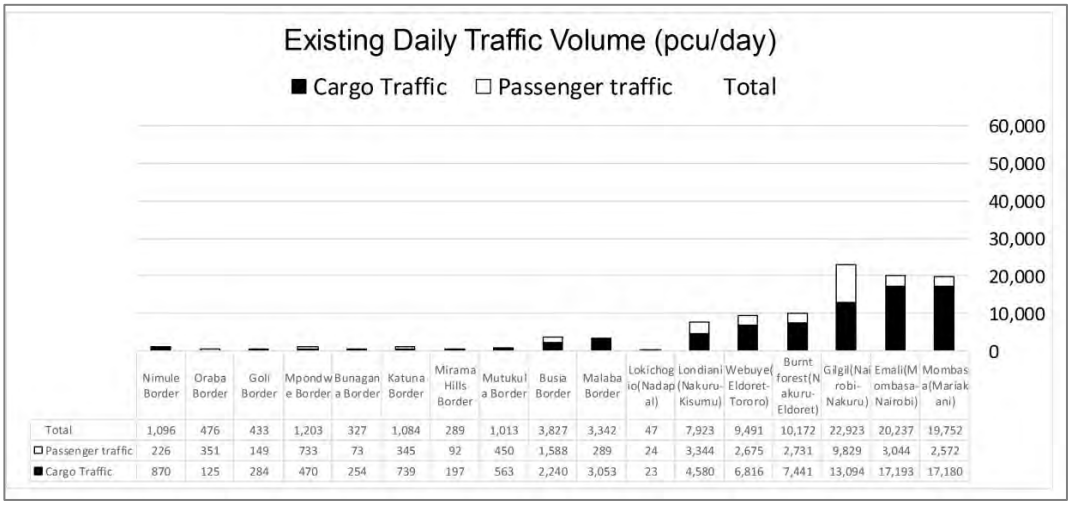
iii) In Kenya, there is increasing cargo traffic demand. As a result, heavy trucks cause road surface deterioration over relatively short periods of time. As such therefore there is need for continuous improvement and maintenance of the road network to meet

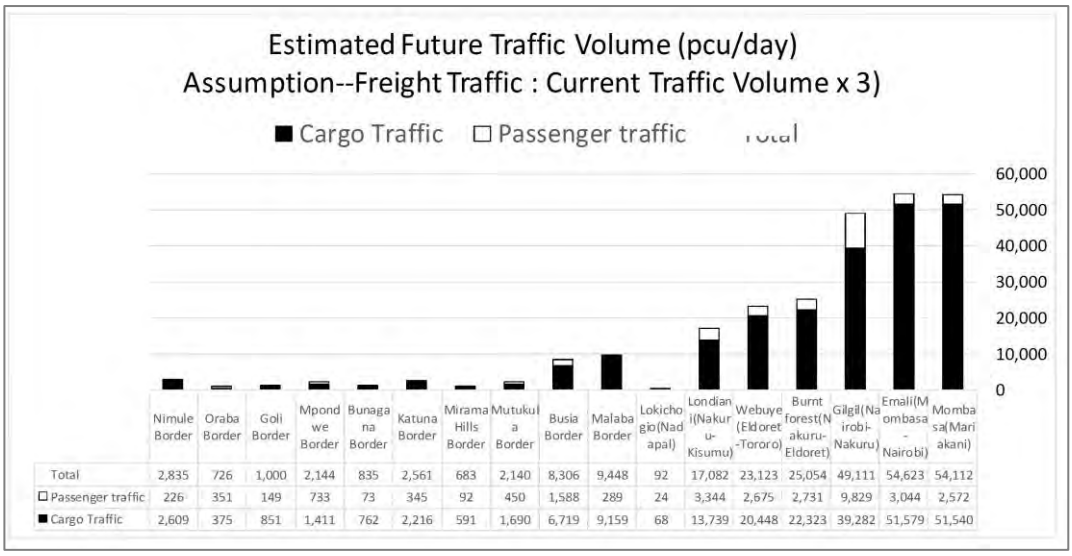
increasing traffic demand for safe and efficient for logistic transport as well as passenger transport. Kenya's road surface on the main route is generally good although many pot holes were observed in Mombasa County during the survey conducted by JICA Study team in July, 2015.

iv) Traffic accidents around black spots on the Northern Corridor road network can be said as one of the major issues. During the survey, JICA Study Team witnessed three traffic accidents within a day between Nairobi and Mombasa. In order to improve the situation around the black spots it is necessary to point out the causes of traffic accidents. Several measures such as additional climbing lanes, speed restriction schemes and pedestrian bridges need to be implemented.

v) Basic observation on the current cargo traffic movement is that too many trailers and heavy trucks require additional exclusive lanes or new express way to effectively meet the cargo traffic demand. For example, the main route on Mombasa-Nairobi-Nakuru-Eldoret-Malaba with a distance of approximately 1,000km could be fronted as a high capacity and high speed logistics highway through expansion of existing roads or Highway- Bypass construction. The Master plan of the Northern Economic Corridor would tackle the above arguments by demonstrating solutions.







Source: Traffic Survey conducted by JICA Study Team in 2015

Figure 5.1.32: Existing Daily Traffic Volumes and Future Traffic Volumes Assumed Increase of Cargo by 3 Times

As shown in the following figure, on the 19th of November, 2015 BBC News reported a 50km Traffic Jam between Mombasa and Nairobi. The worst-affected area was around Taru, 80km from Mombasa. People were reportedly stuck in the jam for more than 48 hours. This jam could be explained by not only heavy rains but also by regular road maintenance.

Source: BBC website (http://www.bbc.com/news/world-africa-34867935)

Figure 5.1.33: Kenyans Stuck in '50km' Traffic Jam on Nairobi-Mombasa Road

2) Uganda

As in the case of Kenya, road is the most fundamental infrastructure for logistics in Uganda. In future, due to the standard gauge railway project and pipeline project, road network will increasingly have a greater role in integrating comprehensive multi transport infrastructures as the link between multiple modes such as railway, airway, waterway and pipeline. Usually last mile of cargo trip is usually done by road transport.

i) JICA Study team conducted Traffic Survey, Data Collection Survey and Road Inventory in Kenya, Uganda and Rwanda. Based on the survey the following problems were identified in as far as the agenda which should be dealt with:

ii) In Uganda Bottleneck points of road traffic can be seen in city centers of Kampala, Entebbe and Jinja. However, this seems to be different from the case of Mombasa where passenger car demand is greater than cargo truck demand. Therefore, from the view of urban transport management, such bottlenecks should be dealt with rather than cargo traffic management.

iii) Bottleneck points exist at Malaba boundary of Kenya, around Inland Container Depots (ICDs) and railway cargo station in Kampala. These seem to be the same as Kenya where cargo traffic is the major cause of congestion. Parking spaces for cargo traffic becomes definitely necessary.

iv) Reducing traffic congestion at the bottlenecks and traffic accidents around black spots on the Northern Corridor road network can be seen as one of major issues. In order to

improve the situation around the bottlenecks it is necessary to point out the causes of traffic congestion, and expand capacity of the network by construction of new construction of expressway, bypass, ring road, over/under pass, additional climbing lanes and conducting traffic demand management. Effective measures should be selected and implemented for each bottleneck. For example, in 2030 the main route on Malaba-Jinja-Kampala-Entebbe with a distance of approximately 220km could be fronted as a high capacity and high speed logistics highway by expansion of existing roads or Highway- Bypass construction.

(2) Railway

Current gaps in railway service include:

1) Adequate railway service: As of now, the lack of a well-functioning railway is a gap in the NEC logistics system. According to the Study Team's research, the meter gauge system's market share among railway, truck and pipeline as measured by tonnage has averaged approximately 8.0% of freight passing through Mombasa Port. Rail market shares in other developed countries are in the range of 12% or more on a ton-kilometer basis. US rail shares have been estimated as high as 39.5% on a ton-kilometer basis and 15.9% on a tonnage basis.

Table 5.1.18: Rail Share of Cargo Transportation in Developed Countries

Mode	EU (2013)	USA (2012)	Japan (2013)	China (2013)	Russia (2013)
Truck	49.4%	45.6%	50.6%	33.2%	4.9%
Rail	11.7%	29.8%	4.9%	17.4%	43.2%
Inland water	4.4%	5.5%	0.0%	18.3%	1.6%
Coastal water	31.3%	3.1%	44.4%	29.0%	0.8%
Pipeline	3.2%	16.0%	0.0%	2.1%	49.5%
	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Eurostat and the American Trucking Association (see footnotes below)

Table 5.1.19: Share of Cargo Transportation Measured by Ton Miles and Tonnage (United States)

Mode	Tons	Ton Miles
Truck	75.1%	28.6%
Rail	15.9%	39.5%
Other	9.0%	31.9%
	100.0%	100.0%

Source: US Federal Railroad Administration[6]

6 National Rail Plan, Moving Forward Progress Report for September 2010, Figure 8 page 14

Railway's advantage compared with road transportation depends to a large degree on the length of haul. As the table below illustrates, railway's share of freight transportation increases as the distance over which the cargo is transported increases.

Table 5.1.20: Share of Cargo Transportation by Length of Haul (United States)

Mode	Truck	Rail	Other	Total
<161 kilometers	84.9%	3.1%	12.1%	100.0%
161-400 kms	82.3%	6.2%	11.5%	100.0%
401-800 kms	62.7%	18.8%	18.5%	100.0%
801-1,200 kms	46.0%	29.8%	24.2%	100.0%
1,201-1,600 kms	31.0%	37.4%	31.5%	100.0%
1,601-2,400 kms	19.4%	42.4%	38.3%	100.0%
2,401-3,200 kms	18.7%	37.5%	43.8%	100.0%
>3,200 kms	31.2%	14.3%	54.5%	100.0%

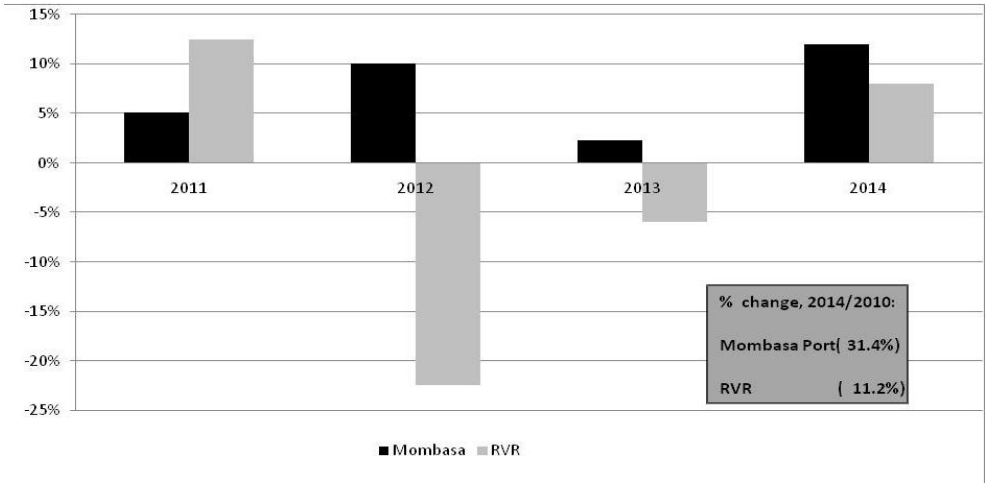
Source: US Bureau of Transportation Statistics (2007 data)[7]

Railway movements within Kenya are relatively short distance. Nairobi is approximately 470 kilometers by rail from Mombasa. Malaba, based on the route through Kisumu, is approximately 697 kilometers from Mombasa. Kampala is approximately 934 kilometers from Mombasa again based on the Kisumu route for SGR. Overall the average length of haul for the SGR as proposed is approximately 689 kilometers.

The SGR project is intended to address the gap in railway transportation market share compared with other countries by providing world class railway services along the NEC. However, SGR is a significant project that will take a number of years to be fully implemented. Over the next three to five years it is important that meter gauge railway service improve to provide an interim solution to shippers, begin the transfer of truck transportation to railway transportation and potentially offer a competitive option to the SGR.

2) RVR track condition and rolling stock availability: RVR has invested in infrastructure and equipment but overall it appears to have lost share of cargo transportation. The private sector complains that the schedule of cargo trains has not been stabilized and, therefore the delivery schedule cannot be fixed. Further strengthening of track and infrastructure and additions to rolling stock should be considered to enable RVR to increase share.

7 http://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/data_and_statistics/by_subject/freight/freight_facts_2015/chapter2/fig2_1



Source: KRC; Mombasa Port

Figure 5.1.34: Percent Change Mombasa Port and RVR Cargo 2010-2014

3) Railway funding: Uganda recently revised the scope of a standard gauge project because of a borrowing limit imposed by the International Monetary Fund (IMF). While this may be temporary (the debt limit increases with GDP) it has delayed Uganda's progress on the SGR project. Kenya is also experiencing challenges financing the route from Nairobi through Kisumu to Malaba but so far has not had to adjust its implementation plans.

(3) Port

On the Northern Economic Corridor, Mombasa can be seen as the biggest bottleneck of transport. Important issues relating to cargo logistics can be pointed out as follows:

1) Time shortening of cargo clearance at the Mombasa Port area: It still takes long time to import cargo, to clear custom and move out of the port although dwell time and loading/unloading time have recently improved significantly than in the past. It also takes time for exporting cargo. Dwell time and loading/unloading time are dominant time for total travel time of cargo.
2) Improvement of road capacity on the trunk roads for cargo traffic within the urban area of Mombasa: The roads within the urban area of Mombasa are so heavily congested that cargo traffic is frequently stuck during the day time. The most fundamental problem is lack of road network and capacity of trunk road. Southern by-pass should be constructed urgently. Moreover, relocation of CFSs outside the port should be implemented in the short term in order to avoid the concentration of trucks and trailers into the Mombasa road. In the long term, based on the trend of increasing demand of cargo and car users, an additional trunk road in Mombasa and between Mombasa Port and Voi town should be examined, designed and constructed.
3) Promotion measures for a modal shift from truck and trailer to the standard gauge railway and pipeline: The Northern Corridor Logistics should be operated by comprehensive multimodal transport infrastructure consisting of road transport, railway, airway, waterway

and pipeline in order to deal with increasing cargo demand. In this regard Mombasa Port is the most important site. Several issues on the modal shift at Mombasa Port are arguable. For example, how to promote a modal shift from track and trailers to the standard gauge railway for cargo would be still unclear not only at the port but also at the other origins and destinations such as railway terminals.

(4) Airport

Both airports of Nairobi and Entebbe have plans to expand the handling capacity for passengers and cargo, and strengthen hub function for the region. For example, flowers and ornamental plants or fishes are having great potential as export goods to Europe by air. In order to promote such types of air cargo handling, the following issues should be considered:

1) Strategic targeting of several cargos which have a potential demand as export or import goods to Europe and other foreign countries by air.
2) Estimating warehouse demand for the goods which have a potential as export or import goods near the airport and providing them with appropriate warehouse.
3) Providing last-mile transport service from the airport to consumption or producing areas by truck and railway including long trip crossing borders

(5) Waterway

Waterway is an eco-friendly transport which can be defined as a more energy-efficient and less environmentally polluted mode than truck. The Lake transport in Lake of Victoria had a great role for cargo logistics between Port Bell, Kisumu and Mwanza. However, cargo transport shifted from lake transport to road transport with the decline of railway logistics in recent years. It could be possible to revival the Lake Transport after the standard gauge project is completed and railway is well operated covering the overall region. In order to revival the Lake transport, the following issues should be looked into:

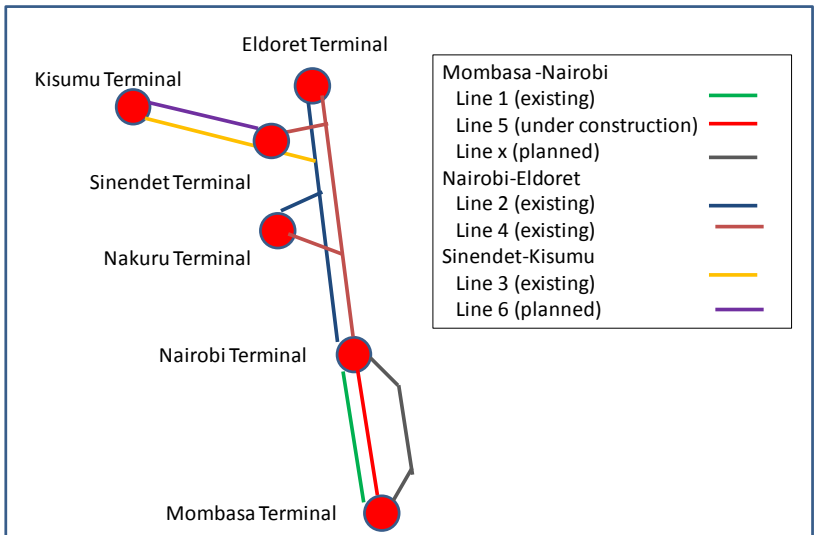
1) Strategic targeting of several cargos which have potential demand for lake transport as a railway system. In this regard, interregional trade or EFCs' trade with both Uganda and Tanzania as well as international trade should be examined.
2) Flexible operation of not only rail wagon but also track/car ferry should be introduced in order to respond to the demand with shorter distance than international cargo. Furthermore, Victoria Lake transport is seen as an attractive sightseeing ship from Kisumu to Port bell and Mwanza.
3) Providing last-mile transport services from the ports around Lake Victoria to production or consumption areas by truck.

4) Kisumu and Port Bell should be well linked with Mwanza port through the improvement of infrastructure of wagon/car ferry port and provision of new vessels including car ferry and passenger vessels.

5) Lake Victoria transport should be supported by road network around Victoria Lake. This is because Lake Transport tends to be much affected by weather conditions. In addition, there are a variety of activities such as fishing, farming, transport, leisure boating; and there are a great number of transport related accidents on the Lake. As an alternative route across the lake between Kenya and Tanzania or Uganda and Tanzania, some circular road around the lake should be planned. This kind of circular road network can contribute stable export or import transport of cargo and promote tourism around the lake which has rich attractive sites for international tourists.

(6) Oil Product Pipeline

In order to meet the increasing demand, pipeline capacity needs to be expanded. The Line 5 is under construction to increase the capacity from Mombasa to Nairobi, replacing old Line 1 system. The Line 3 from Sinendet to Kisumu will also be replaced with Line 6. Overview of future pipeline system in Kenya is illustrated as follows:



Note: Line 1 will be decommissioned after completion of Line 5; Line 2 will be decommissioned at the time of upgrading of Line 4; Line 3 will be decommissioned after completion of Line 6
Source: Toward a Petroleum Master Plan for Kenya 2015

Figure 5.1.35: Schematic Drawing of Product Pipeline System in Kenya

Expansion scheme of petroleum product pipeline is summarized as follows:

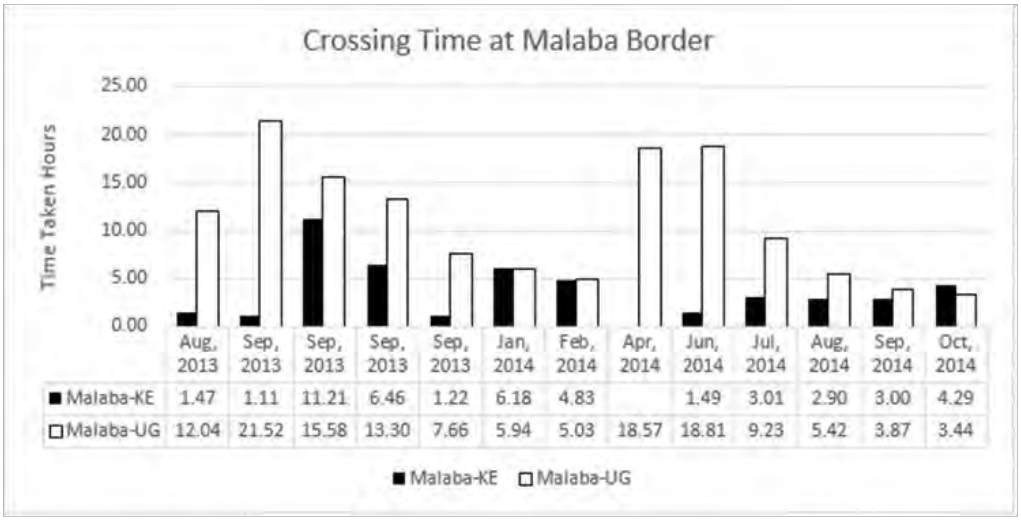
Table 5.1.21: Product Pipeline Expansion Project Summary

Line Name	Size/Upgrade	Year	Installed Flow Rate (m3/hr)	Capacity (million m3/yr)
Mombasa-Nairobi				
Line 1	14 inch	2013	880/615	5.2
Line 5	20 inch	2016	880	6.9
	Upgrade	2025	1830	15.4
Line x	14-20 inch	2040	1200	10.1
Total (After replacement of Line 1 to 5)				**25.5**
Nairobi-Eldoret				
Line 2	6-8 inch	2013	220	1.8
Line 4	14 inch	2013	378	3.2
	Upgrade	2019	531	4.5
	Upgrade	2026	757	6.4
Total (After replacement of Line 2 to 4)				**6.4**
Sinendet-Kisumu				
Line 3	6 inch	2013	110	0.9
Line 6	10 inch	2017	400	3.4
Total (After replacement of Line 3 to 6)				**3.4**

Source: Toward a Petroleum Master Plan for Kenya 2015

(7) Border Post

According to data form Northern Corridor Transit & Transport Co-ordination Authority (NCTTCA) latest "Northern Corridor Transport Observatory survey" issued in Dec.2014, the transit time for crossing at Malaba border has been remarkably reduced. The performance as of Oct, 2014 was approximately 7 hours for border crossing procedures. Although it is certain that border procedure is computerized at both Kenya and Uganda, this data only calculated the data processing time for border crossing process, not including time for long queue, and non-computerized procedure.



	Aug, 2013	Sep, 2013	Sep, 2013	Sep, 2013	Sep, 2013	Jan, 2014	Feb, 2014	Apr, 2014	Jun, 2014	Jul, 2014	Aug, 2014	Sep, 2014	Oct, 2014
Malaba-KE	1.47	1.11	11.21	6.46	1.22	6.18	4.83		1.49	3.01	2.90	3.00	4.29
Malaba-UG	12.04	21.52	15.58	13.30	7.66	5.94	5.03	18.57	18.81	9.23	5.42	3.87	3.44

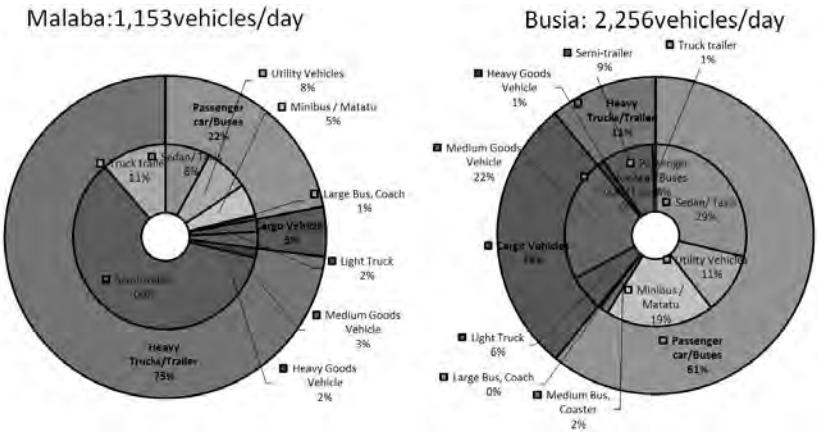
Source: NCTTCA "Northern Corridor Transport Observatory survey" issued at Dec.2014

Figure 5.1.36: Malaba Crossing Time

JICA STUDY TEAM' s GPS survey conducted in March 2015 shows that it takes 1.5 days for border crossing including time spent for overnight sleep and interview survey for forwarders also indicate 2 days for border crossing is not long. Long queues and hold up of trucks are common. A 4km long queue with over 200 trucks was observed when the survey was conducted

by June.2014. According to the interview survey at Sep, 2015, the custom officials at Malaba in Uganda reported that it took 1.2 days for total crossing time, a reduction of 0.3 days from JICA STUDY TEAM survey. There are gaps between more efficient operation and current operation at many borders. As such therefore improvement projects should be implemented;

1) Border infrastructure improvement such as expansion of capacity of gate and access road should be considered.
2) 24-hour operation should be implemented in practice. Clearing agents do not provide 24hours/7days operations. So border crossing at night is not well worked. In addition, night time driving is unsafe because of lack of adequate street lights coupled with inadequate security operations thereby making night time sleep at the border is common.
3) There is no scanner to minimize on physical examination of goods.
4) There is frequent power blackout and slow speed for customs procedure.
5) Bond cancellation procedure remains manual, resulting in long time.
6) OSBP procedure is not fully implemented, and custom procedures are required at both side.
7) In Malaba and Busia borders, it is necessary to use two borders more efficiently by providing information of traffic congestion to drivers. Currently many heavy trucks use Malaba border while passenger cars use Busia border. As a result, the Malaba border is always congested while Busia is not.



Note: HGV: Heavy Goods Vehicle
Source: JICA Study Team

Figure 5.1.37: Traffic Volume as Malaba and Busia

(8) Inland Depot

1) Kenyan side

ICD development depends on railway service. The following projects are taken into account.

- New ICD for Standard Gauge Railway (SGR)

  The SGR program includes the development of a new ICD or Nairobi South Hub, located about 4 km to the west of the current ICD with a capacity of 400,000 TEU per annum, only to serve the SGR. The New ICD will be operated by the SGR operator.
- Embakasi ICD

  The SGR program includes the upgrade of the Nairobi ICD to a capacity of about 400,000 TEU's, to serve both Meter gauge and SGR systems. The Nairobi's Embakasi ICD, and the SGR will be connected by a freight road, with both terminals being served by new access roads to a new Mombasa Road-Enterprise Road interchange, and from there along dedicated freight service road connecting to the Southern and Western Nairobi bypass roads.
- Kisumu ICD

  In November 2011, RVR stopped operation on the Nakuru to Kibos branch line majorly due to vandalism of the rail line. Along with the SGR construction, Kisumu ICD should be considered as a logistics depot connecting the SGR with the Lake transport.
- Eldoret ICD

  Although it has never been operated by KPA, plans are under way to revive operation of the ICD. It is currently being used by Moi University for courses training.

2) Uganda side

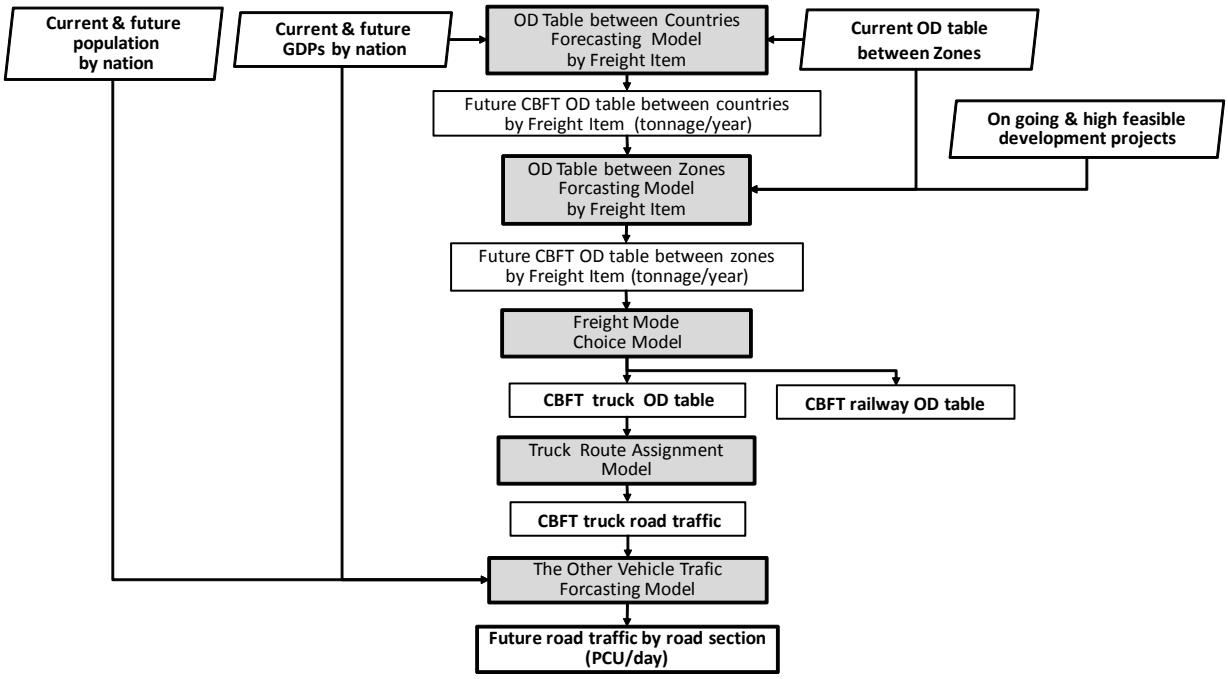
ICD project will be dependent on SGR extension plan. According to an interview survey at Mukono ICD, Northern route (Tororo-Gulu) will be the first priority so that facility development at both points will be necessary. Trademark also seeks to promote Gulu as a "Trade hub" with the aim of providing a total trade function including logistic functions.

5.2 Freight Traffic Demand Forecasting

5.2.1 Outline and Methodology

(1) Outline of Forecasting Methodology

The figure below shows forecasting flowchart. It shows the outline of Cross Border Freight Traffic (CBFT) forecasting method. It is based on the four-step forecasting method which is one of the most typical commonly used methods for traffic demand forecasting.



Source: JICA Study Team

Figure 5.2.1: Freight Traffic Demand Forecasting Flow Chart

Each forecasting method by step is shown in Table 5.2.1. Moreover, the Freight Mode Choice Model will be described in the next section in detail.

Table 5.2.1: Summary of Preliminary Freight Traffic Demand Forecasting Model System

Model	Explained variable	Explanatory variable	Type of model
OD Table between Countries Forecasting Model by Freight Item*	Total CBFT flow via Mombasa port by freight item (tonnage/year)	GDP in export partners and current OD table between countries	・ Multiple regression model (time series model) ・ Elastic value model calculated based on the difference between rates of the trade volume and the GDP in export or import partners
	The other CBFT flow by freight item (tonnage/year)	GDP in export partners and current OD table between countries	Elastic value model calculated based on the difference between rates of the trade volume and the GDP in export or import partners
OD Table between Zones Forecasting Model by Freight Item	CBFT OD table between zones by Freight Item (tonnage/year)	Current OD table between zones and existing development plans	Present OD pattern method and scenario analysis
Freight Mode Choice Model	Truck and railway shares of CBFT OD table	Total time and cost by mode by OD pair	Discrete choice logit model
Truck Route Assignment Model	CBFT truck road traffic	Driving time by road section and current border post usage share	All or Nothing (AON) assignment with shortest time route search method
Other Vehicle Traffic Forecasting Model	Road traffic by road section (PCU/day)	GDP and population growth from 2015 to 2030 in Uganda and Kenya	Growth rate model assumed that the yearly average growth rate is equal to the growth rate of each country's GDP or the geometric average of the growth rate of each country's population and GDP's.

* The existing models and forecasting result were applied. They were built and forecasted in the JICA Study "The Project for Technical Assistance to Kenya Ports Authority on Dongo Kundu Port, Mombasa Master Plan (June 2015)"
Source: JICA Study team

(2) Freight Mode Choice Model

(Transport mode)

As far as freight transport mode is concerned, four modes are focused. They are seaport, railway, truck and pipeline. Mombasa sea port handles approximately 26million tons per year in 2015 and railway was estimated to have carried freight of more than 2.2 million tons per year from Mombasa port in 2015 while pipeline carried 5.4 million tons per year. On the other hand, airport handling volume was 0.3 million ton per year both in Kenya and Uganda. In addition, inland port handling volume is much less than that at airports although Port Bell in Uganda had dealt with 0.5 million ton per year in the peak year 2002. It can be said that handling freight volume at airports and inland ports in Kenya and Uganda is extremely lower than that at Mombasa sea port. Therefore, airport and inland port is not dealt with as a transport mode in this future traffic demand forecasting. As a result, freight demand forecast on NEC is conducted focusing on Mombasa Port, railway, truck and pipeline.

With regard to forecasting future modal share, the share of pipeline is set up as a priority based on the figure estimated in Oil Master Plan in Kenya. Therefore, future freight traffic demand is forecasted by Mombasa port handling volume and modal share of railway and truck on land.

(Formulation of the model)

Discrete Choice models methodology is applied for the Freight Mode Choice Model which estimates shares of railway and truck freight tonnage. Especially, the Binary Logit model (BL) for two alternatives and the Multi-Nominal Logit model (MNL) for three and more alternatives have been the most widely used structure for modeling discrete choices in transport behavior. Therefore, we adopted the BL model for estimating two transport modes (railway and truck) choice probabilities of railway and truck usage.

(Freight mode usage data)

Railway and truck freight transit data between Mombasa port to or from zones including main railway stations are used for the model building. The truck data includes individual freight trip data from the Roadside Freight OD Survey in the ‘Goods Movement and Traffic Survey' expanded to annual tonnage volume from the daily vehicle unit. The railway data includes current freight flows (tonnage/year) between the zone pairs which were estimated in this project.

(Assumption of the Level of Service variables)

Current (2015) Level of Service (LOS) variables used in the Freight Mode Choice Model - total transit time and cost - were assumed like the table 5.2.2 below. Total time and cost of 40 feet container transit were represented as the LOS variables used in the model.

Table 5.2.2: Assumed Current Total Transit Time and Cost of 40 Feet Container (2015)

Zone pair			Total time (days)		Total cost (USD)	
			Truck	Railway (MGR)	Truck	Railway (MGR)
East	Mombasa	Nairobi	7.2	8.7	1,915	2,280
↓	Mombasa	Eldoret	7.9	7.7	2,515	2,480
West	Mombasa	Kampala	8.3	10.4	3,600	3,260
West	Nairobi	Mombasa	6.2	7.7	1,580	2,080
↓	Eldoret	Mombasa	7.6	8.4	2,080	2,280
East	Kampala	Mombasa	9.5	10.1	3,130	2,810

Note1: Railway's time and cost were assumed by JICA Study team using "NCTTCA; Northern Corridor Transport Observatory Report, December 2014" and "The Sub – Committee of the Stakeholder Forum; Repot on the causes of declining performance of the inland container depot, Nairobi (IDCN), and the proposed strategies to reverse the trend, September 2014"

Note2: Total time includes time from vessel arrival to destination arrival, and empty container transportation time in the case of export. Total cost includes port side charge, clearing agent charge, transport charge, and IDC usage charge.

Source: JICA Study team

(Model parameter Estimation)

Using freight mode usage data and the LOS variables, the model parameters were estimated. The method of Maximum weighted likelihood was adopted. Then every sample's annual tonnage expanding coefficients were used as samples' weights. This statistical method is commonly used for estimation of discrete choice models. In this study, it was assumed that the structure of mode choice is same between freight items, and one model was estimated for all freight items, because the current railway OD table data by freight item could not be collected.

The estimated model parameters are shown in Table 5.2.3. All parameter's t-values exceed two, therefore all parameters are statistically significant at the five percent level.

Figure 5.2.2 shows the comparison of current actual railway shares and estimated railway shares between zones. This model, according to JICA Study Team, has enough predictability of current situation. In view of this, a good model could be built for forecasting. Note that this model is applied to all items except oil, fluorspar, and soda ash, because it is assumed oil is transported by truck and pipeline only and fluorspar and soda ash are transported by railway only.

Table 5.2.3: Estimated BL Model Parameters

( ) : t value

Parameter \ Alternative	Truck	Railway	
α : Total time (days)	-0.3919		(-2.29)
β : Total cost (USD)	-0.0016		(-3.94)
γ : Constant	-	-2.21	(-7.96)
Sample Size	1,213		

*Exclude oil, soda ash, and fluorspar

Source: JICA Study Team

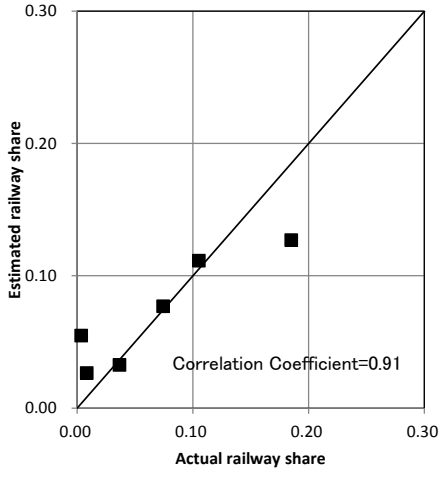


Figure 5.2.2: Current Railway Shares –Actual Values and Estimated Values

5.2.2 Demand Forecast

(1) Forecasting scenario

In this freight traffic demand forecasting in 2030, the following scenario is assumed as the base case:

- Assumed base case GDP growth (cf. Chapter 2).
- Considering ongoing development project and high feasible project that were shown in Table 5.2.4.
- Especially, considering oil field development at Albert Graben in Uganda and Standard Gauge Railway (SGR) project explicitly.

Table 5.2.4: Existing Development Projects Considered Explicitly in Freight Traffic Demand Forecasting

Project Site	Existing Development Project	Detail
Uganda	・ Oil field development ・ Oil refinery construction ・ Oil product pipeline construction	・ Oil field development at Albert Graben ・ Crude oil pipeline construction from the oil field to Lamu port via Lokichar in Kenya ・ Oil refinery construction at Hoima in Uganda ・ Oil product pipeline construction from Hoima to Kampala, from Kampala to West Uganda, from Kampala to East Uganda
Kenya	・ Oil product pipeline construction	・ New Oil product pipeline construction from Mombasa to Eldoret taking the place of the current pipeline.
Kenya and Uganda	・ SGR project	・ SGR constructed from Mombasa to Kampala by 2030
Borders	・ OSBP project	・ Ongoing One Stop Border Post Project

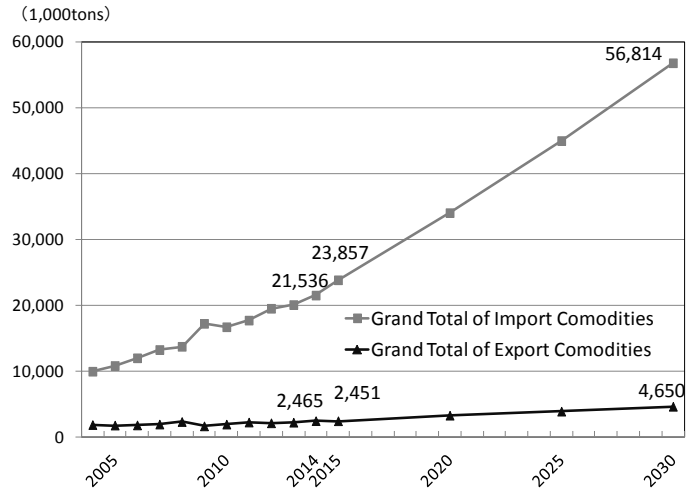
Source: JICA Study Team

(2) Freight OD table Forecasting

(Future total freight tonnage forecasting via the port of Mombasa)

For forecast total CBFT flow via Mombasa port in 2030, existing models and forecasting results from JICA study were applied. The existing models include, by freight item, some multiple regression models (time series model) and some elastic value models calculated based on the difference between rates of trade volume. These models' explanatory variables are GDPs in export or import partners.

The forecasting result is shown Figure 5.2.3. It shows that total import freight (tonnage/year) from the port of Mombasa is 57 million tons in 2030, growing 2.4 times from 24 million tons in 2015. Total export freight is 4,650 thousand tons, growing 1.9 times of 2,451 thousand tons in 2015.



Source: JICA; "The Project for Technical Assistance to Kenya Ports Authority on Dongo Kundu Port, Mombasa Master Plan (The Second Progress Report June 2015)"

Figure 5.2.3: Forecasting Result of Grand Total of Import and Export Commodities via the Port of Mombasa

On the other hand, the other future CBFT flows which are not via Mombasa port are forecasted by GDP elastic value model calculated based on the difference between rates of the trade volume and the GDP in export or import partners.

(3) Freight mode Share forecasting

(Formulation of the forecasting model)

The structural formulas of the Freight Mode Choice Model as a MNL model adding the newly alternative SGR to the BL model were applied.

(Assumption of future LOS variables)

The assumption for future LOS variables which are explanatory variables of the Freight Mode Choice Model shown in formula (5-3) and (5-4) are as follows:

- According to the figure above, port dwell time of import will be shortened from 2.5 days to 2 days, and customs procedure time at Mombasa port will be shortened from 2.7 days to 1 day in the future.
- According to above figure, CY delivery time of export will be shortened from 3 days to 1.5 days
- Because of OSBP project, border passage time by truck will be shortened from 1.5 days to 1.0 days in the future.
- The time of obtaining empty containers for export will be shortened to one day because of establishment of empty container depots.
- Because of rehabilitation of the MGR's tracks, the average speed between the stations will improve to 40km/hour from 35km/hour and the operation frequency will be high enough to avoid waiting time.

- SGR's average speed between the stations will be around 50km/h and the operation frequency will be high enough to avoid waiting time.
- Unwillingness to change MGR and SGR locomotives at the border.
- Total transit costs of truck and MGR will change from the current situation as shown in the section 5.5.
- Total transit cost of SGR will change from 1.0 times to 0.2 times of the current total transit cost of truck, because the SGR costs are uncertain.
- Table 5.2.5 and Table 5.2.6 show the assumed future total transit times and total transit costs each.

Table 5.2.5: Assumption of Future Total Transit Times

(days)

			Truck		Railway(MGR)		Railway(SGR)	
			2015	2030	2015	2030	2015	2030
East	Mombasa	Nairobi	7.2	5.7	8.7	4.6	-	5.4
↓	Mombasa	Eldoret	7.9	6.4	7.7	5.1	-	5.8
West	Mombasa	Kampala	8.3	6.7	10.4	5.8	-	6.4
West	Nairobi	Mombasa	6.2	4.2	7.7	3.4	-	3.5
↓	Eldoret	Mombasa	7.6	5.4	8.4	3.9	-	3.9
East	Kampala	Mombasa	9.5	6.7	10.1	4.2	-	4.0

Source: JICA Study Team

Table 5.2.6: Assumption of Future Total Transit Costs

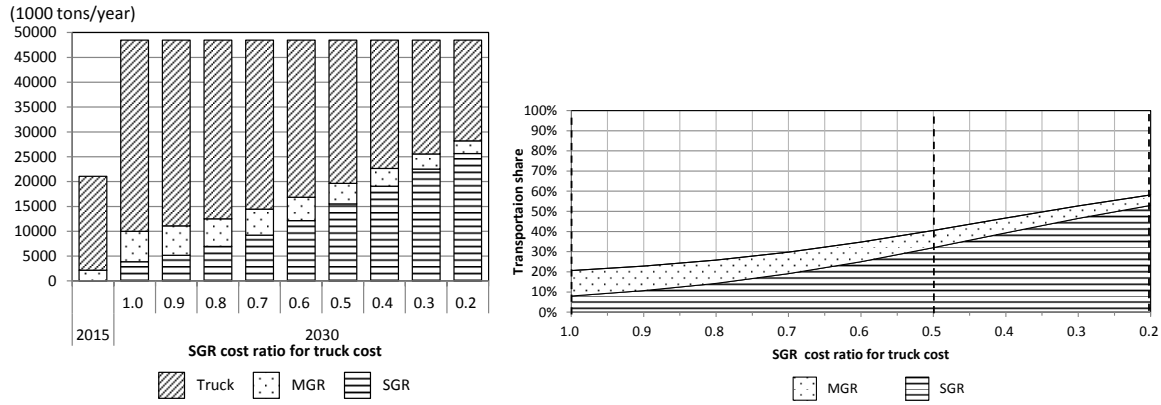
(USD)

			Truck		Railway(MGR)		Railway(SGR)
			2015	2030	2015	2030	2030
East	Mombasa	Nairobi	1,915	1,490	2,280	2,080	
↓	Mombasa	Eldoret	2,515	2,090	2,480	2,280	-0%, 10%, -20%, …, -80%
West	Mombasa	Kampala	3,600	2,700	3,260	2,860	decreasing for the
West	Nairobi	Mombasa	1,580	1,180	2,080	2,080	current truck costs
↓	Eldoret	Mombasa	2,080	1,440	2,280	2,280	
East	Kampala	Mombasa	3,130	2,130	2,810	2,810	

Source: JICA Study Team

(Forecasting of freight mode share)

Figure 5.2.4 shows forecasting results of future freight demand between Mombasa port and the other zones using the Freight Mode Choice Model and the assumption shown in Table 5.2.5 and Table 5.2.6. From these results, the railway share of SGR and MGR becomes approximately 40% in the case that SGR transit cost level is a half of the current truck costs. This situation will be set as the Railway Base Case shown in section 5.2.5 below. And the situation that the SGR transit cost level is same as the current truck cost one will be set as the Railway Pessimistic case. In this case, the railway share of SGR and MGR becomes approximately 20% of truck and railway cargo tonnage via Mombasa port. On the other hand, the situation that SGR transit cost level became 20% of the current truck cost level will be set as the Railway Optimistic case in section 5.2.5 below.



Source: JICA Study Team

Figure 5.2.4: Change of Freight Tonnage via Mombasa by Mode with the Total Cost Change of SGR in 2030

(Future OD table between forecasting results)

Table 5.2.7 is estimated OD tables between the countries by mode. In 2030, it is assumed that SGR's transit cost level is half of the current truck's cost one.

Table 5.2.7: Forecasted OD Table by Mode between Countries

[Current OD table by mode in 2015]

		Mombasa		Kenya		Uganda		Other EAC		DR Congo		South Sudan		Total	
		1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)
Mombasa	Truck			11,932	94%	4,332	86%	468	100%	321	100%	580	100%	17,633	92%
	Rail			802	6%	716	14%	0	0%	0	0%	0	0%	1,518	8%
	Total			12,734	100%	5,048	100%	468	100%	321	100%	580	100%	19,151	100%
Kenya	Truck	979	63%			1,412	97%	207	100%	195	100%	994	100%	3,787	86%
	Rail	569	37%			51	3%	0	0%	0	0%	0	0%	620	14%
	Total	1,548	100%			1,463	100%	207	100%	195	100%	994	100%	4,407	100%
Uganda	Truck	236	76%	431	99%			323	100%	146	100%	55	100%	1,191	94%
	Rail	76	24%	4	1%			0	0%	0	0%	0	0%	80	6%
	Total	312	100%	435	100%			323	100%	146	100%	55	100%	1,271	100%
Other EAC	Truck	21	100%	111	100%	653	100%							785	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	21	100%	111	100%	653	100%							785	100%
DR Congo	Truck	7	100%	3	100%	21	100%							31	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	7	100%	3	100%	21	100%							31	100%
South Sudan	Truck	10	100%	82	100%	6	100%							98	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	10	100%	82	100%	6	100%							98	100%
Total	Truck	1,253	66%	12,559	94%	6,424	89%	998	100%	662	100%	1,629	100%	23,525	91%
	Rail	645	34%	806	6%	767	11%	0	0%	0	0%	0	0%	2,218	9%
	Total	1,898	100%	13,365	100%	7,191	100%	998	100%	662	100%	1,629	100%	25,743	100%

[Future OD table by mode in 2030 - SGR with half of truck cost case]

		Mombasa		Kenya		Uganda		Other EAC		DR Congo		South Sudan		Total	
		1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)	1000 Tonnage /Year	share(%)
Mombasa	Truck			19,587	65%	4,970	45%	1,019	100%	609	100%	1,523	100%	27,708	63%
	Rail			10,567	35%	6,009	55%	0	0%	0	0%	0	0%	16,576	37%
	Total			30,154	100%	10,979	100%	1,019	100%	609	100%	1,523	100%	44,284	100%
Kenya	Truck	777	23%			1,203	89%	641	100%	596	100%	2,371	100%	5,588	67%
	Rail	2,627	77%			145	11%	0	0%	0	0%	0	0%	2,772	33%
	Total	3,404	100%			1,348	100%	641	100%	596	100%	2,371	100%	8,360	100%
Uganda	Truck	242	35%	1,345	95%			694	100%	200	100%	129	100%	2,610	84%
	Rail	442	65%	69	5%			0	0%	0	0%	0	0%	511	16%
	Total	684	100%	1,414	100%			694	100%	200	100%	129	100%	3,121	100%
Other EAC	Truck	60	100%	210	100%	1,098	100%							1,368	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	60	100%	210	100%	1,098	100%							1,368	100%
DR Congo	Truck	17	100%	6	100%	70	100%							93	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	17	100%	6	100%	70	100%							93	100%
South Sudan	Truck	31	100%	192	100%	14	100%							237	100%
	Rail	0	0%	0	0%	0	0%							0	0%
	Total	31	100%	192	100%	14	100%							237	100%
Total	Truck	1,127	27%	21,340	67%	7,355	54%	2,354	100%	1,405	100%	4,023	100%	37,604	65%
	Rail	3,069	73%	10,636	33%	6,154	46%	0	0%	0	0%	0	0%	19,859	35%
	Total	4,196	100%	31,976	100%	13,509	100%	2,354	100%	1,405	100%	4,023	100%	57,463	100%

[OD table in 2030 expressed with the index that assumed 2015 year 100 - SGR with half of truck cost case]

		Mombasa	Kenya	Uganda	Other EAC	DR Congo	South Sudan	Total
Mombasa	Truck		164	115	218	190	263	157
	Rail		1318	839				1092
	Total		237	217	218	190	263	231
Kenya	Truck	79		85	310	306	239	148
	Rail	462		284				447
	Total	220		92	310	306	239	190
Uganda	Truck	103	312		215	137	235	219
	Rail	582	1725					639
	Total	219	325		215	137	235	246
Other EAC	Truck	286	189	168				174
	Rail							
	Total	286	189	168				174
DR Congo	Truck	243	200	333				300
	Rail							
	Total	243	200	333				300
South Sudan	Truck	310	234	233				242
	Rail							
	Total	310	234	233				242
Total	Truck	90	170	114	236	212	247	160
	Rail	476	1320	802				895
	Total	221	239	188	236	212	247	223

Source: JICA Study team

5.2.3 Future Traffic Forecasting

(1) Methodology

Future road traffic forecasting method is summarized in Table 5.2.8. The CBFT truck flows on road are assigned with the All or Nothing (AON) assignment method using the future CBFT vehicle trip OD table converted from annual tonnage OD tables. It was then assumed that future border post usage share of Malaba and Busia will be equal to the current share by OD pair between zones.

Moreover, the other domestic truck flows in the future were estimated by the assumption that traffic growth from 2015 to 2030 will be 2.6 times in Uganda and 2.4 times in Kenya. The passenger vehicle traffic was also estimated by the assumption that traffic growth from 2015 to 2030 will be 1.9 times in Uganda and 1.7 times in Kenya.

Table 5.2.8: Methodology of Future Traffic Forecasting

Model	Output	Input	Method
Truck Route Assignment Model	Cross Border Freight Traffic (CBFT) Truck traffic (PCU/day)	Driving time by road section and current border post usage share.	Combination of the All or Nothing (AON) assignment method with shortest time route search and adapting current border post usage share by OD pair between zones.
The Other Vehicle Traffic Forecasting Model	Other Domestic Truck traffic by road section (PCU/day)	GDP growth from 2015 to 2030 in Uganda and Kenya.	Growth rate model assumed that yearly average growth rate is equal to the growth rate of each country's GDP In the result, the growth from 2015 to 2030 is 2.6 times in Uganda, and 2.4 times in Kenya.
	Passenger Vehicle traffic by road section (PCU/day)	GDP and population growth from 2015 to 2030 in Uganda and Kenya.	Growth rate model assumed that yearly average growth rate (YAGR) is equal to the growth rate of each country's geometric average of the growth rate of the each country's population and GDP： Ugandan YAGR = (2.9×6.5)1/ 2= 3.78 % Kenyan YAGR = (2.4×5.9)1/2 = 4.36 % In the result, the growth from 2015 to 2030 is 1.9 times in Uganda and 1.7 times in Kenya.

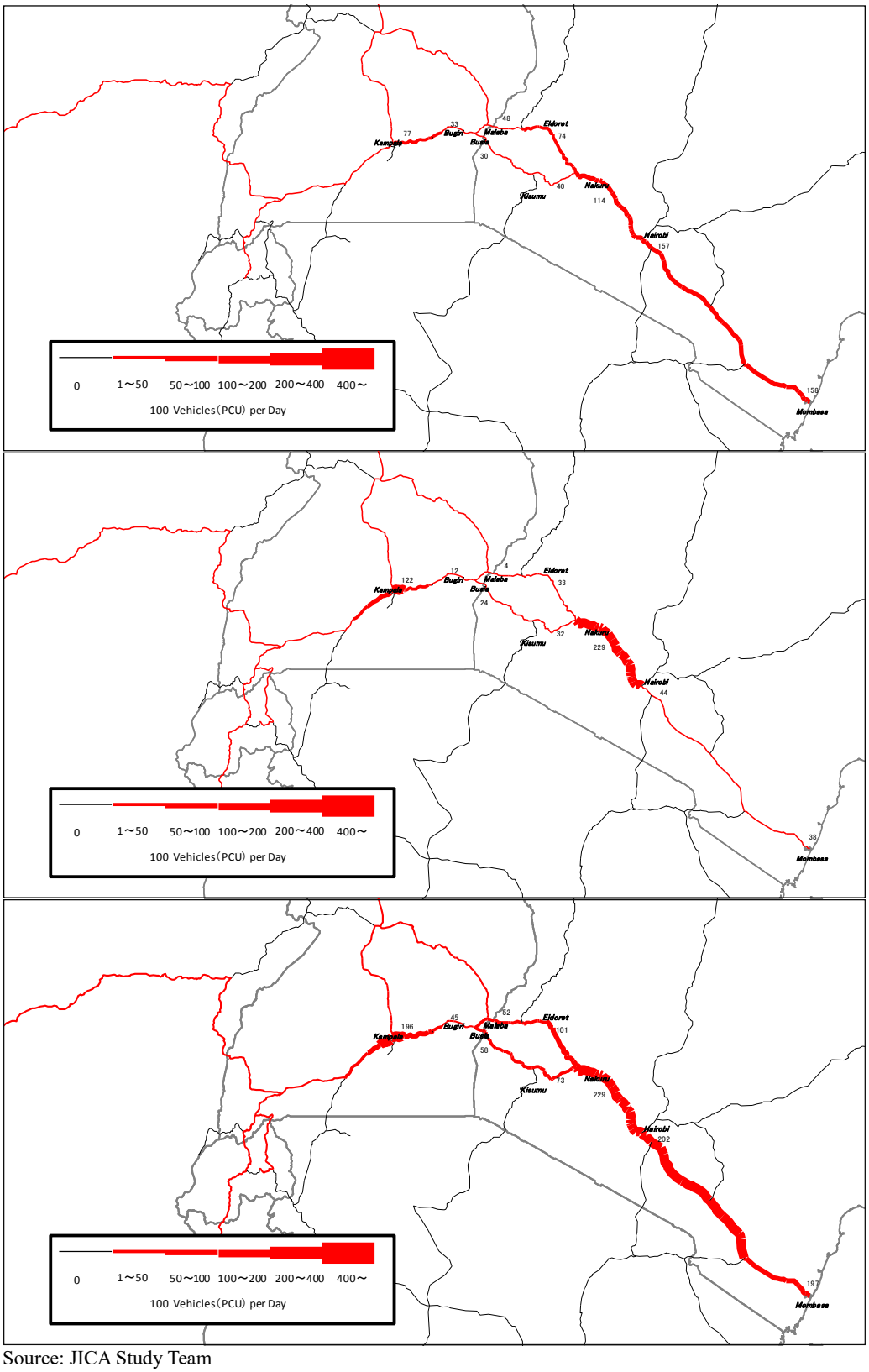
Source: JICA Study Team

(2) Forecasting Result

Figure 5.2.5 shows estimated current vehicle traffic flows on the road sections in 2015. The upper figure shows the CBFT flows, the middle figure shows the other domestic truck and passenger vehicle flows, and the figure below shows total traffic flows. Figure 5.2.6 shows forecasted future traffic flows in 2030. In this forecasting, it was assumed that the SGR's transit cost level is half of the current truck's transit costs. These results are summarized as follows:

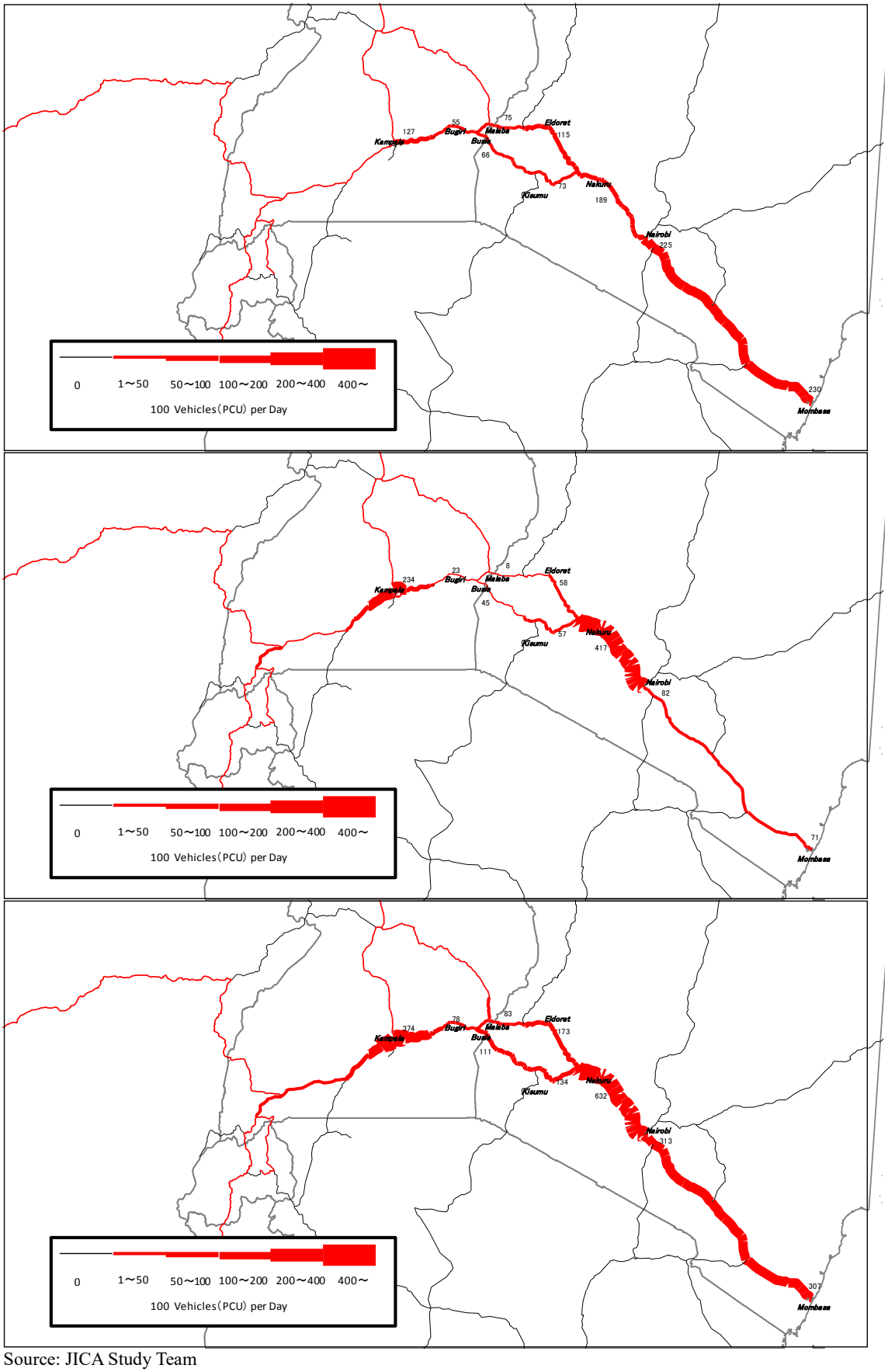
- Maximum traffic of the CBFT in 2030 is 23,000 PCU/day on the section between Nairobi and Mombasa.
- The CBFT traffic between Kampala and Malaba is 13,000 PCU/day in 2030.
- The other domestic truck and passenger traffic is concentrated around Kampala and between Nairobi and Nakuru.

- In the future, total traffic will be over 60,000 PCU/day between Nairobi and Nakuru, over 40,000 PCU/day around Kampala area, and over 30,000 PCU/day between Mombasa and Nairobi.



Source: JICA Study Team

Figure 5.2.5: Vehicles (PCU) on Road Sections in Both Directions in 2015 (Upper: CBFT, middle: Domestic Truck and Passenger Vehicle, below: Total)



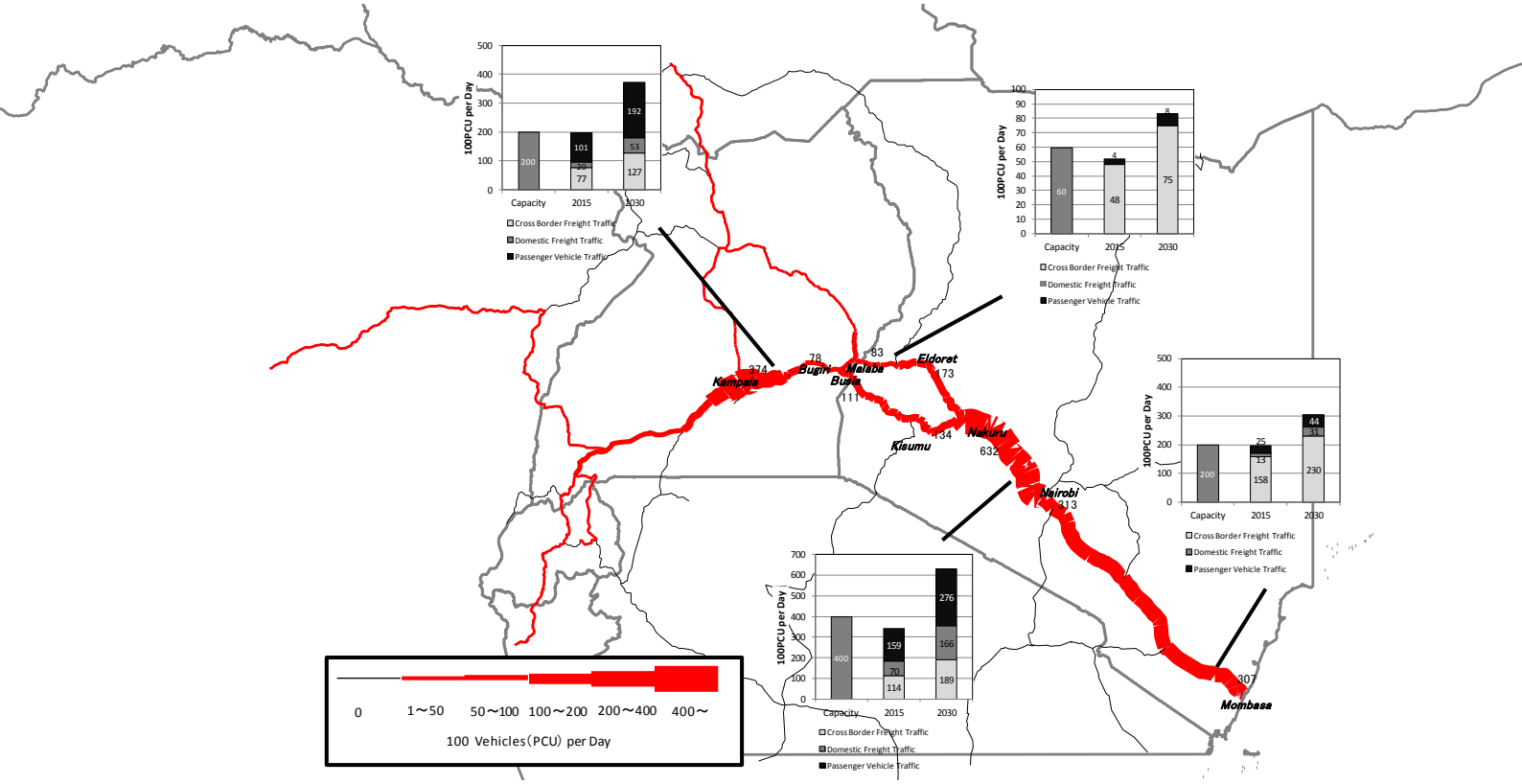
Source: JICA Study Team

Figure 5.2.6: Vehicles (PCU) on Road Sections in both Directions in 2030 (Upper: CBFT, middle: Domestic Truck and Passenger Vehicle, below: Total)

5.2.4 Gap Assessment and Future Bottlenecks

The following shows the main bottlenecks on the road in 2030:

- Even for the current demand in Mombasa area two-lane capacity which is approximately 20,000 PCU/day is not enough. Therefore, the traffic demand on the road requires at least four lanes between Mombasa and Nairobi in the future.
- The traffic between Nairobi and Nakuru will reach over 60,000 PCU/day which needs over six-lane capacity road.
- The traffic around Kampala area will reach over 40,000 PCU/day which needs over four-lane capacity road.
- Even if oil transported by truck from Mombasa to Uganda shifts to the pipeline from Hoima to Kampala and transit modes shift from truck to SGR, traffic demand on the Malaba border is forecasted to reach 8,300 PCU/day from 5,200 PCU/day in 2015.
- A simple comparison of traffic volume and road capacity near Malaba border reveals that the volume is lower than the capacity.
- Nevertheless, there is always a long queue at the Malaba border because of long waiting time for customs clearance of cargo which reportedly take more than 6 hours on average.
- Therefore, actual passing border capacity at Malaba is estimated to be around 6,000 PCU/day which is equal to 1,800 trucks/day because the capacity must slightly exceed the traffic volume of the current vehicles passage which is 5,200 PCU/day.
- If the clearance time is shortened to 3 hours on average, passing border capacity would nearly double. With the success of shortening clearance time, the passing border capacity can have over 10,000 PCU/day capacity which is equal to 3,000 trucks/day which could deal with future traffic demand.



Source: JICA Study Team

Figure 5.2.7: Bottleneck on the Road in 2030

5.2.5 Case Study in Multiple Scenarios

In this section, a case study for examining modal shift from truck to railway in multiple scenarios was carried out. The assumptions of the scenarios are shown in Table 5.2.9.

Table 5.2.9: Assumption of the Multiple Scenarios

Scenarios	Socio economic framework	Existing projects	LOS of truck and railway
Base case	Assumed base case GDP growth (cf. Chapter 2)	Considering ongoing development project s and high feasible projects that were shown in Table 5.2.4.	SGR's costs are 50% of the current truck's and the others were shown the section 5.16.4 above.
Optimistic case (more modal shift)			SGR's costs are 20% of the current trucks and the others are same as Base case.
Pessimistic case (less modal shift)			SGR's costs are same as the current truck ones and the others are same as Base case.

Notes: Pipeline share is set up as a fixed number 21 % in 2030 based on the Kenya oil master plan
Source: JICA Study team

According to the results shown in Table 5.2.10, several findings obtained from this future demand forecasting are:

- In the Base case in 2030, railway is forecasted to carry 20 million tons per year and to obtain a share of 32% among truck, railway and pipelines for cargo at Mombasa port. If the pipeline is excluded, the share is 40% whereas truck's share is 60%.
- In the Optimistic case in 2030, railway is forecasted to carry 28 million tons per year and to obtain a share of 46% among truck, railway and pipelines for cargo at Mombasa port. If the

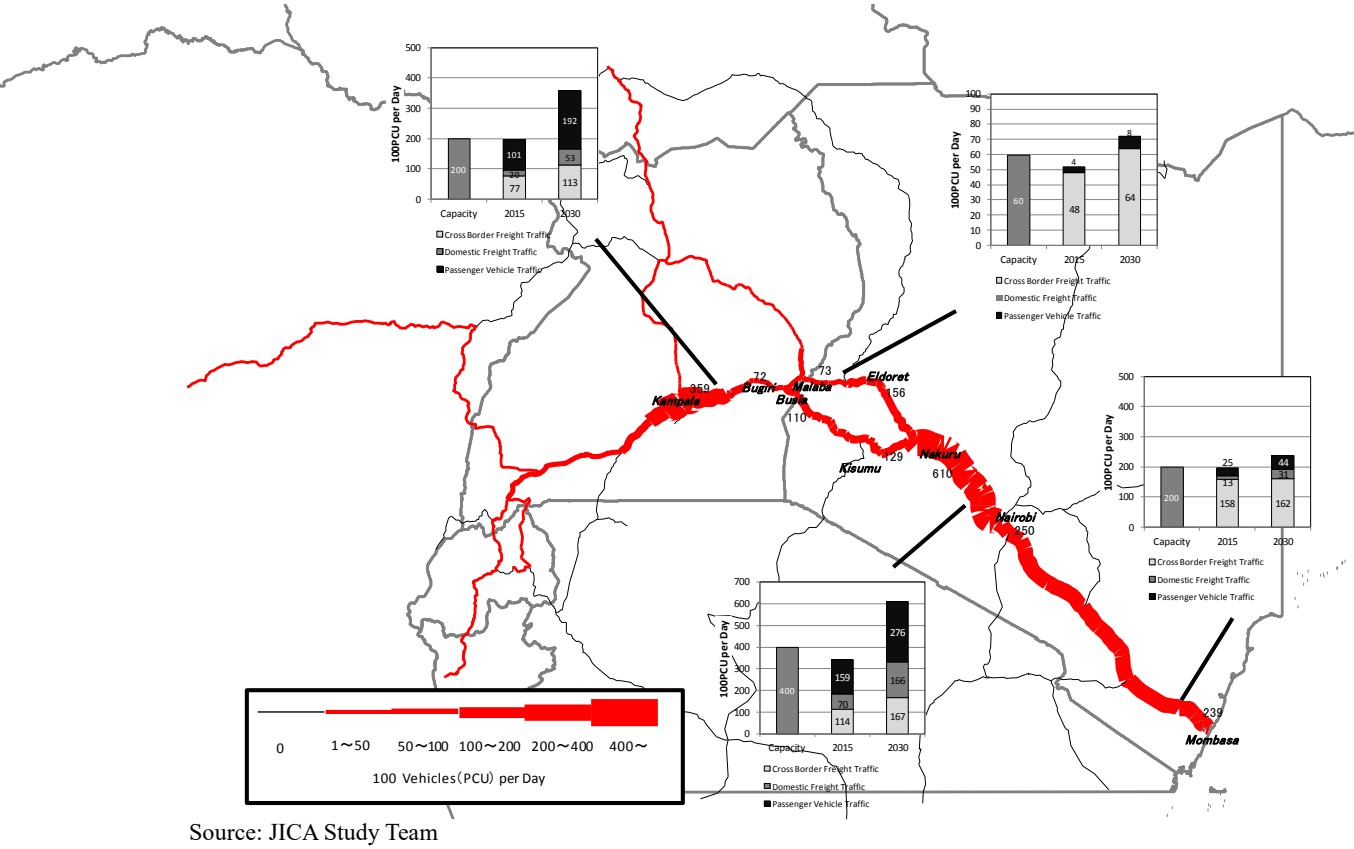
pipeline is excluded, the share is 58% whereas truck's share is 42%. Therefore, the Optimistic case can be said to be the reverse of the Base case in the share figure. Furthermore, in the Optimistic case in 2030, truck is forecasted to carry 20 million tons just as the Base case in 2030. The Optimistic case can be said to be the highly effective case for controlling truck use although ton-kilometers by truck in total is going up by 32% from 18,798 to 24,813 million ton-kilometers. Ton-kilometers in total include all CBFT truck demand including cargo not via Mombasa port.

- In the Pessimistic case in 2030, railway is forecasted to carry 10 million tons per year and to obtain a share of 16% among truck, railway and pipelines for cargo at Mombasa port. If the pipeline is excluded, the share is 21% whereas truck's share is 79%. As a result, the Pessimistic case truck demand will increase by double in that trucks are forecasted to carry 39 million tons per year in 2030 whereas trucks carried 19 million tons per year in 2015.

Table 5.2.10: Results of the Demand Forecasting under the Multiple Scenarios

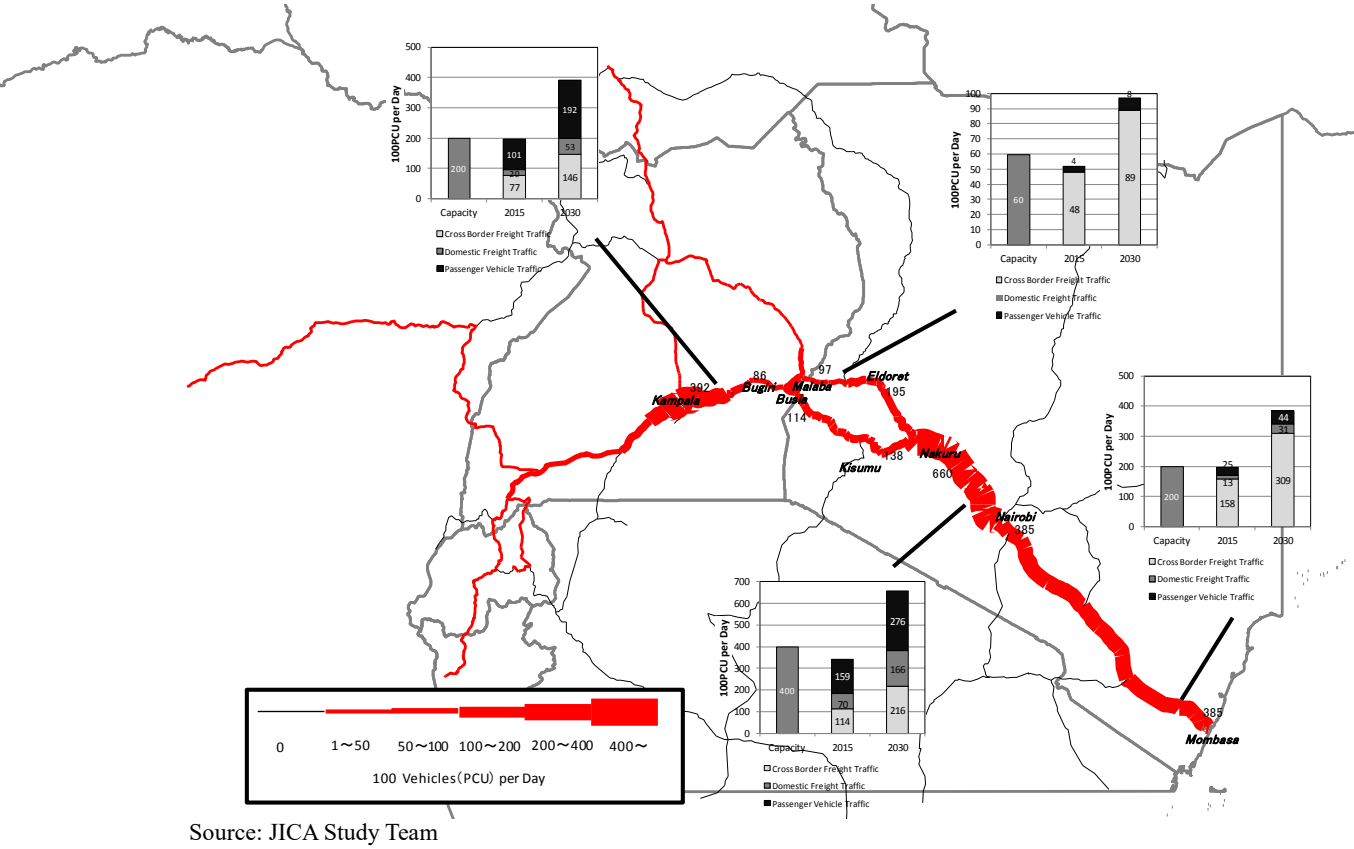
Contents (Unit)		Transit mode	2015	2030 Scenarios		
				Base Case	Optimistic Case	Pessimistic Case
Tonnage*1 (million tons / year)	vol.	Truck	18.7	28.8	20.3	38.5
		Railway	2.2	19.6	28.2	10.0
		Crude oil et al. (Pipeline)	5.4	13.0	13.0	13.0
		Total	26.3	61.5	61.5	61.5
	share1	Truck	71%	47%	33%	63%
		Railway	8%	32%	46%	16%
		Crude oil et al. (Pipeline)	21%	21%	21%	21%
		Total	100%	100%	100%	100%
	share2	Truck	89%	60%	42%	79%
		Railway	11%	40%	58%	21%
		Total	100%	100%	100%	100%
Ton-kilometer*2 (million t-kms / year)	vol.	Truck	18,798	31,154	24,813	38,433
		Railway	2,113	17,515	25,635	8,185
		Total	20,911	48,669	50,448	46,618
	share2	Truck	90%	64%	49%	82%
		Railway	10%	36%	51%	18%
		Total	100%	100%	100%	100%
Real vehicle-kilometer *2 (1000 vehicle-km/day)		Truck	6,730	11,218	9,805	12,898

*1 Import and export tonnage basis from or to Mombasa port.
*2 Aggregated about all CBFT OD pairs.
Source: JICA Study Team



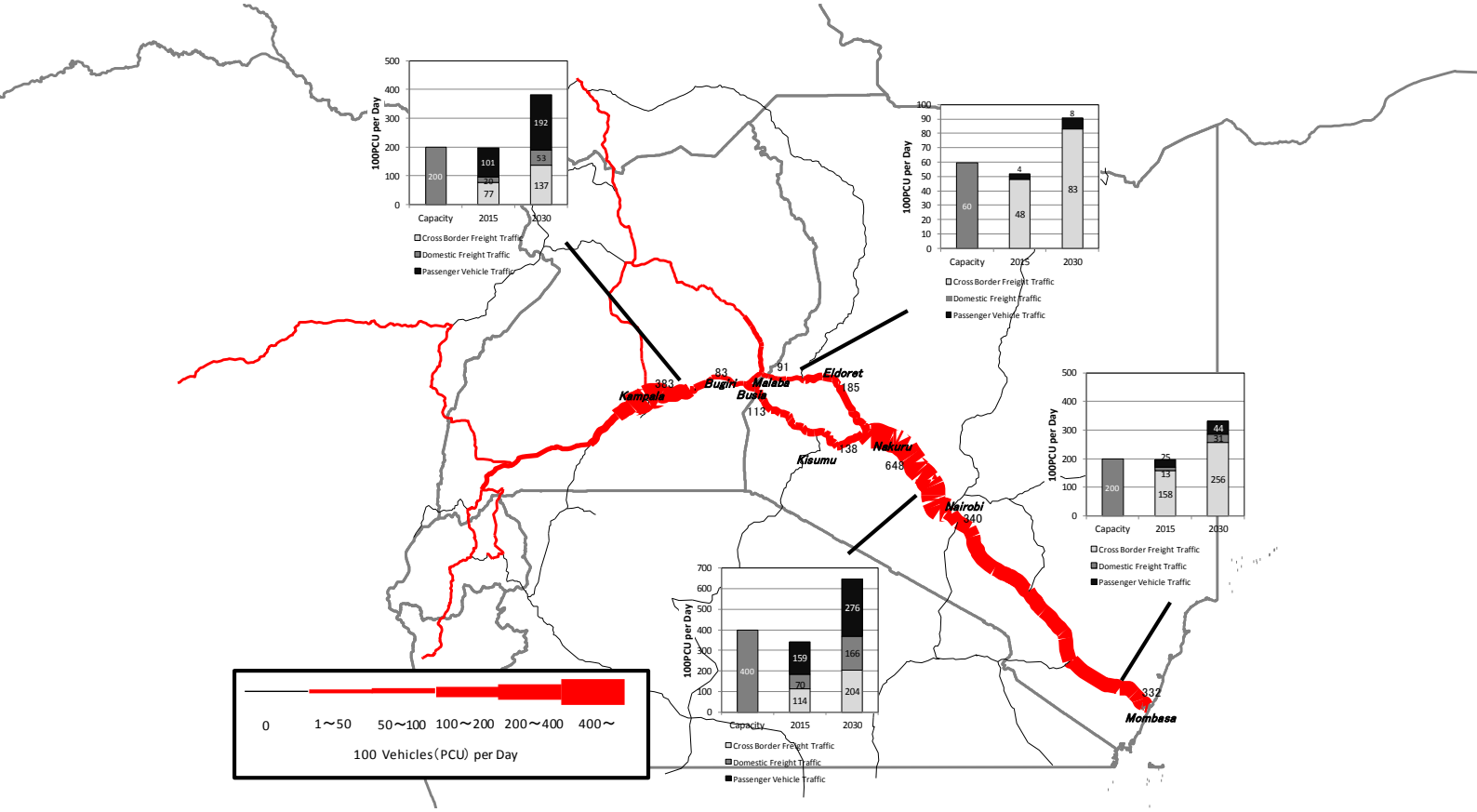
Source: JICA Study Team

Figure 5.2.8: Bottleneck on the Road in 2030 under the Alternative Case 1 Scenario (Optimistic Case)



Source: JICA Study Team

Figure 5.2.9: Bottleneck on the Road in 2030 under the Alternative Case 2 Scenario (Pessimistic Case)



Source: JICA Study Team

Figure 5.2.10: Bottleneck on the Road in 2030 under the base case without container depots

In this master plan, empty container depots are assumed to be efficiently assigned in logistic hubs in Kenya and Uganda. As a result, many empty containers are forecasted to be carried by railway to Mombasa port. According to the results shown in Table 5.2.11, its impact is forecasted to decrease by 9% or 3 thousand PCU per day at Mariakani in Mombasa area.

Table 5.2.11: Summarized Traffic Volumes in the Sections on the Road

Sites	Traffic Volume (100 PCU/day)					
	2015	2030				
		Base Case	Optimistic case	Pessimistic case	Base case without empty container depots	Index assumed the base case 100
Mariakani	196	305	237	384	331	109
(Mombasa area)	100	156	121	196	169	
Nakuru	343	631	609	658	646	102
	100	184	178	192	188	
Rironi	343	618	594	647	637	103
(Nairobi-Nakuru)	100	180	173	189	186	
Seeta	198	372	358	391	382	103
(Kampara area)	100	188	181	197	193	

Upper: volume, below: the index assumed 2015 year 100
Source: JICA Study Team