

5.3 Development Strategy for Transport and Logistic Infrastructure

5.3.1 Review of Future Projects

(1) Road

There are 30 road projects in Kenya related to the Northern Economic Corridor. In Kenya, 5 sections in addition to 5 OSBPs have been completed. Road expansion on congested sections in Nairobi and Mombasa on the main route are ongoing. In Kenya, from the view of road safety improvement, 20 roadside stations will be constructed by PPP. The other information about new road planning and construction projects will be following.

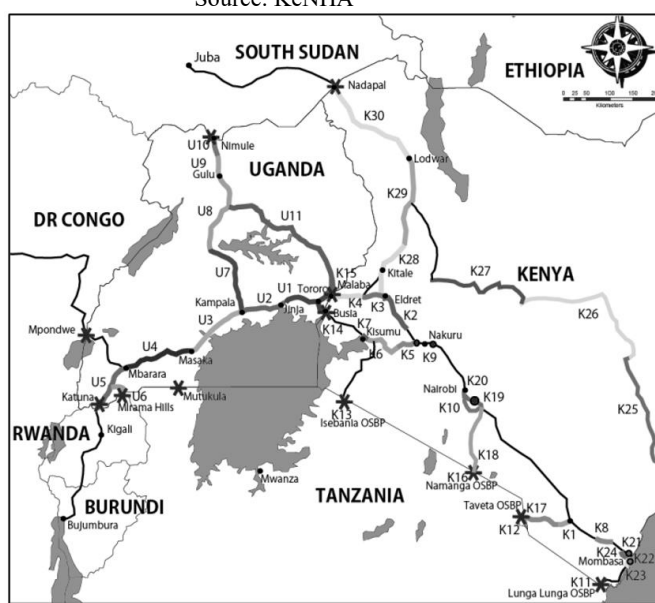
There are 11 road projects in Uganda related to the Northern Economic Corridor. In Uganda, 5 sections are completed. Two important sections of Kampala- Jinja and Kampala- Masaka on the main route are ongoing.

Table 5.3.1: Ongoing Road Projects in Kenya & Uganda

Ongoing Projects in UGANDA				Ongoing Projects in KENYA			
No.	Section	Financer	Status	No.	Section	Financer	Status
U1	Iganga-Tororo-Malaba-Busia-Namntbe	GoK	Completed	K1	Voi - Mwatate (A23) - Wundanyi	GoK	Completed
U2	Kampala-Jinja Expressway	PPP	Planning	K2	Timboroa - Eldoret (A104)	AFDB/GoK	Completed
U3	Kampala-Masaka	GoU/EU	Ongoing	K3	Eldoret - Webuye (A104)	EU/GoK	On-going
U4	Masaka-Mbarara	EU	Completed	K4	Webuye - Malaba (A104)	EU/GoK	On-going
U5	Mbaraba-Ntungamo-Kabale-Border	EU	Ongoing	K5	Mau Summit - Kericho(B1/A1)	WB/GoK	Completed
U6	Ntungamo-Mirama Hills	GoU/TradeMark	Completed	K6	Kericho - Nyamasaria (A1)	WB/GoK	Completed
U7	Kampala-Kafu	GoU	Completed	K7	Nyamasaria - Kisumu Kisian (incl. Kisumu Bypass)	WB/GoK	Completed
U8	Kafu-Kamudini-Gulu	GoU	Ongoing	K8	Maji ya - Chumvi - Bachuma Gate	WB/GoK	On-going
U9	Gulu-Atiak	WB	Ongoing	K9	3 interchange on A104, Nakuru - Njoro Turnoff, Nakuru - Nyahururu Turnoff, mau Summit Kericho Turnoff	WB/GoK	On-going
U10	Atiak-Nimule	JICA	Ongoing	K10	Southern Bypass	EXIM/GoK	On-going
U11	Tororo-Soroti-Kamudini	WB/GoU	Ongoing	K11	OSBP at Lunga Lunga	WB/GoK	Completed
				K12	OSBP at Taveta	WB/GoK	Completed
				K13	OSBP at Isebania	WB/GoK	Completed
				K14	OSBP at Busia	WB/GoK	Completed
				K15	OSBP at Malaba	WB/GoK	Completed
				K16	Athi River - Namanga OSBP	AFDB/GoK	On-going
				K17	Mwatate - Taveta	AFDB/GoK	Completed
				K18	NUTRIP* - A104 - JKIA junction - Southern Bypass junction		On-going
				K19	NUTRIP - Southern Bypass junction - James Gichuru road junction		On-going
				K20	NUTRIP - James Gichuru junction - Rironi		On-going
				K21	MPARD** Package 1 Miritini - Kipevu		On-going
				K22	MPARD Package 2 Mwache - Dongo Kundu		On-going
				K23	MPARD Package 3 Dongo Kundu - Kibundani		On-going
				K24	In. A109 - Moi Int. Airport MSA (C110)		On-going
				K25	Lamu - Garissa		On-going
				K26	Garissa - Isiolo		On-going
				K27	Isiolo - Nginyang		On-going
				K28	Lesseru - Kitale - Marichpass	WB/GoK	On-going
				K29	Marichpass - Lodwar	WB/GoK	On-going
				K30	Lodwar - Nandapar	WB/GoK	On-going

Source: UNRA

Source: KeNHA



Source: JICA Study Team

Figure 5.3.1: Ongoing Road Projects in Kenya and Uganda

(2) Railway

Future railway projects include implementation of the standard gauge railway network, establishment of ICDs and railway yards to support SGR operations and locomotive and wagon investments by RVR to continue improvements to meter gauge railway service.

(Standard Gauge Railway)

The base case development scenario assumes the following standard gauge railway projects will be completed as indicated.

Table 5.3.2: Standard Gauge Railway Developments (Base Case)

Line Segment	Km ⁸	Project	Est. Completion	Status ⁹
Mombasa-Nairobi	472	Standard gauge line, locomotives, wagons	June 2017	Completion June 2017
Nairobi- Longonot (Naivasha)	120	Standard gauge line	December 2017	EPC contract awarded; detailed design in progress
Longonot-Narok-Bomet-Sondu-Ahero-Kisumu-Yala-Mumias-Malaba	365	Standard gauge line	December 2021	EPC contract and financing discussions in progress; to be constructed in phases
Kampala-Tororo-Malaba	237	Standard gauge line, locomotives, wagons	December 2019	EPC contract awarded
Tororo-Soroti	140	Standard gauge line	June 2020	FS complete
Soroti-Gulu	268	Standard gauge line	June 2022	FS complete
Gulu-Pakwach	117	Standard gauge line	2025	FS in complete
Gulu-Nimule	108	Standard gauge line	2025	FS in progress
Kampala-Kasese	344	Standard gauge line	2030	FS in progress
Bihanga-Mirama Hills	200	Standard gauge line	2030	FS in progress
Mirama Hills-Kigali	200	Standard gauge line	2030	FS in progress

Source: JICA Study Team

As noted for the Mombasa-Nairobi and Kampala-Tororo-Malaba segments, the EPC contracts include supply of initial locomotive and wagon fleets by the chosen Chinese contractor. Other segments could require additional rolling stock depending on the extended operating territory and additional volume generated by those segments. The table below is an implementation schedule for the SGR segments:

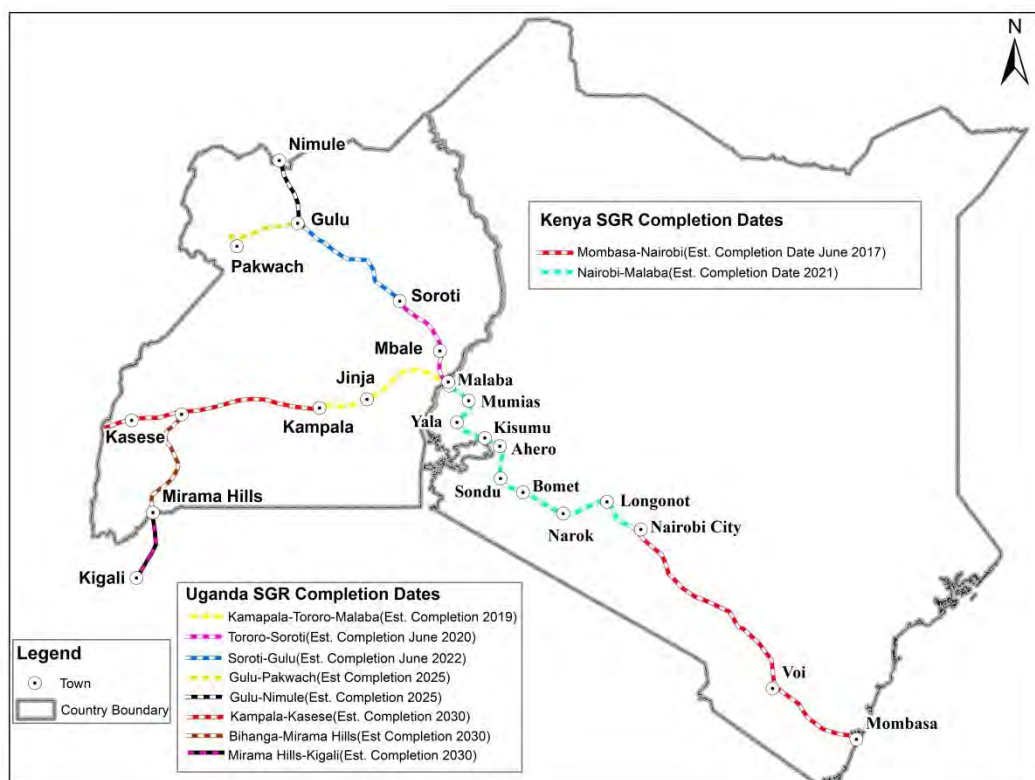
Table 5.3.3: SGR Development Schedule (Base Case)

SGR Line Segment	2015		2016		2017		2018		2019		2020		2021		2022		2025	2030
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2		
Mombasa-Nairobi																		
Nairobi- Longonot (Naivasha)																		
Longonot-Narok-Bomet-Sondu-Ahero-Kisumu-Yala-Mumias-Malaba																		
Kampala-Tororo-Malaba																		
Tororo-Soroti																		
Soroti-Gulu																		
Gulu-Pakwach																		
Gulu-Nimule																		
Kampala-Kasese																		
Bihanga-Mirama Hills																		
Mirama Hills-Kigali																		

Source: Stakeholder interviews; JICA Study Team assumptions

⁸ Kilometer distances are estimated using various sources

⁹ Known to the Study Team as of 22 October 2015



Source: JICA Study Team; Stakeholder interviews

Figure 5.3.2: Standard Gauge Railway Developments (Base Case)

The Study Team was informed by the Uganda SGR Project Management Unit (PMU) that all SGR lines in Uganda will be electrified, requiring infrastructure to distribute electricity along the railway and electric locomotives. While the initial project cost will be greater than the cost to build a diesel line, there are potential savings in operating costs if the cost to supply electricity is lower than the cost to supply diesel fuel. From a logistics point of view, interchange with the Kenya SGR will be complicated if Kenya does not follow suit and electrify its standard gauge railway. Based on the Study Team’s research and discussion with KRC officials it does not appear that KRC is considering an electrified railway.

In addition, the Base Case Development Scenario assumes major SGR cargo handling facilities at Mombasa, Nairobi Embakasi ICD, Nairobi South, Kisumu, and Kampala. Small ICDs are expected at Jinja and Tororo. Full locomotive and railway equipment maintenance depots will be at Nairobi South and Kampala. Additional facilities can be expected at Gulu when that line goes into service. These facilities will support standard gauge transportation and logistics in areas expected to be destinations and distribution points for container and bulk cargo.

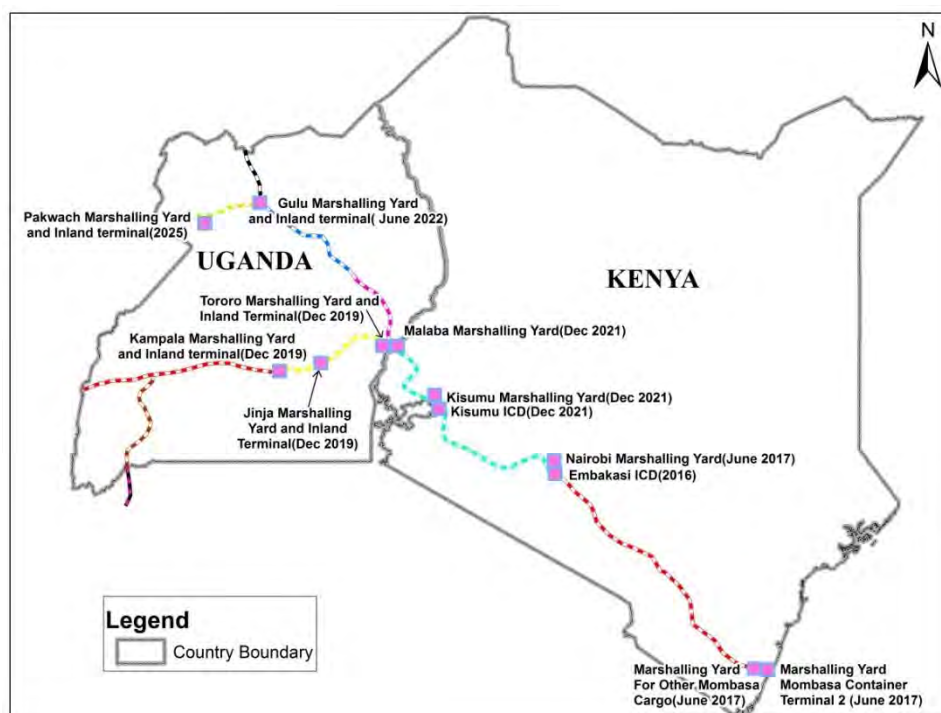
Table 5.3.4: SGR Operating Facilities (Base Case Development Scenario)

Location	Description	Timing	Objective
Embakasi ICD (Nairobi)	Standard gauge tracks and handling facilities added to existing meter gauge depot	2016	Service for container imports terminating in Nairobi and container exports going on rail in Nairobi
Nairobi marshalling yard	New facility to be built as part of the Mombasa-Nairobi SGR	June 2017	Service for imported non-container cargo terminating beyond Nairobi; dry bulk

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Location	Description	Timing	Objective
	project		cargo handling; non-container export through Mombasa
Nairobi rolling stock and railway equipment maintenance depots	New facility to be built adjacent to the new marshalling yard	June 2017	Primary maintenance facility for SGR rolling stock and railway equipment; locomotive fueling
Mombasa marshalling yard for new container terminal	SGR marshalling yard on land reclaimed from the Indian Ocean; direct access to new terminal; service to existing container terminals	June 2017	Service for inbound and outbound container traffic at new terminal and existing berths 16-19
Mombasa marshalling yard for non-containerized cargo	Yard with bulk and general cargo handling capacity, located outside port	June 2017	Service for Mombasa Port other than container berths
Mombasa rolling stock maintenance facility	New facility to be built adjacent to the new non-container marshalling yard	June 2017	Minor maintenance, possibly locomotive fueling
Malaba marshalling yard	Marshalling yard for customs inspections	Dec 2021	Customs inspections
Kisumu marshalling yard	Yard with bulk, general cargo and container handling capacity	Dec 2021	Service for new Kisumu Port and surrounding area
Kisumu ICD	Within marshalling yard	Dec 2021	Service for new Kisumu Port and surrounding area
Kisumu rolling stock maintenance facility	New facility to be built adjacent to the new marshalling yard	Dec 2021	Minor maintenance, possibly locomotive fueling
Jinja marshalling yard and inland terminal	Yard with bulk, general cargo and container handling capacity	Dec 2019	Small ICD to serve Jinja area
Tororo marshalling yard and inland terminal	Yard with bulk, general cargo and container handling capacity	Dec 2019	Small ICD to serve Tororo area; distribution point for Gulu and Pakwach before SGR implementation
Kampala marshalling yard and inland terminal	Yard with bulk, general cargo and container handling capacity	Dec 2019	Service for Kampala area cargo; currently planned to be located in the area of Kampala Industrial Park (Namanve); distribution point for Kasese
Kampala rolling stock and railway equipment maintenance depot	New facility to be built adjacent to the new marshalling yard	Dec 2019	Primary maintenance facility for SGR rolling stock and railway equipment; locomotive fueling
Gulu marshalling yard and inland terminal	Yard with bulk, general cargo and container handling capacity	June 2022	Service for Gulu area cargo including Pakwach and Juba until SGR lines are in place
Pakwach marshalling yard and inland terminal	Yard with bulk liquid, general cargo and container handling capacity	2025	To handle crude oil and other cargo

Source: JICA Study Team



Source: JICA Study Team

Figure 5.3.3: SGR Cargo Handling and Equipment Maintenance Locations

(Meter Gauge Railway)

The Base Case Development Scenario assumes the following investments for RVR and the meter gauge system. The scenario was made by the JICA study team based on the information from related organizations. Some of these investments have been recently completed or are in progress. A healthy meter gauge system is important to begin the improvement in rail service while SGR is established. As mentioned in the strategy discussion above, an improved meter gauge railway potentially will reduce the overall cost of establishing a maintaining effective railway service and provide competition for the standard gauge railway to the benefit of rail shippers.

Table 5.3.5: Meter Gauge Railway Developments (Base Case)

Investment	Description	Timing	Approx. Value	Objective
Locomotive purchases	Additional locomotives	As needed	Approximately USD 1.15 million per unit ¹⁰	Increase capacity and reliability
Track rehabilitation	On-going improvement in track condition	Continuous	Based on content and timing of work	Reduce maintenance expense; improve transit times and reliability
ROW/structures	On-going improvement to culverts, bridges, ICDs, marshalling yards	Continuous	Based on content and timing of work	Improve reliability and safety
Rehabilitation of Tororo-Gulu-Pakwach branch line	Reopen closed line	Mid-2016	USD 50 million (URC estimate)	Reopen out of service line in anticipation of crude oil development in the Albertine region; potential inbound well

¹⁰ Based on recent purchase of 20 locomotives for a total of USD 23 million

Investment	Description	Timing	Approx. Value	Objective
				construction and operation materials and outbound crude if a satisfactory pipeline option is not available
Rail wagons	Additional wagons	On-going	Based on wagons purchased and timing of purchases	To support increased volume

Source: RVR press releases; various news reports; JICA Study Team

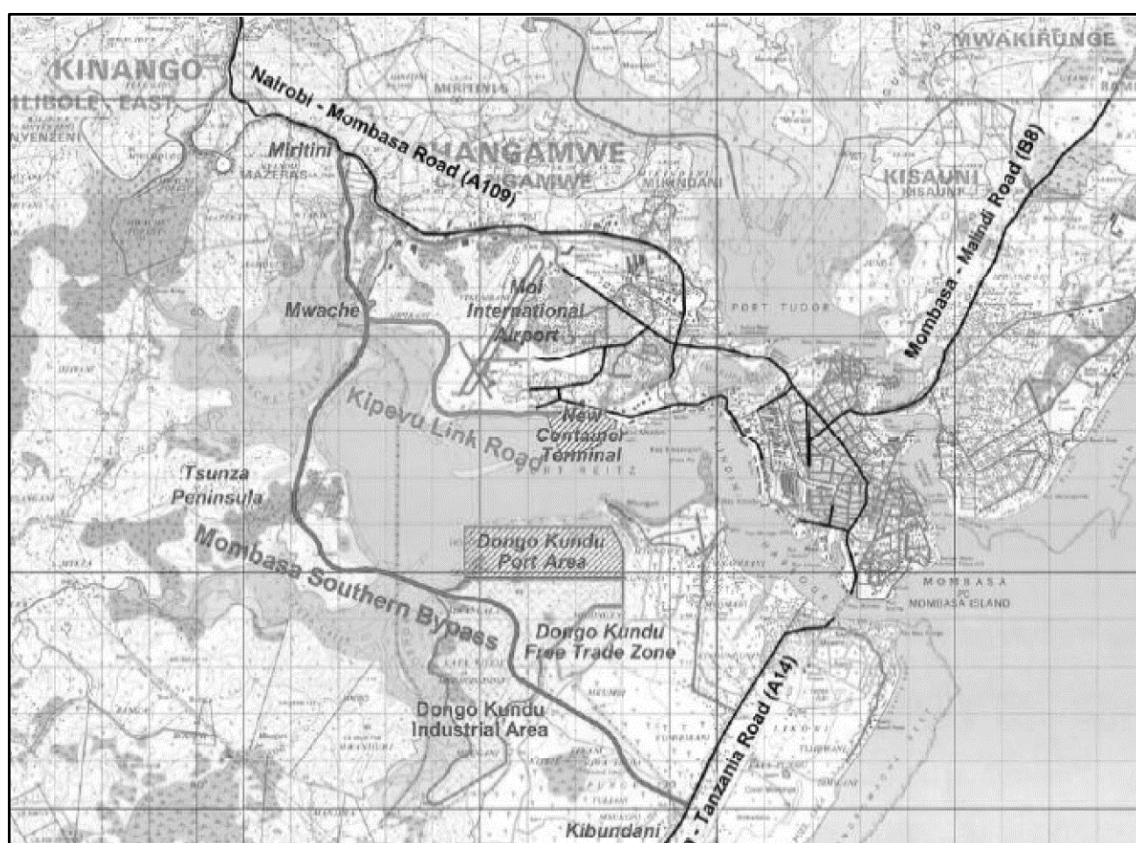
An additional assumption for the Base Case is the expansion of private sector investment in wagons and containers. Currently two or three companies lease tank containers for transport of bulk liquids. The containers are ideal for rail-truck intermodal movements because they have a metal frame to facilitate Trans loading between truck and rail. The Base Case assumes this activity will continue and expand and potentially spread to lease of locomotives and rail wagons (i.e., the third party company owns rolling stock and leases them to the railways and shippers).

(3) Port

Ongoing and planned projects are:

- 1) Mombasa Port Development Project (Phase 1)/ JICA, Project Schedule: Nov. 2007-Feb. 2016
 - (a) Construction of the Second Container Terminal (depth: 15m and 11m; berth ×.2)
 - (b) Procurement of cargo handling equipment (SSG cranes and RTG cranes)
 - (c) Construction of an access road (approx. 1.6km)
 - (d) Dredging works (dredging volume: approx. 3 million cubic meters)
 - (e) Consulting services (detailed design, bidding assistance, construction supervision and assistance for selection of terminal operators, etc.)
- 2) Mombasa Port Development Project (Phase 2)/ JICA, Project Schedule: Mar. 2015-June 2021
 - (a) Construction of the Second Container Terminal (depth: 15m; berth ×.1)
 - (b) Procurement of cargo handling equipment (Gantry cranes and Transfer cranes)
 - (c) Procurement of Security Facilities
- 3) Project on Master Plan for Development of Dongo Kundu, Mombasa Special Economic Zone/ JICA, Project Schedule: Jan. 2014-Mar. 2015
- 4) Project for Technical Assistance to Kenya Ports Authority on Dongo Kundu Port, Mombasa Master Plan/ JICA, Project Schedule: Aug. 2014-Oct. 2015
- 5) Study on the Project for Construction of Mombasa Gate Bridge/ JICA
- 6) Construction of a new standard gauge railway linking Mombasa with Nairobi, Kampala and other hinterland destinations began in 2013, supported by China EXLIM Bank.
- 7) Construction of a southern by-pass for Mombasa linking the south to north coasts began in 2015, supported by JICA.

Project map for Mombasa Port Master Plan is shown as below.



Source: The Project for Technical Assistance to Kenya Ports Authority on Dongo Kundu Port, Mombasa Master Plan, the Second Progress Report, June 2015, JICA

Figure 5.3.4: Project Map for Mombasa Port Master Plan

(4) Airport

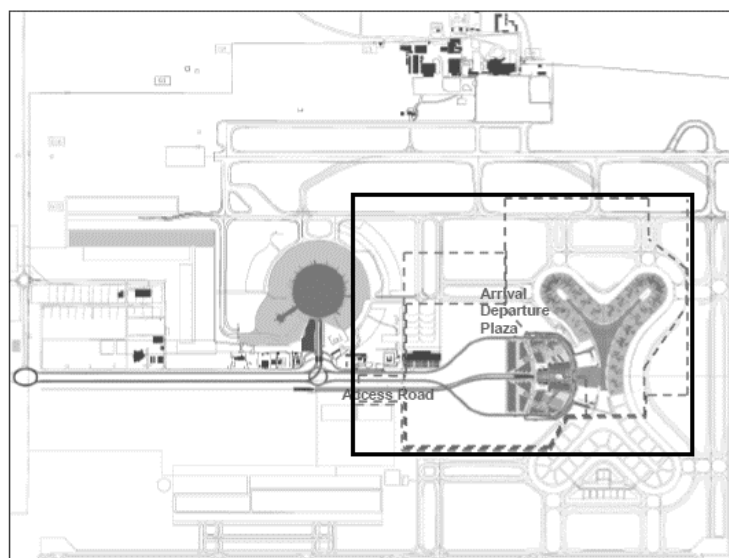
1) Airport in Kenya

(a) Jomo Kenyatta International Airport Expansion Project

When the airport was first opened in 1958 it had been designed for a maximum capacity of 2.5 million passengers a year. In 2006 the airport handled in excess of 4.4 million passengers. The Kenya Airports Authority (KAA) declared their intention to expand and improve Jomo Kenyatta International to make it a hub not only for EACs but also for Africa. In addition, the airport is a very important cargo hub in EACs. On 7 August 2013, a fire broke out inside the main terminal building at Nairobi's Jomo Kenyatta International Airport destroying two of the three units contained in the building. Although no one was killed, two people were hospitalized with non-life-threatening injuries.

An expansion of the cargo handling facilities particularly for horticulture and floriculture produce is also on the agenda. So far, as Airport Expansion Project, a new arrival terminal has been completed in 2015 and new construction of airport runway

No.2 is ongoing. The runway also will enable direct long haul flights to destinations such as New York City, carrying up to 32 tones. Construction of No.2 runway began in January 2016 and will be completed in December 2017. In addition, modern cargo facilities are planned and on-going capacity expansion.



Source: Jomo Kenyatta International Airport Greenfields Terminal Project, Environmental and Social Impact Assessment Summary, February 2015, African Development Bank

Figure 5.3.5: Proposed Future Development (Airport Classification)

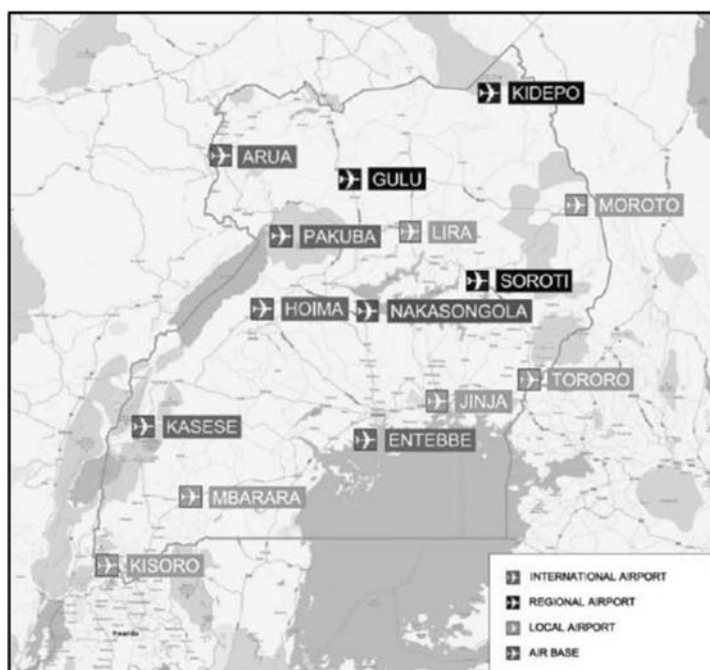
(b) Eldoret Airport

The Eldoret International Airport runway and cargo handling facilities will be expanded to start export of fresh agricultural produce. The expansion of runway will be 4.3km from 3.5km. The expansion will cost more than Sh2 billion.

2) Airport in Uganda

(a) National Airports Development Plan

The National Airports Development Plan considers a classification system of functional airport roles which clearly demonstrates the types of facilities and services that should be provided at each airport category.



Source: Uganda Civil Aviation Master Plan, March 2014, Civil Aviation Authority in Uganda

Figure 5.3.6: Proposed Future Development (Airport Classification)

[International Airport]

Airports in the international category are airports of entry and exit for international traffic, which perform all services and support facilities related to customs, immigration, health service, quarantine of animals, plants and similar procedures, in which air transport is provided on a regular basis. Airports proposed to cover this deficit are Arua, Kasese and Pakuba, and given the future strategic role of the proposed Kabaale (Hoima) Airport, it will be necessary to open it to international traffic.

[Regional Airport]

These airports support some level of scheduled commercial airline service in addition to a full range of general aviation service. It could also include international charter flights, particularly if it is placed in a tourism destination. Airports proposed in this category are Soroti, Gulu and Kidepo.

[Local Airport]

These airports support most twin and single engine aircraft. They also support local air transport needs and special use aviation activities. Airports proposed in this category are Jinja, Lira, Moroto, Tororo, Mbarara and Kisoro.

(b) Uganda Civil Aviation Master Plan

The Civil Aviation Authority (CAA) in Uganda has prepared Uganda Civil Aviation Master Plan in March 2014.

(c) Entebbe International Airport Master Plan

Entebbe International Airport Master Plan considers the current situation of the airport and proposes the necessary actions for the next 20 years.

Beyond that, an ultimate vision of the airport development is also proposed. The master plan defines a land use strategy. The traffic forecast considers the economic growth of the East Africa region and the impact of liberalization of air transport within the EAC. According to the Entebbe International Airport Master Plan, Cargo volume will increase 3times after 20years from 2012.

Developments proposed in the master plan are part of the comprehensive land use strategy for the future airport development. This will enable the optimum allocation of space to each project at the airport. A sketch of this concept is presented below, followed by a figure with the final image of the airport within the master plan period of study (2014-2033).

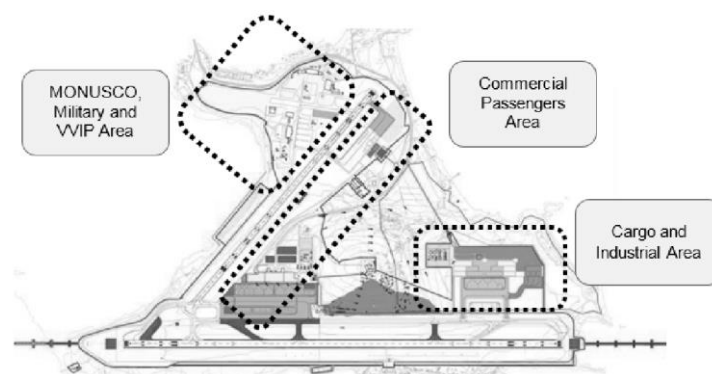
[Ultimate Development Plan of Entebbe International Airport]

For the very long term development of the airport and considering the constraints it is limited by, the proposal is, first of all, to look for a location for a new airport to serve Kampala. Once a suitable location is identified, this option should be compared with the option of a second runway at Entebbe International Airport.

Table 5.3.6: Traffic Forecast in Entebbe International Airport

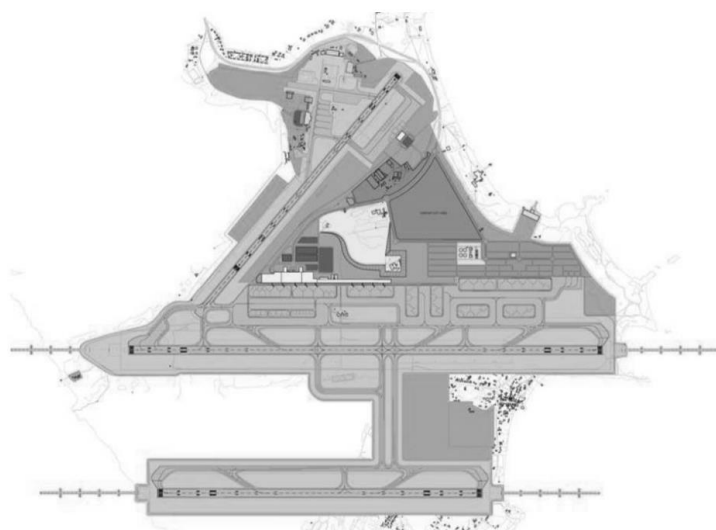
	Total Movements	Total Passengers	Cargo (tones)
2012	43,449	1,475,631	55,907
2018	55,500	2,377,100	77,100
2023	76,300	3,810,700	100,700
2033	123,700	7,667,700	172,100

Source: Uganda Civil Aviation Master Plan, March 2014, Civil Aviation Authority in Uganda



Source: Uganda Civil Aviation Master Plan, March 2014, Civil Aviation Authority in Uganda

Figure 5.3.7: Proposed Layout Plan of Entebbe International Airport



Source: Uganda Civil Aviation Master Plan, March 2014, Civil Aviation Authority in Uganda

Figure 5.3.8: Very Ultimate Development Plan/ Long Term Development Plan of Entebbe International Airport

(5) Waterway

- 1) Implementation of the rehabilitation and expansion programs for inland ports, including Kisumu, Port Bell, and Jinja. Rehabilitation of Port Bell is supported by World Bank and EU while that of Jinja port is supported by World Bank.
- 2) Development of Mwambani port in Tanga, Musoma Port and New Kampala Port at Bukasa. Bukasa Port development project as the new Port Bell Project was proposed by MOW in the past. The project aimed to realize better port functions, expand port-area, and add not only wagon ferries but also boats. In addition, a new industrial park is planned to be constructed near the port. However, it has never implemented at all.
- 3) URC prepared a concept paper on the status and re-development proposals for inland water ways and marine ports. Summary of Ports Re-development Plan is shown as below.

Table 5.3.7: Ports Re-Development Plan

	Name of Port	Proposed Plan
1	Port Bell	<ul style="list-style-type: none"> • Dredging of the Port area and access channel • Rehabilitation of the linspan and fendering • Construction of one new RO-RO berth for general cargo handling • Construction of a new quay 240 meters long • Construction of open storage area for 330 TEUs • Parking slots for 175 trailers • Procurement of new cargo handling equipment • New office blocks and ware house • New bridge for passenger vessels • Establishment of reception facilities for vessels • Design and Construction of access roads to Port bell
2	Jinja	<ul style="list-style-type: none"> • Dredging of the Port area and the access channel • Rehabilitation of the Linkspan, the fendering system and the long dolphin • Repair and expansion of the existing quay • Construction of an open storage area. • Provision of truck parking slots • Procurement of new handling equipments • Construction of an office block • Provision of reception facilities

	Name of Port	Proposed Plan
		<ul style="list-style-type: none"> • Design and construction of access road to Jinja Port • Construction of covered storage
3	Entebbe	<ul style="list-style-type: none"> • URC management to first resolve existing issues regarding institutional occupation of the Port by the UPDF's Marine • The port is strategically positioned to facilitate an intermodal interchange terminal for the proposed urban marine passenger services for people commuting between Entebbe and Kampala. • Carry out a detailed study for the intermodal transport on marine passenger Services
4	Lambu	<ul style="list-style-type: none"> • Return management of the Port to URC marine • A detailed study to assess re-development plans for the Port and market Potential for hinterland • Engage local administration in the review processes • Put up sign posts for ownership and publicity to sensitize communities against further encroachments
5	Kibanga	<ul style="list-style-type: none"> • Put up URC sign Posts to publicize ownership and sensitize communities • Carry out a detailed consultancy study on the market potential for whole stretch to Majanji Port • Explore possibilities of relocating the Bukasa project to this Port
6	Majanji	<ul style="list-style-type: none"> • Put up URC sign Posts to publicize ownership and sensitize communities • Carry out a detailed consultancy study on the market potential for whole stretch to Majanji Port • Explore possibilities of relocating the Bukasa project to this Port
7	Namasagali	<ul style="list-style-type: none"> • The Port is suitable for a Maritime learning environment. • URC management should explore possibilities of transforming the Port into an Institution for Maritime, Railway or transport related courses. • Return the Port from Namasagali College or partner up
8	Masindi	<ul style="list-style-type: none"> • Survey the Port and acquire ownership documents
9	Butiaba	<ul style="list-style-type: none"> • Put up URC sign Posts to publicize ownership and sensitize communities • Carry out a detailed consultancy study on the market potential for whole river Nile basin Transport Corridor • Survey the Port and acquire ownership documents
10	Pakwach	<ul style="list-style-type: none"> • Put up URC sign Posts to publicize ownership and sensitize communities • Carry out a detailed consultancy study on the market potential for whole river Nile basin Transport Corridor • Survey the Port and acquire ownership documents

Source: Concept Paper on the status and re-development proposals for inland water ways and marine ports

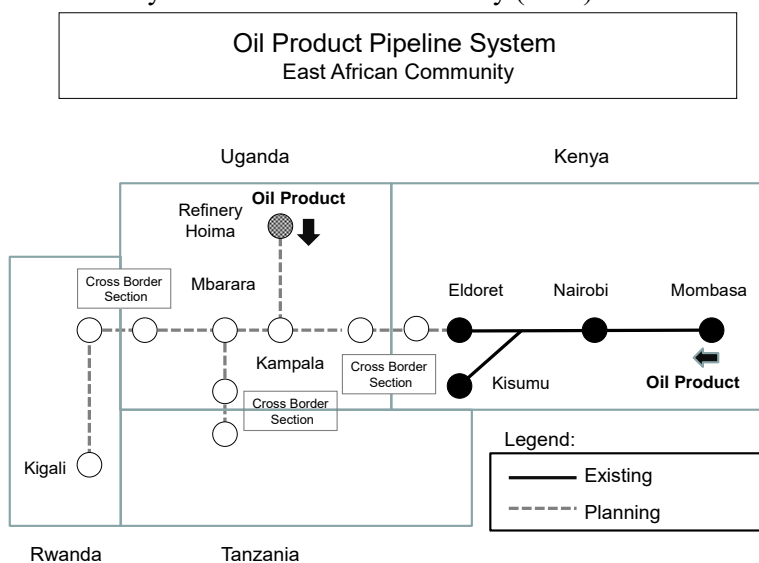


Source: JICA Study Team

Figure 5.3.9: Inland Ports in Uganda

(6) Oil Product Pipeline

Construction of Oil Product Pipeline system will be developed in Uganda to distribute the product oil from the refinery. The system will be extended to the east and tied into the system in Kenya. The system will also be extended to Mbarara and further to Kigali (Rwanda) and also to Tanzania, as endorsed by the East African Community (EAC).



Source: JICA Study Team

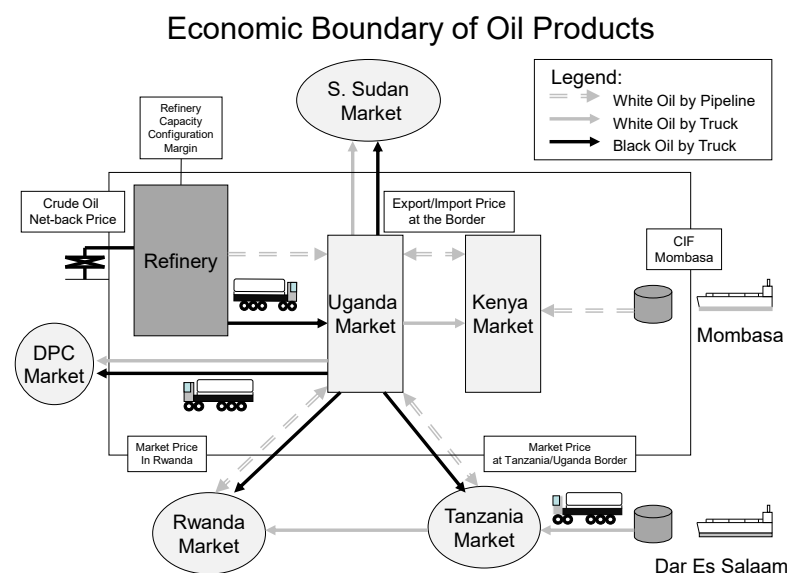
Figure 5.3.10: Oil Product Pipeline System in EAC Countries

There is “Economic Boundary” that needs to be taken into consideration to optimize the oil flow in the region. “Economic Boundary” is the outer rim of economic area where oil product price is optimized or normalized without any further disturbance. In Rwanda, Oil products from Mombasa are competing with the products from Dar Es Salaam, and also with Refinery in Uganda. Product from Refinery in Uganda will also be facing competition with the product from Mombasa and also Dar Es Salaam. Crude oil price in Uganda should also be competitive to support the refinery economics. Following is a list of cost factor which are considered to impact the price of oil product within the Economic Boundary:

- White Oil Product Flow
 - CIF price at Mombasa Port
 - Market Price at Uganda/Kenya Border
 - Refinery Capacity, Configuration, and Refining Margin
 - Net back price of Crude Oil in Uganda
 - Market Price in Rwanda
 - Market Price in Tanzania/Uganda Border

- Black Oil Supply Flow
 - Demand for fuel oil and asphalt in Uganda and adjacent countries

Note that Black Oils are highly demanded energy products for industrial use and also use for road infrastructure construction. These products have some difficulties in transportation without equipping with proper heating system, and more importantly affect refinery configuration in Uganda.



Source: JICA Study Team

Figure 5.3.11: Economic Boundary of Oil Products

There might be some difficulties in pipeline operation if the pipeline is owned and operated under the separate entities. Ideally the pipeline system is operated by minimum numbers of operators on a common platform and/or protocol. Oil Product Pipeline should be installed sooner to develop market and oil product distribution system, prior to the refinery construction, and to avoid the market risk for refinery operation.

(7) Boarder Post

There are several ongoing OSBP projects at the borders as already mentioned. Here, both Malaba and Busia borders which are the busiest borders are focused on. Malaba and Busia OSBP projects are shown in the following table.

Table 5.3.8: Summary of Malaba & Busia OSBP Project

Malaba & Busia OSBP Project	Malaba Border		Busia Border	
	Kenya	Uganda	Kenya	Uganda
Implementation Period		2015	2011-2015	2011-2014
Implementation Agency	KeNHA	MoWT	KeNHA	MoWT
Fund Resource	WB/TMEA	WB	TMEA	TMEA

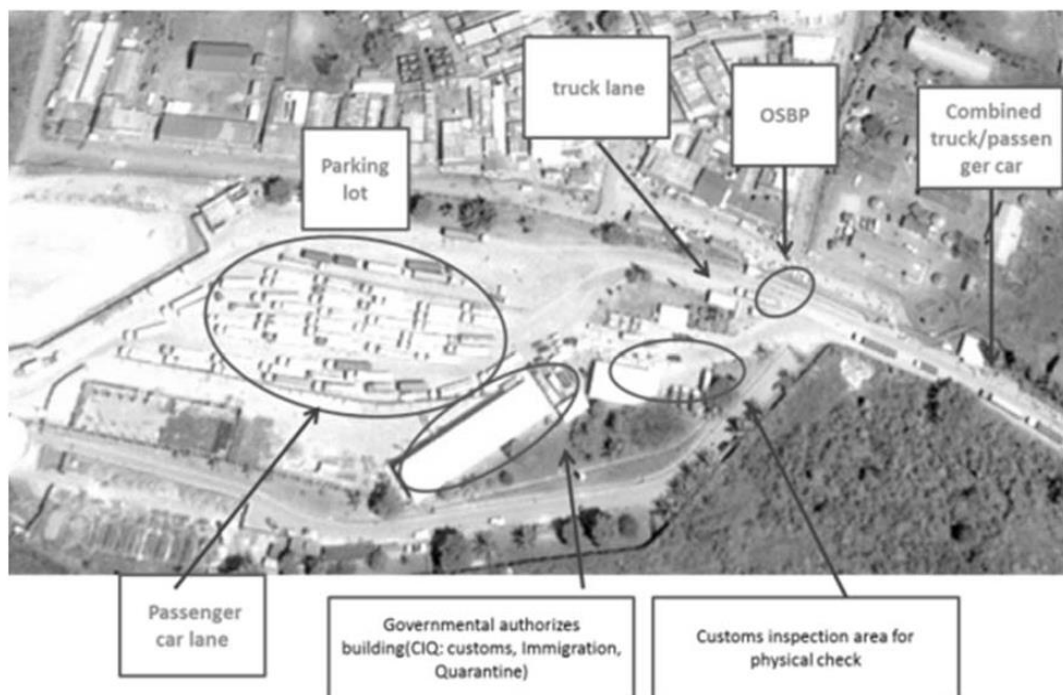
Source: Interview results to Border post offices.

(Malaba border post)

Single Custom Territory (SCT) scheme is planned to avoid time consumed at the border. According to interview survey conducted on September, 2015 for border customs office, the transit time will be minimized (ultimate goal is 3 hours for total crossing time) along with development of electric seal installation of reading machine. In practice, bond cancel procedure is planned to shift from manual basis to computerized procedures. Nevertheless, the performance of OSBP is still limited. Regarding truck transportation, note process is jointly conducted, but customs procedure is still separately conducted at both counties according to JICA STUDY TEAM site survey carried on September, 2015.

1) Kenyan side

Poor road infrastructure and small parking lot result in the long queues of trucks, reaching 4-8 km. In addition, the bridge between border facilities is narrow and passenger/cargo trucks are mixed. However, those infrastructure (road, bridge) and facilities (building for governmental authorities) are under construction with the support of the World Bank.



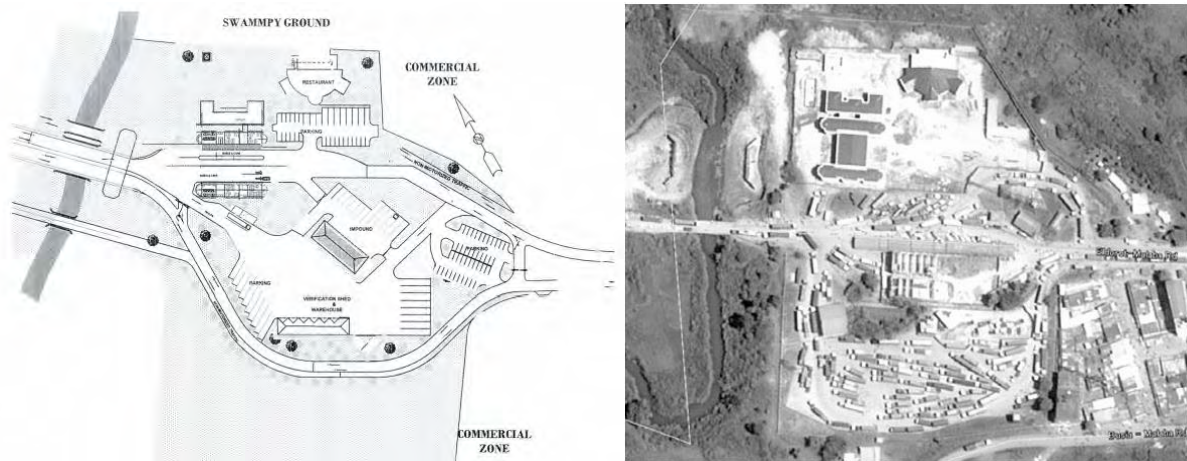
Source: JICA Study team

Figure 5.3.12: Image of Malaba border(Uganda)

2) Uganda side

Basic infrastructures are more developed than the Kenyan side; modern facility for government authorities, customs physical inspection area and wide parking area. This results in smooth access from Ugandan inland to the border. Furthermore, there are many unloading trucks which are much easier for border crossing than loading trucks hence traffic movement is smooth.

Malaba OSBP Layout (Kenya)



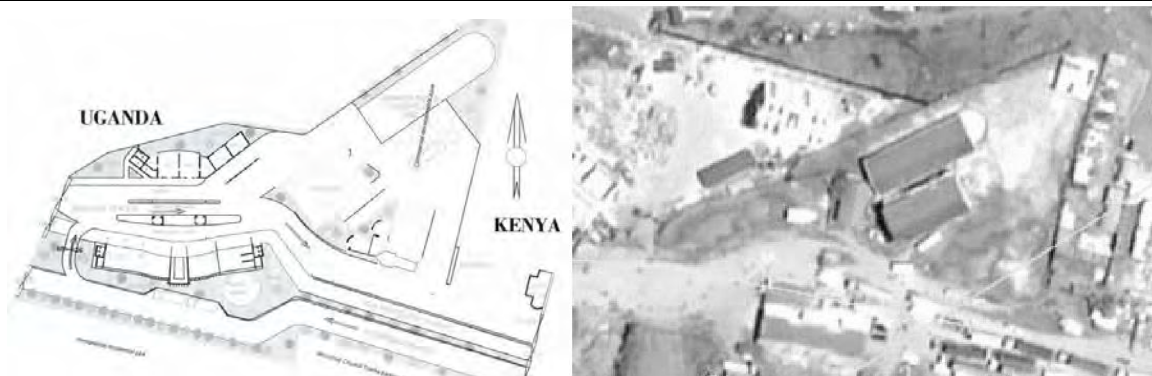
Following facilities such as Immigration offices, custom offices, border police post, national information services, Kenya bureau of standards, Kenya plant inspectorate services office, public health offices and social facilities are accommodated in OSBP.

Review of original design

Separation of traffic from non-motorized traffic

Appropriated layout of staff car park for the prevention of all traffic flow

Busia OSBP Layout



Following facilities such as Immigration offices, custom offices, border police post, national information services, Kenya bureau of standards, Kenya plant inspectorate services office, public health offices and social facilities are accommodated in OSBP.

Review of original design

Separation of the inbound and outbound vehicular traffic flows for avoidance of any possible compromise

Appropriated zoning and planning of layout for smooth and simple administration

Provision of certain requirements such as impounding yard

Source: East African Trade and Transport Facilitation Project (EATTFP) Proposed Malaba and Busia One Stop Border Posts Schematic Design Review Report, November 2011, Katoconsult and Associates, Google Earth

Figure 5.3.13: Malaba OSBP & Busia OSBP Layout Plan at Kenya Side

(8) Inland Depot

1) Kenya side

ICD development depends on railway service. Following projects are taken into account:

- New ICD for Standard Gauge Railway (SGR)
The SGR program includes the development of the 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. This terminal is planned to be owned and operated by KRC.
- 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. Currently PPP management approach supported by the World Bank is considered along with the revival plan of 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.

5.3.2 Development Scenario

As already mentioned in Section 5.2, based on the future modal share of cargo transport, three kinds of scenarios are set up as follows:

Case-1 (Optimistic Case)

Case-1 is an Optimistic Case. The Optimistic Case assumes railway will have a share of 46% of total import and export in tonnage for cargo transport at Mombasa Port. Railway is assumed to

carry 28million tonnes and Truck to carry 20million tonnes per year in 2030. As a result, in Case-1, truck demand is assumed to increase 1.08 times from that of 2015 by 2030.

Case-2 (Base Case)

Case-2 is the Base Case in which railway has a share of 32% of total import and export in tonnage for cargo transport at Mombasa Port. Railway is assumed to carry 20million tonnes and Truck to carry 29million tonnes per year in 2030. As a result, in Case-2, truck demand is assumed to increase 1.54 times from that of 2015 by 2030.

Case-3 (Pessimistic Case)

Case-3 is a Pessimistic Case in which railway has a share of 16% of total import and export in tonnage for cargo transport at Mombasa Port. Railway is assumed to carry 10million tonnes and Truck to carry 39million tonnes per year in 2030. As a result, in Case-3, truck demand is assumed to increase 1.86 times from that of 2015 by 2030.

Table 5.3.9: Future Development Scenarios

Item		Case-1 (Optimistic Case)	Case-2 (Base Case)	Case-3 (Pessimistic Case)
Total demand of cargo of import and export at Mombasa port (million tonnes in 2030)		62	62	62
Cargo volume by mode at Mombasa Port (million tonnes) in 2030	Railway	28	20	10
	Truck	20	29	39
	Pipeline	13	13	13
Modal Share by mode at Mombasa Port (000's tonnes) in 2030	Railway	46%	32%	16%
	Truck	33%	47%	63%
	Pipeline	21%	21%	21%

Note: On the Daily Nation Website on 16th January 2016, Kenya Railways Managing Director Atanas Maina said the highest cargo preference the parastatal could enjoy was 50 per cent. He also said that in 2015, 24 million tonnes of cargo passed through the port of Mombasa and it was projected to reach 26 million tonnes this year increasing to over 30 million tonnes in 2025.

Source: JICA Study Team

In this section, from the view of supply side consideration, focusing on SGR operation in the future, how to realize modal share by railway is described.

The future cargo transportation by truck on roads of the Northern Economic Corridor will be greatly affected by the future railway share of cargo from Mombasa Port. Shifting cargo transportation on the Northern Economic Corridor from road to rail is a key objective of the SGR project. The above cases for future railway modal share assume the Standard Gauge Railway Project will be implemented in Kenya and Uganda on the schedule indicated.

As Base Case, it is assumed that in 2025 railway will have a share of approximately 40% of container and 20% of non-container cargos from Mombasa port. Modal share by truck is calculated at 60% for container cargo and approximately 80% for non-container cargo from 2025 to 2030. This assumes that approximately 99% of petroleum products will continue to be transported by pipeline. The estimated share attained by Standard Gauge Railway in Kenya and Uganda assumes operation begins on the Mombasa-Nairobi segment from 2018 and the segments connecting Nairobi to Kampala are in operation by January 2022.

Other segments in Uganda are estimated to begin operating at various times between 2020 and 2030. In addition to serving Uganda territory, these routes will support international trade with South Sudan, Rwanda and the Democratic Republic of Congo.

The SGR route from Tororo to Nimule, South Sudan is currently planned to be completed in 2025. The South Sudan Parliament passed the “standard gauge railway protocol” in June 2015 approving the construction of an SGR line between Juba and Nimule¹¹. Obtaining funding for construction and an environmental assessment will follow. At this time there is not an estimated date for completing construction.

According to Uganda railway officials, the routes connecting Kampala to Kasese and Bihanga to Kigali (through Mirama Hills) are scheduled for completion in 2030. For Rwanda, this suggests several years of continued truck transit moves from Mombasa and rail-truck moves from Kampala. The approximate road distance from Kampala to Kigali is 670 kilometers. Rwanda is concerned and is trying to convince Uganda to accelerate construction of the Kampala-Bihanga-Mirama Hills-Kigali line to support rail transport of cargo exported and imported by Rwanda¹². Rwanda has indicated that it may consider the Tanzanian port of Dar es Salaam if necessary.

It is expected that by 2020 SGR will capture approximately 36% of the import and export container traffic at Mombasa and the meter gauge system 4%. This volume would require approximately four SGR trains and three MGR trains per day from Mombasa to Nairobi and three SGR and three MGR trains per day from Nairobi to Mombasa. As volume grows, SGR train operations increase to seven trains per day to Nairobi and six trains per day from Nairobi to Mombasa. MGR operations become five trains per day to Nairobi and remain at three per day from Nairobi to Mombasa. The number of trains is estimated so that no more than 75% of SGR’s capacity is utilized¹³.

Table 5.3.10: Railway Share of Mombasa Cargo – Base Case

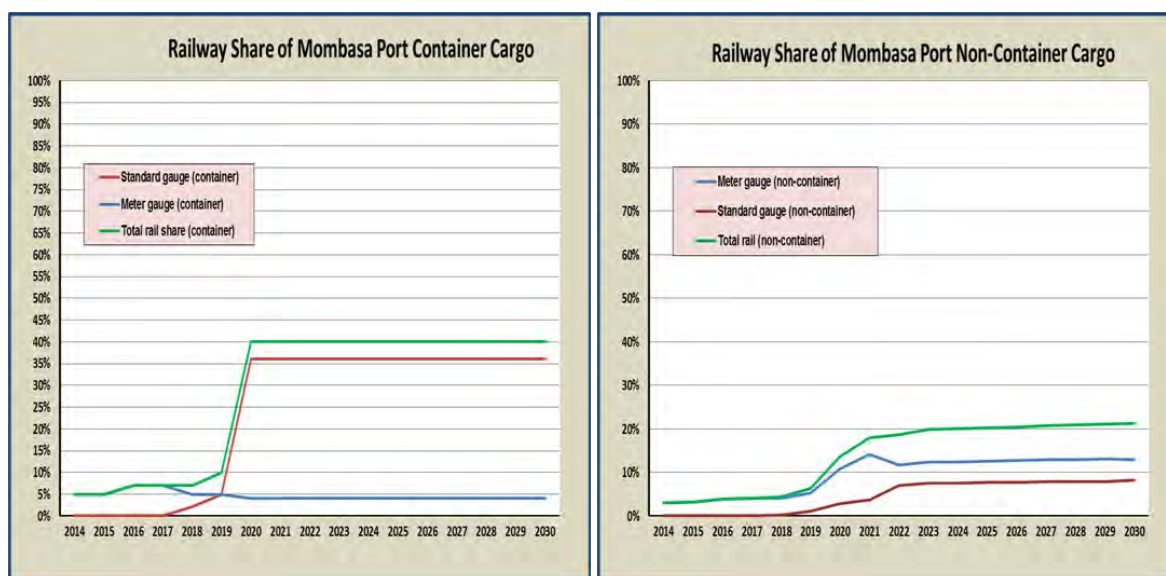
	SGR	SGR	SGR	MGR	MGR	MGR	Rail Total
	(2020)	(2025)	(2030)	(2015)	(2025)	(2030)	(2030)
Share of Mombasa cargo (tonnage)	18.0%	21.9%	22.7%	8.6%	9.8%	10.2%	32.0%
Container cargo (TEUs)	36.0%	36.0%	36.0%	4.0%	4.0%	4.0%	40.0%
Import	36.0%	36.0%	36.0%	4.0%	4.0%	4.0%	40.0%
Export	36.0%	36.0%	36.0%	4.0%	4.0%	4.0%	40.0%
Share of non-container cargo	2.9%	7.7%	8.2%	10.8%	12.6%	13.0%	21.2%
Import	3.0%	7.9%	8.4%	11.1%	12.9%	13.2%	21.6%
Export	0.1%	0.3%	0.3%	1.5%	1.5%	1.6%	1.9%

Source: JICA Study Team

¹¹ Parliament Approves Juba-Nimule Railway, The New Nation, 24 June 2015

¹² Kampala-Kigali railway project derails, The Independent, 19 July 2015

¹³ SGR capacity Study Team’s estimate based on estimated container train service from Mombasa to Nairobi and train service based on details provided by KPA



Source: JICA Study Team

Figure 5.3.14: Railway Share of Mombasa (Container Cargo and Non- Container Cargo)

This train operating plan would return approximately 85% of empty containers to Mombasa by rail. This assumes efficient handling of empty containers at the ICDs or separate empty container depots. This is discussed further in later sections of the report.

SGR's capture of market share is expected to be driven by its cost and service advantage versus road transport and the meter gauge railway. The tables below compare estimated cost and projected service for the SGR, MGR and road transport. The tables illustrate SGR's distinct advantage versus the other transportation options.

Table 5.3.11: Estimated Cost and Tariff for SGR, MGR and Road Transport

(USD)	SGR (1)	MGR (2014)	Truck (2014)
Operating expense per ton-km (2)	0.0464	0.0643	0.3568
Revenue per ton-km	0.0580	0.0595	0.3757
Revenue per ton	43.13	NA	177.31
Tariff 40' container (Mombasa-Nairobi) (1)	368	1,350	1,915
Tariff 40' container (System average)	538		
Operating margin	20.0%	(8.1%)	5.0%

Notes: (1) 2014 costs and 2025 estimated volume; (2) MGR as reported by Qalaa Holdings; truck assumes expenses equal 95% of revenue; ton-kilometers assume 13.5 tons per 40' container and a 472 km transit Mombasa-Nairobi

Source: JICA Study Team analysis and review of public documents

SGR's estimated operating expense per ton-kilometer is based on standard gauge freight railway experience in Europe and the United States. The \$0.0464 per ton-kilometer shown in the table above is the average of the figures shown below.

Table 5.3.12: Average cost per ton-kilometer

Mode	EU	USA	UP	NS
	(EUR/tkm)	(EUR/tkm)	(USD/tkm)	(USD/tkm)
	(2005)	(2005)	(2014)	(2014)
HD Truck	0.140	0.200		
Rail	0.110	0.010		
EUR/USD	1.271	1.271		
USD/tkm	0.140	0.013	0.009	0.024

Notes: HD Truck is heavy duty truck

Source: EU and USA: COMPETE analysis; UP and NS company reports¹⁴

Table 5.3.13: Railway Service Assumed

	SGR	SGR	MGR	MGR	Road	Road
	Container	Non-Container	Container	Non-container	Container	Non-container
	(2025)	(2025)	(2025)	(2025)	(2015)	(2015)
Wagons per train						
Mombasa-Nairobi	95	50	25	25		
Nairobi-Mombasa	95	50	25	25		
Mombasa-Kampala	95	50	25	25		
Kampala-Mombasa	95	50	25	25		
Trailing tonnes per train						
Mombasa-Nairobi	3,830	3,798	630	615		
Nairobi-Mombasa	2,394	1,162	468	188		
Mombasa-Kampala	3,830	3,798	630	615		
Kampala-Mombasa	2,394	1,162	468	188		
Trains per segment per day (1)						
Mombasa-Nairobi	4	2	3	7		
Nairobi-Mombasa	4	1	2	1		
Mombasa-Kampala	2	1	1	1		
Kampala-Mombasa	1	<1	1	<1		
Transit time (hours)						
Mombasa-Nairobi	14.4	16.8	18.5	23.9		
Nairobi-Mombasa	14.4	14.4	18.5	18.5		
Mombasa-Kampala	28.6	33.2	36.6	47.3		
Kampala-Mombasa	28.6	28.6	36.6	36.6		
Origin-destination (hours/days) (2)						
Mombasa-Nairobi	129.7/5.4	164.1/6.8	109.9/4.6	184.5/7.7	172.8/7.2	235.8/9.8
Nairobi-Mombasa	82.9/3.5	95.4/4.0	82.1/3.4	87.0/3.6	162.0/6.8	204.0/8.5
Mombasa-Kampala	152.8/6.4	180.5/7.5	138.4/5.8	207.9/8.7	211.0/8.8	295.0/12.3
Kampala-Mombasa	97.0/4.0	109.6/4.6	100.2/4.2	105.1/4.4	226.5/9.4	240.0/10.0

(1) Kampala exports of non-containerized cargo will be combined with container trains

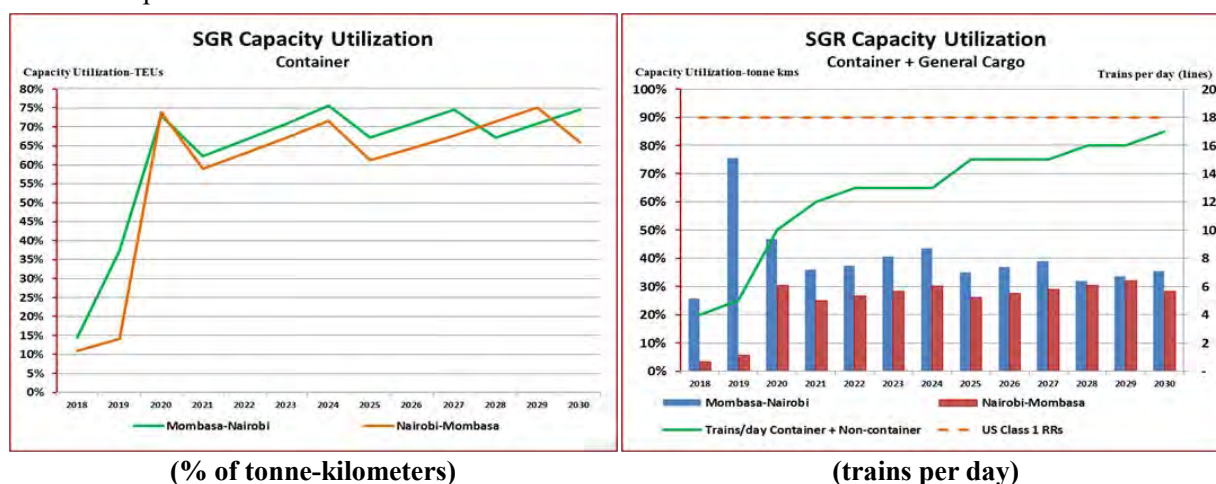
(2) Includes handling and customs activities at Mombasa and Nairobi/Kampala

Source: JICA Study Team analysis and review of public documents

The figures below show the estimated capacity utilization of the standard gauge railway based on the Study Team's analysis. The figure on the left measures capacity for container trains in terms of TEUs. The capacity modeling set a maximum threshold of 75% utilization to allow for unforeseen operating problems as well as short term surges in traffic. The figure on the right

¹⁴ COMPETE Analysis of the contribution of transport policies to the competitiveness of the EU economy and comparison with the United States, October 2006, 2005 data; UP (Union Pacific, US Class 1 railroad and NS (Norfolk Southern, US Class 1 railroad) from company annual financial reports for 2014

indicates the number of trains operated on the Mombasa-Nairobi corridor in comparison with the performance of U.S. railroads¹⁵.



Source: JICA Study Team

Figure 5.3.15: SGR Capacity Utilization

SGR should address shippers' concerns with service reliability, transit times and cost. SGR's heavier track structure and wider gauge allow faster operating speeds and heavier trains than the meter gauge railway. With new signaling systems and rolling stock the SGR system has the ability to provide reliable service that consistently achieves the railway's commitments to customers. In addition, as mentioned in 5.2.2, it is expected in this case that SGR's level of transit cost is 50% of truck's transit cost.

The main assumptions supporting the Case-2 (Base Case) rail volume estimate include:

- The SGR system is developed between 2015 and 2030 with the core route to Kampala operating by the beginning of 2022.
- RVR continues to invest in track infrastructure, locomotives and rail wagons.
- Uganda, working with RVR, ensures that the meter gauge line Tororo-Gulu-Pakwach by mid-2016 is rehabilitated sufficiently to provide effective service over the entire branch with capacity to transport well pipe and other materials for development of the oil fields in the Albertine region.
- SGR transit time is better than road transportation.
- SGR cost per ton-km is 50% of truck cost and SGR tariffs are below road and MGR tariffs.
- SGR focuses primarily on container traffic capturing a share of 36%.
- Over time RVR concentrates on general and bulk cargo and maintains a presence in container transport.
- ICDs and railway yards are implemented to support SGR and MGR operations and an efficient flow of cargo along the NEC.

15 National Rail Freight Infrastructure Capacity and Investment Study, Cambridge Systematics, September 2007, Table 4.2, page 4-7; single track, automatic block signaling system, US Class 1 railroads

On the other hand, it may not be easy to shift share from truck to railway given that truck is currently in a dominant position and has strength as a more flexible mode especially over relatively short distances. Furthermore, in order to compete with trucks and maximally utilize railway's strength as a cost-effective mode for longer, heavier and voluminous cargo, cost-efficient and timely operation is necessary. There is a risk that it may take longer to implement such efficient operations. Therefore, a Pessimistic Case is examined assuming a 15% share of total cargo tonnage for SGR and MGR combined.

An Optimistic Case considers the possibility that by 2025 railway share for container cargo would achieve 60% (measured on a TEU basis). In addition, as mentioned in 5.2.2, it is assumed in this case that SGR's level of transit cost is less than 50% of truck's transit cost. The Optimistic Case assumes shippers value the benefits of railway more highly and the Kenyan and Ugandan governments' efforts to achieve modal shift are more successful than expected. Therefore, this can be seen as a very successful achievement of modal shift from road to rail led by implementation of the Standard Gauge Project as well as the logistics strategy on the Northern Economic Corridor. At the same time, the possibility of railway capacity constraints is greater for the Optimistic Case emphasizing the need to establish and maintain efficient train operations. This Optimistic Case could be said to be difficult to attain until 2030 because more frequent and more efficient operation than the Base Case is difficult and truck transport service must be improved to compete with railway in the market of cargo transport.

The Pessimistic Case assumes railway has a share of 20% of container cargo from Mombasa port by 2025 (measured on a TEU basis) and 8.5% of non-container cargo. Modal share by truck is assumed to be 80% from 2025 to 2030. As mentioned in 5.2.2, it is assumed in this case that SGR's level of transit cost is as same as truck's transit cost. This can be seen as a failure of the Standard Gauge Project as well as logistics strategy implementation on Northern Economic Corridor. As mentioned in 5.2.2, it is assumed in this case that SGR's level of transit cost is more than truck's transit cost.

Road development policy for logistics on Northern Economic corridor should have as a minimum target to attain Case-2. This means that demand for truck transport will increase by approximately 1.38 times from 2015 until 2030 is the basic assumption for road transport planning of Northern Economic Corridor Master Plan.

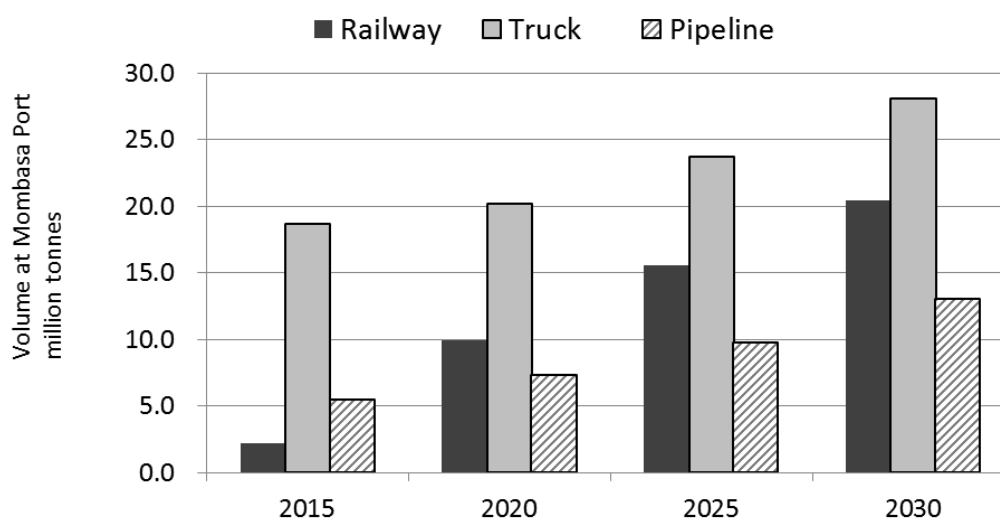
The figure and table below compare estimated truck volume and railway volume in the Base Case. In 2020 it is estimated that truck haulage will decline as SGR becomes fully functional. By 2025, truck tonnage is projected to be higher than 2015 reflecting the growth in Mombasa Port cargo.

Table 5.3.14: Projected Truck and Railway Tonnage (Base Case)

Unit: million tonnes /year

Year	2015	2020	2025	2030
Railway	2.2	9.9	15.5	20.3
Truck	18.7	20.1	23.7	28.2
Pipeline	5.4	7.3	9.7	13.0
Total	26.3	37.4	48.9	61.5

Source: JICA Study Team



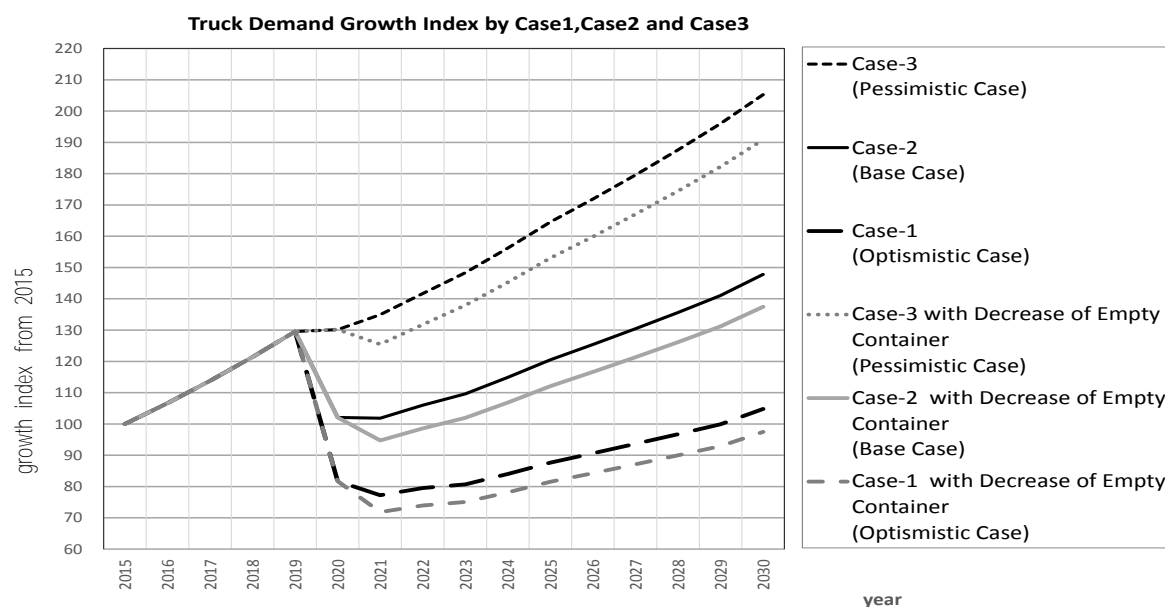
Source: JICA Study Team

Figure 5.3.16: Projected Truck and Railway Tonnage (Base Case)

Table 5.3.15: Case Setting for Several Scenarios

Case description	Assumption of Cargo Demand Growth by Trucks																																	
<p>Case-1 (Optimistic Case)</p> <p>Case-1 is an Optimistic Case. The Optimistic Case assumes railway will have a share of 46% of total import and export in tonnage for cargo transport at Mombasa Port. Railway is assumed to carry 28million tonnes and Truck to carry 20million tonnes per year in 2030. As a result, in Case-1, truck demand is assumed to increase 1.08 times from that of 2015 by 2030.</p> <table border="1"> <thead> <tr> <th>Case-1 (Optimistic)</th> <th>2015</th> <th>2020</th> <th>2025</th> <th>2030</th> </tr> </thead> <tbody> <tr> <td>Rail Share</td> <td>8%</td> <td>37%</td> <td>45%</td> <td>46%</td> </tr> <tr> <td>Truck Share</td> <td>71%</td> <td>42%</td> <td>34%</td> <td>33%</td> </tr> <tr> <td>Pipeline Share</td> <td>21%</td> <td>21%</td> <td>21%</td> <td>21%</td> </tr> <tr> <td>Cargo Demand Growth Index</td> <td>100</td> <td>142</td> <td>186</td> <td>234</td> </tr> <tr> <td>Truck Demand Growth Index</td> <td>100</td> <td>84</td> <td>90</td> <td>108</td> </tr> </tbody> </table>	Case-1 (Optimistic)	2015	2020	2025	2030	Rail Share	8%	37%	45%	46%	Truck Share	71%	42%	34%	33%	Pipeline Share	21%	21%	21%	21%	Cargo Demand Growth Index	100	142	186	234	Truck Demand Growth Index	100	84	90	108	<p>Road Traffic Demand for all (Case-1: Rail 46%, Truck 33%, Pipeline 21%)</p>			
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Source: JICA Study Team



Notes: 7% of Empty Container volume is forecasted to decrease if Empty Container Depot and SGR operation for empty containers are implemented (as shown in Table 5.2.11).

Source: JICA Study Team

Figure 5.3.17: Comparison of Road Traffic Demand Growth in three Cases

5.3.3 Development Strategy

(1) Transport Network

As far as the future cargo demand is concerned, Case-2 (Base Case) can be said to be more appropriate than Case-1 (Optimistic Case) and Case-3 (Pessimistic Case) because the setting assumption for SGR operation plan such as frequency, capacity and charge is thought to be more practical and realistic than the others. As a result, the future demand from 2015 until 2030 for planning transport infrastructures is assumed to be as follows:

- Cargo throughput at Mombasa port will be 2.34 times in tonnage from 2015 to 2030
- Railway share of cargo from and to Mombasa will be 33% in tonnage in 2030
- Truck share of cargo from and to Mombasa will be 46% in tonnage in 2030
- Pipeline share of cargo from and to Mombasa will be 21% in tonnage in 2030
- Truck Traffic will be 1.54 times in tonnage or in number of vehicle from 2015 to 2030

To summarize current situation, gap and the future demand of cargo and traffic, there are five main issues relating to the transport infrastructure on the Northern Economic Corridor, namely:

- Integration of multimodal infrastructures as an international logistics network
- Building efficient road network as the most fundamental logistics infrastructure
- Improvement of bottlenecks of logistics
- Improvement of road traffic safety
- Promoting of industrial development on the logistic corridor

Strategies are set up for the above issues. The Northern Corridor should be built as a Comprehensive Multimodal Transport System consisting of road transport, railway, airway, waterway and pipeline in order to utilize the existing and planned assets of infrastructure effectively, to maximize economic efficiency and to be in eco-friendly transport in the future. Development strategy can be summarized in Figure 5.3.17 and Table 5.3.15.

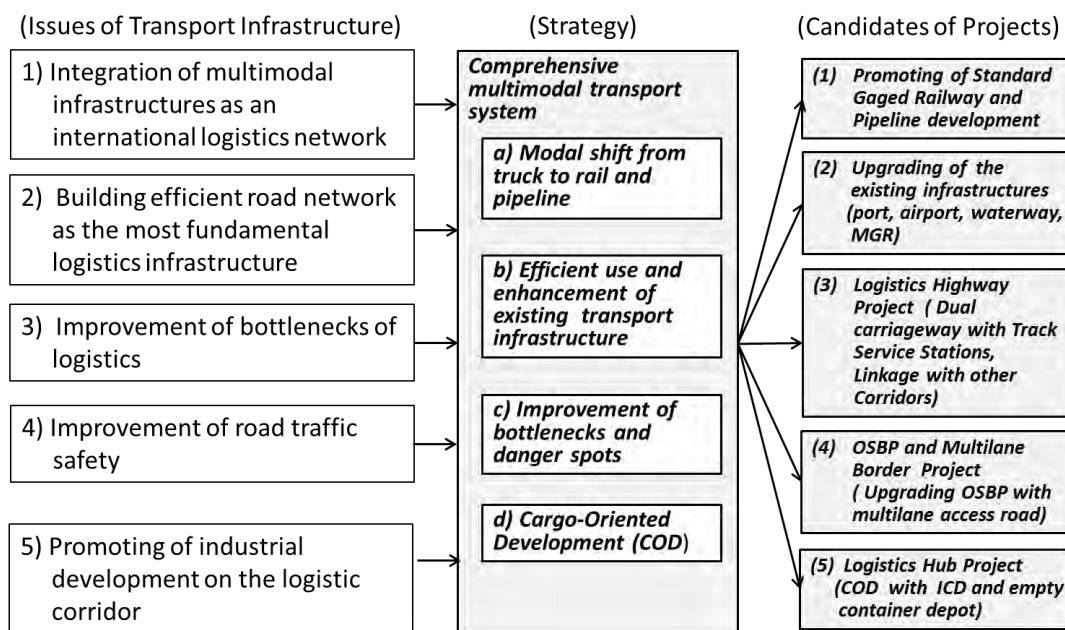
Modal shift from truck to rail and other modes is a key policy on the Northern Corridor in the near future. Currently 8% of cargo from Mombasa port to EACs is estimated to be carried by railway. Railway is usually a cost-efficient mode for long distance, heavy, large amount of freight such as coal, cement, construction materials and so on. On NEC Railway should be used more for cargo transport through the Standard Gauged Railway Project. In addition, pipeline should be promoted for oil transport.

As Efficient use and enhancement of existing transport infrastructure, Meter gauged railway and the waterway in Victoria Lake should be reactivated. Promotion of these modes will lead to not only the modal shift from truck to railway, but also the use of an eco-friendly transport among Kenya, Uganda and Tanzania.

Congestion and accident have emerged as the very serious problems in road traffic on NEC. Improvement of bottlenecks and danger spots should be improved in the future. Particularly in Mombasa, Nairobi, Nakuru, Eldoret, Kisumu, Kampala and their surrounding areas there are increasing traffic demands and bottlenecks of road traffic and traffic accident black spots. In addition, single carriageway has a high risk for traffic accident on the road highly consisting of heavy goods vehicles.

Near Mombasa port, railway and airport cargo terminals, junction of road, ICDs and borders, industrial park development for manufacturing, warehouse, fishery /agricultural/ timber processing should be planned by the government as a logistics hub. Such kind of development can be called as Cargo-Oriented Development (COD). COD is supposed to activate regional economic vitality, create jobs and promote international trade effectively. As a result, it would lead to improve a gap of cargo between import and export, and decrease a great number of unloaded trucks and empty containers on the road.

Main projects associated with the strategies are shown in Table 5.3.17.



Source: JICA Study Team

Figure 5.3.18: Development Strategy of Logistics on Northern Economic Corridor

Table 5.3.16: Summary of Development Strategy based on an Analysis of Demand- Supply Relation

Item	Current Situation	Future Trend until 2030	Development Strategy
Demand	<ul style="list-style-type: none"> Rapid increase of container cargo throughout at Mombasa port with more than 7% of annual growth rate. Cargo imbalance between import and export Long distance with more than 1,000km from Mombasa port to inland countries 	<ul style="list-style-type: none"> Until 2030, the past trend of increasing cargo demand at Mombasa port is forecasted to continue. Oil flow will change due to the development of crude oil in Uganda. 	<p>a) Modal shift from truck to rail and pipeline Railway should be used more for cargo transport through the Standard Gauge Railway Project. Pipeline network enhancement should be promoted more.</p> <p>b) Efficient use and enhancement of existing transport infrastructure Existing infrastructures such as MGR and waterways in Lake Victoria should be more efficiently used for logistics and be enhanced as an eco-friendly transport.</p>
Supply	<ul style="list-style-type: none"> Not sufficient supply to the demand although investing to Mombasa port, roads, OSBPs in recent years. Not efficient use of railway with a share of less than 5% from and to Mombasa port. Very low frequent operation of waterway in Victoria Lake after the accident in 2005. Too many trucks carrying empty containers. 	<ul style="list-style-type: none"> SGR will be provided from Mombasa to Nairobi, Malaba, Kampala, etc. Pipeline network is expected to expand capacity from Mombasa to Nairobi, Eldoret and Kisumu. Mombasa port will have nearly triple container capacity of handling. Road capacity improvements are going to implement in Mombasa, Nairobi, Kampala and other sections. OSBPs would complete for most of borders. 	<p>c) Improvement of bottlenecks and danger spots The main route from Mombasa to Nairobi, Malaba, Kampala, Kigali and Bujumbura should be improved to be safer and smoother at least with dual carriageway in the long run.</p>
Issues	<ul style="list-style-type: none"> Over dependent on road transport and very low modal share of railway. Road congestion in Mombasa, Nairobi, Kampala and borders Many traffic accidents on the road network. Low mobility and reliability of Transport and logistics flow with high cost 	<ul style="list-style-type: none"> Integration of multi infrastructures as an international logistics network. Building efficient road network as the most fundamental logistics infrastructure. Improvement of bottlenecks of logistics. Improvement of road traffic safety. Promoting of industrial development on the logistic corridor. 	<p>d) Cargo-Oriented Development (COD) CODs should be conducted around the logistics hubs which will have ICD and logistics center function and will be located along SGR.</p>

Source: JICA Study Team

Table 5.3.17: Summary of Projects of Transport and Logistics Infrastructure

Category of Project	Infrastructure								List of Main Projects ■ Ongoing/Other Plan suggested project ★ NEC MP suggested
	Road	Railway	Port	Airport	Waterway	Pipeline	Border post	ICD	
(1) Promotion of Standard Gaged Railway and Pipeline Project									<ul style="list-style-type: none"> ■ SGR project in Kenya, Uganda and Rwanda (Mombasa- Nairobi: 472km, Completion June 2017) (Nairobi- Kisumu- Malaba: 485km, Completion 2021) (Malaba-Kampala: 237km, Completion 2019) ■ New pipeline project for oil product, crude oil and gas, Refinery in Uganda (Mombasa-Kampala-Eldred-Kampala-Kigali)
		✓				✓			
(2) Upgrading projects of the existing infrastructures (port, airport, waterway, MGR)									<ul style="list-style-type: none"> ■ New Container Berth at Mombasa Port in Kenya ■ New Container Berth at Lamu Port in Kenya ■ Capacity increasing at Jomo Kenyatta International Airport in Kenya ■ Terminal expansion, Cargo area construction, at Entebbe International Airport in Uganda ■ Inland waterway transport project at Lake Victoria in Kenya, Uganda and Tanzania (Rehabilitation of 3-6 ports, introducing of new freight vessels) ■ MGR Rehabilitation of track and so on
		✓	✓	✓	✓				
(3) Logistics Highway Project (Dual carriageway with Truck Service Stations, Linkage with other Corridors)									<ul style="list-style-type: none"> ■ Dualling of Mariakani-Mombasa Road in Kenya (35km) ■ Kampala-Jinja and Kampala-Mpigi Expressway Project in Uganda(57km,30km) ■ New Nile Bridge in Uganda (525meters) ★ Logistics Highway Project (Mariakani-Voi and Nairobi-Nakuru in Kenya, 257km) ★ Logistics Highway Project (Jinja-Junction of Malaba/Busia in Uganda,130km) ★ Truck Service Station in Kenya (Voi, Emali) ★ Truck Service Station in Uganda (Bugiri)
	✓								
(4) OSBP and Multilane Border Project (Upgrading OSBP with multilane access road)									<ul style="list-style-type: none"> ■ Kenya/Uganda: OSBP projects at Malaba, Busia) ■ Uganda/Rwanda: OSBP project at Katuna and Mirama Hills ■ Uganda/South Sudan: OSBP project at Nimule and Oraba ■ Uganda/DRC: OSBP project at Mpondwe, Bunagana and Goli ■ Uganda/Tanzania: OSBP project at Mutukula ■ Kenya/Tanzania: OSBP projects at Malaba, Busia) ★ Multilane Border Project at Malaba and Busia in Kenya
	✓						✓		
(5) Logistics Hub Project (COD with ICD and empty container depot)									<ul style="list-style-type: none"> ★ Logistics Hub Project at Mombasa, Nairobi and Kisumu in Kenya ★ Logistics Hub Project at Tororo, Kampala, Mbarara and Guru in Uganda <p>Location for logistics hub will be selected along SGR and near Logistics Highway</p>
	✓	✓						✓	

Source: JICA Study Team

(2) Road

Key Strategy

Under the assumption of the Base Case, truck share of cargo from and to Mombasa will be 46% in tonnage in 2030 and, as a result, truck traffic will be 1.38 times in tonnage or in number of vehicle from 2015 to 2030. This increasing demand will influence greatly on the road from Mombasa to Kampala. In particular, road sections of Mombasa-Nairobi and Nairobi-Nakuru will be the most affected as heavy congestion sections until 2030 unless road capacity improvement is implemented. In addition, congestion at the Malaba border will become busier and it makes passing time longer unless passing border capacity is improved. Under the

assumption of this future demand increase, not only congestion but also traffic accidents will be more serious and be more required to improve. In addition, from the view of wider road network building in the long run, the linkage NEC with other corridors such as Central Corridor, LAPSSET Corridor and Kampala-Juba-Addis Ababa-Djibouti Corridor is required.

The key strategy for trunk road along NEC here is named by JICA Study Team as Logistics Highway Project. The concept of Logistics Highway Project is “International Logistics Highway with High Safety, Smart Mobility and Low Lifecycle Cost”.

Firstly, High safety will be achieved through introducing high capacity at least with double carriageway, climbing lane on steep section, service road in urban areas, grade separation at congested intersections or railroad crossings, guard fence, street lighting, appropriate pavement and drainage system.

Secondly, it is recommended that Smart Mobility will be continuously introduced and improved on logistic highway by advanced ICT and IOT. NEC, especially the section between Mombasa and Nairobi, has very high ratio of heavy goods vehicle and almost all the vehicles have long distance travel and limited similar destinations. It means that if trucks and trailers are well managed by ICT and IOT, efficient traffic movement can be attained easier than urban traffic movement. It suggests that Truck movement will be monitored by GPS data and estimated travel time of alternative routes will be navigated to drivers. A variety of information such as traffic accident, disaster, terrorism, weather, traffic regulation and construction work will be accessible to drivers in the future. Furthermore, automatic truck driving, ecofriendly vehicle such as electric or hydrogen vehicle will be introduced. All the above measures are recommended. As a result, these measures would lead to high speed, stable and safe logistics, cost reduction, and efficient operation for forwarders and carriers.

Thirdly, heavy goods vehicle makes pavement damages relatively faster than passenger cars. Damage to pavements cause traffic accidents and consequently leads to higher management cost for road authority. In future road pavement condition should be monitored continuously by big data of GPS and related inspection data in vehicle. Road repair work will be efficiently conducted based on the data. As a result, efficient road asset management system will be implemented leading to lifecycle cost reduction.

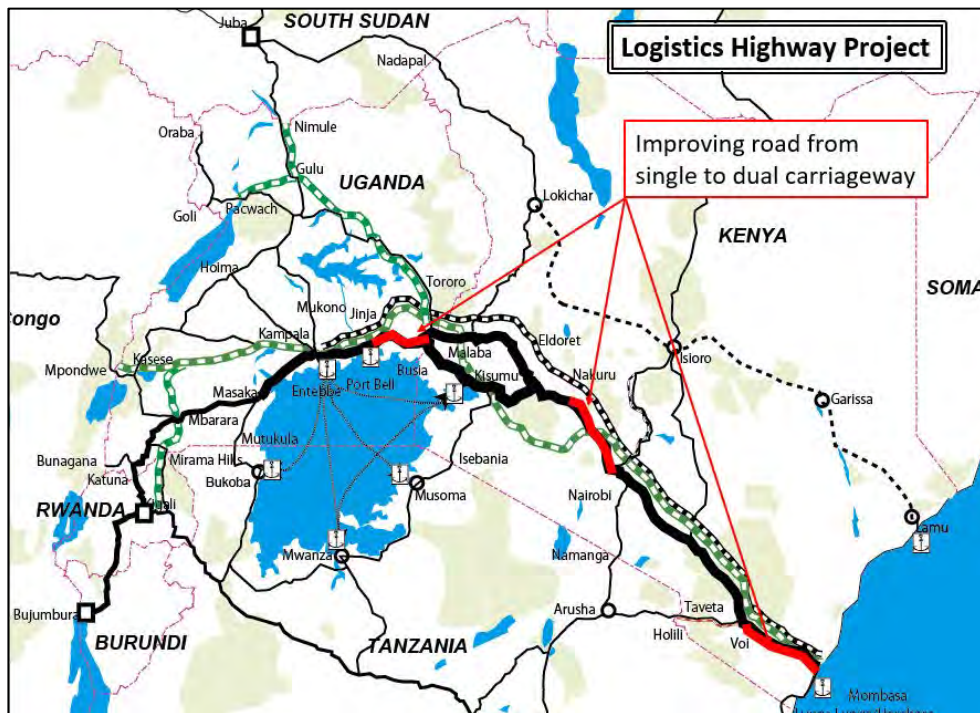
For road infrastructure, the following three components will be conducted:

- Improving road from single to dual Carriageway
- Assigning Truck Service Stations along logistics highway
- Linking with other Corridors

(a) Improving road from single to dual carriageway

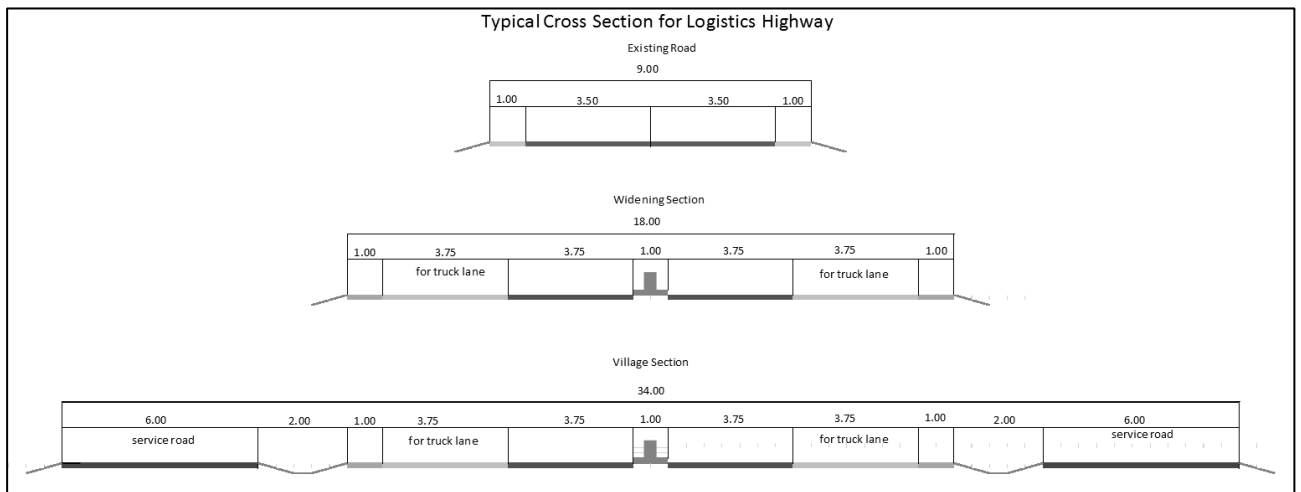
As a basic policy, the main route of Northern Economic Corridor from Mombasa, Nairobi, Kampala, Kigali and Bujumbura should have dual carriageway at least. This is because most sections will require four-lane capacity at least until 2030 and double carriageway with median strip is much safer than single carriageway without median strip.

- Even in the optimistic case, road traffic demand will increase because not only cargo from Mombasa port but also regional cargo demand and passenger car demand will be increased together with the economic growth and population increase with an annual growth rate of 5% approximately in the East African Region.
- Therefore, road investment will be continuously necessary to improve road congestion and to reduce traffic accidents for the main routes on Northern Economic Corridor.
- Particularly, there are three sections which clearly show the necessity of capacity expansion to four lanes with more than 20,000pcu/day at least in the future based on traffic demand forecasting results. They are Mombasa-Nairobi, Nairobi-Nakuru and Junction of Malaba/Busia- Jinja- Kampala-Masaka.
- As far as the section of Mombasa-Nairobi is concerned, it is better to improve from Mombasa to Voi via Mariakani as a high priority section because Voi is an important junction to Nairobi and Arusha in Tanzania. The section between Mombasa and Voi should be expanded to 4 lanes. Consideration for this improvement is on-going.
- Base Case shows that both sections of Nairobi-Nakuru and Jinja-Kampala-Masaka will handle nearly or more than 40,000pcu/day. Looking at long term trend after 2030, this implies that both sections will surely exceed a capacity of four lanes and require six lanes. Therefore, it is recommended that both sections should be supplied with six lanes in 2030. If there are some difficulties in the expansion of existing roads because of limitation of land in highly populated areas of the section between Nairobi and Nakuru, elevated structure such as viaduct or bypass type of road should be introduced. On the other hand, tunnel structure will be one of the options at the section of Rift valley should there be difficulties in widening the existing road at this section.



Source: JICA Study Team

Figure 5.3.19: Location Map of Logistics Highway on NEC

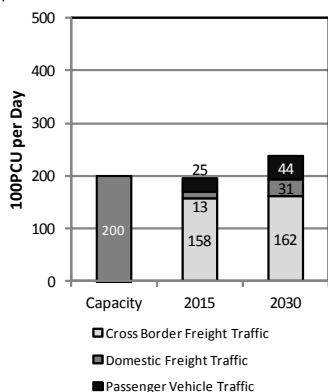


Source: JICA Study Team

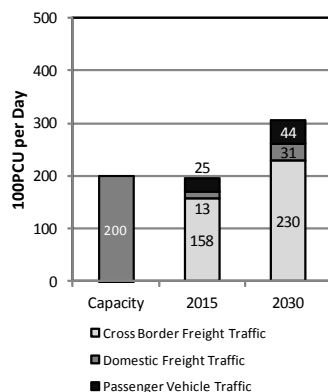
Figure 5.3.20: Proposed Typical Cross Section for Logistics Highway on NEC

Mariakani in Mombasa in Kenya

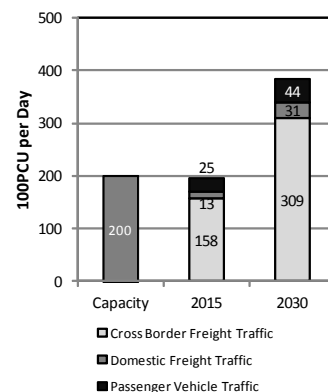
Optimistic Case



Base Case

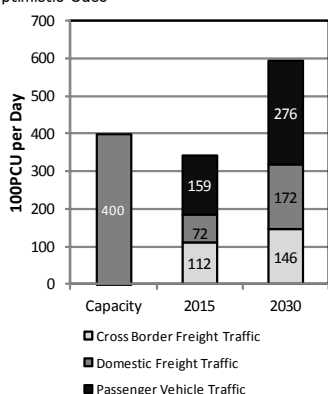


Pessimistic Case

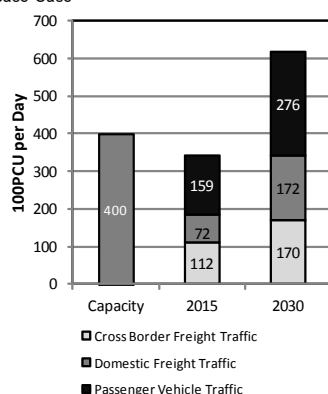


Rironi between Nairobi and Nakuru in Kenya

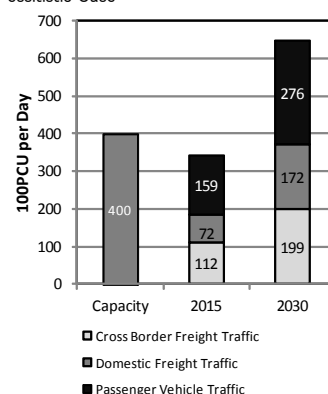
Optimistic Case



Base Case

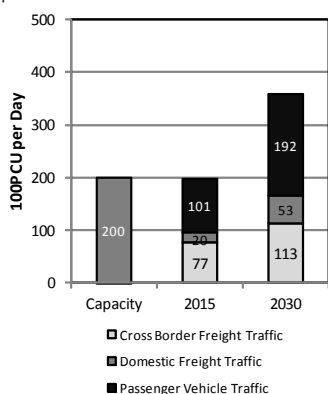


Pessimistic Case

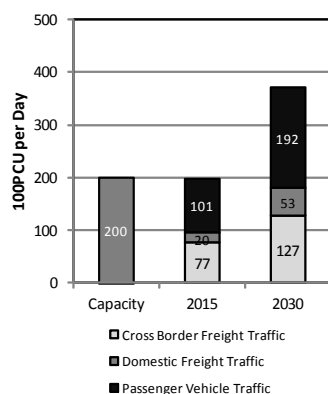


Seeta near Kampala in Uganda

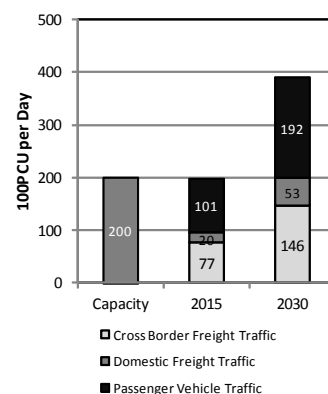
Optimistic Case



Base Case

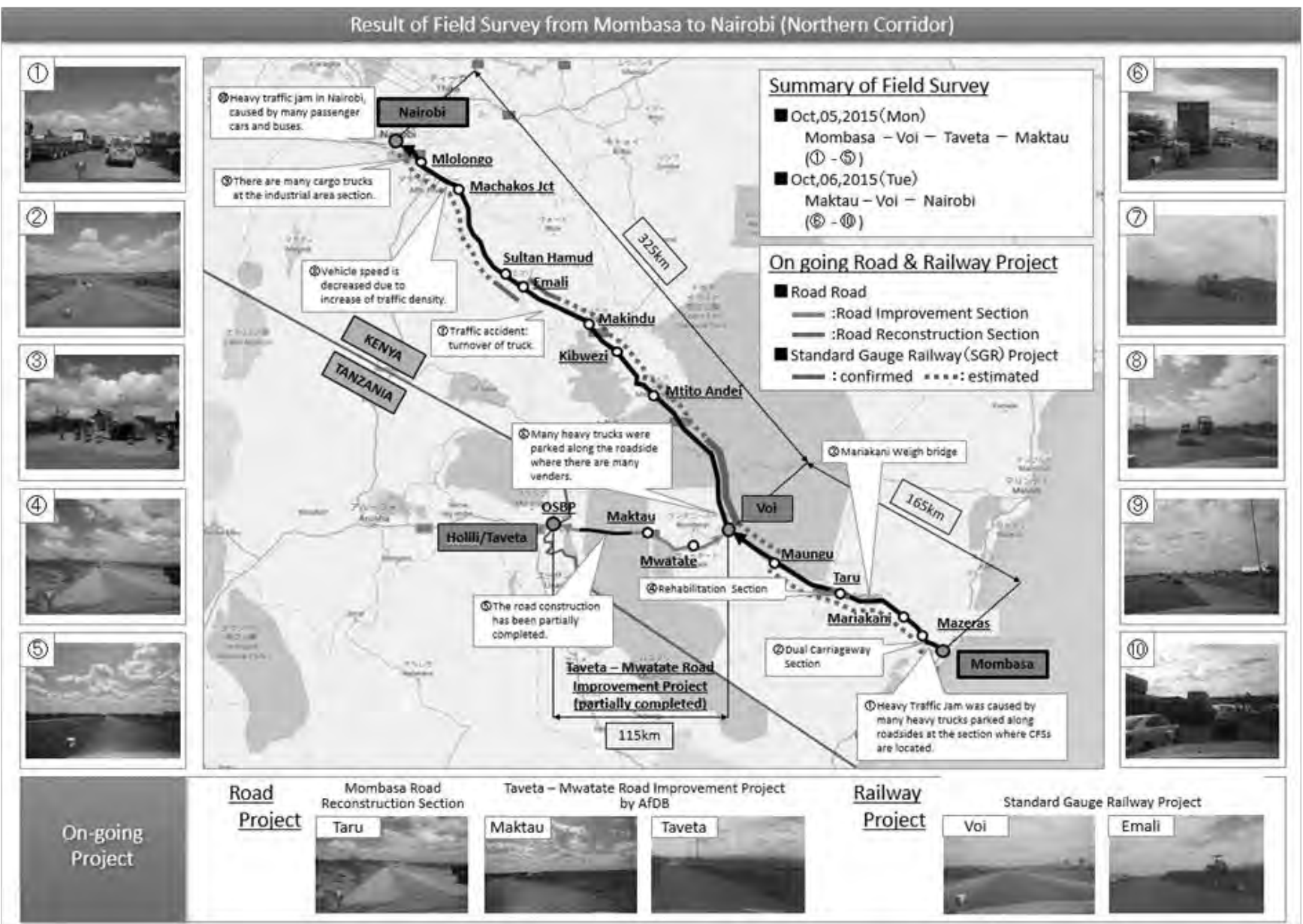


Pessimistic Case



Source: JICA Study Team

Figure 5.3.21: Traffic Forecasting Results on the main section on the main routes on NEC



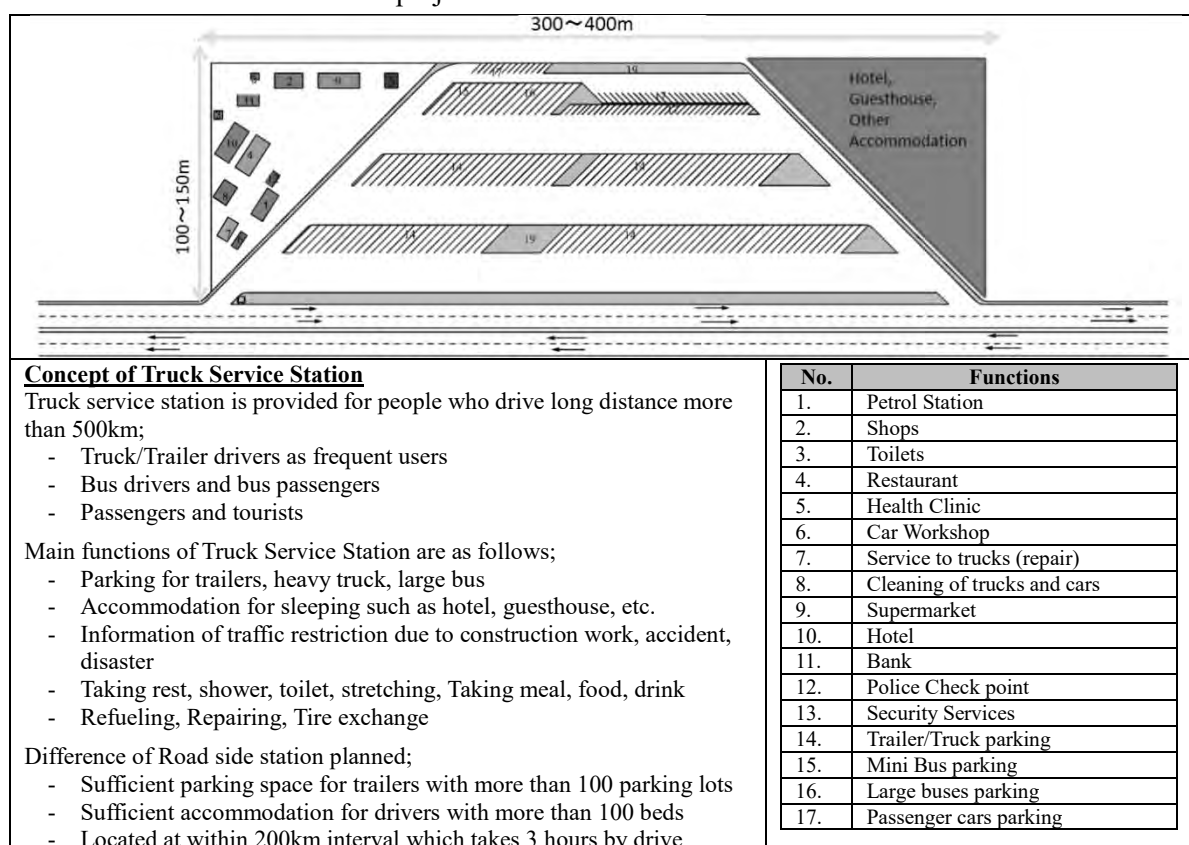
Source: JICA Study Team
Figure 5.3.22: Current Road Situation between Mombasa and Nairobi along Northern Corridor in Kenya

(b) Assigning Truck Service Stations along logistics highway

NEC is used by long distance drivers who frequently drive more than 500km. In Kenya there are many towns called transit town which provides accommodation, meal, refuel and so on. Furthermore, in Kenya and Uganda roadside station plan on NEC is made and began to implement the plan. This is similar to Michi-no-Eki project in Japan. These are planning to assign with an interval of about 50km and to provide a variety of services which are required by car drivers.

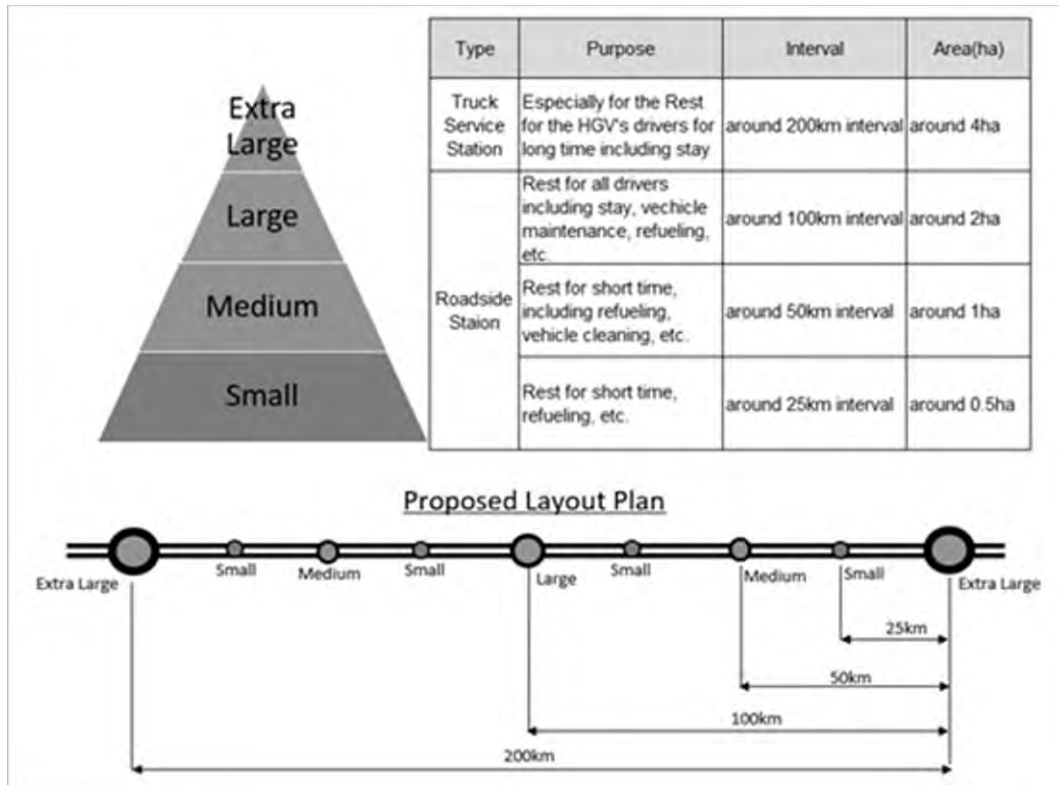
However, it can be required to facilitate sufficient large size parking lots for trailers and sufficient accommodation for long distance drivers. Such kind of facility is called as Truck station in Japan. It is different function from Mitchi-no-Eki project to aim providing information and encouraging local economy. There are 35 truck stations in Japan managed by Truck association.

Truck Service Station suggested here is to have enough large sized parking lots of more than 100 because more than 100 heavy goods vehicles for one direction are running in daytime on many sections of NEC. In addition, sufficient accommodation which is open 24 hours is provided for long distance drivers. Furthermore, traffic restriction information is provided to drivers before selecting a border to pass. These three functions are focused on in Truck Service Station project.



Source: JICA Study Team

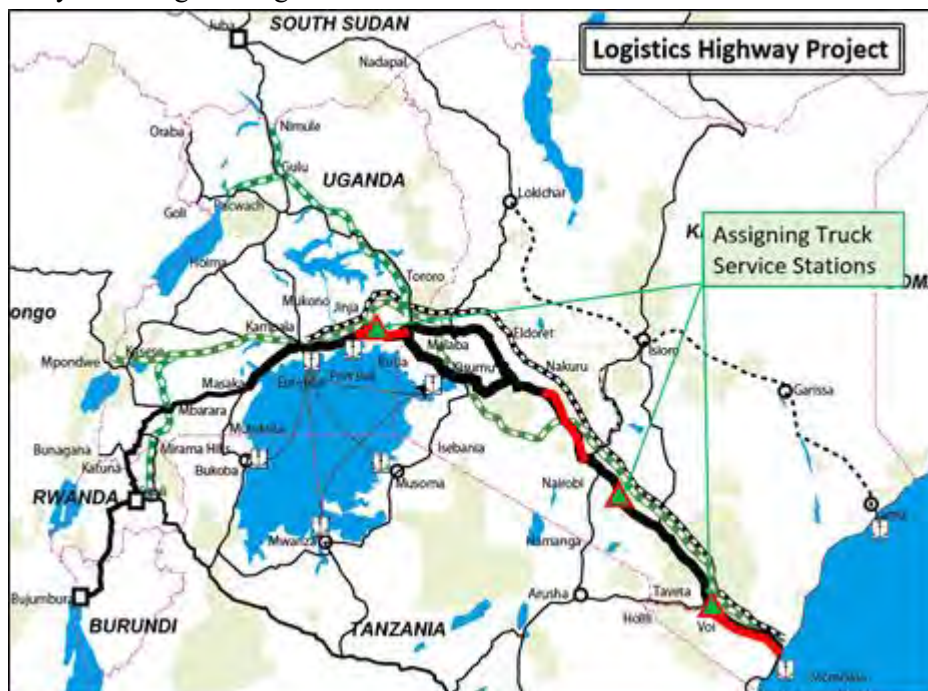
Figure 5.3.23: Image of Truck Service Station on NEC



Source: JICA Study Team

Figure 5.3.24: Image of Hierarchy of Road side station and Truck Service Station

Location of Truck Service Station is suggested as priority project for Voi and Emali in Kenya and Bugiri in Uganda.



Source: JICA Study Team

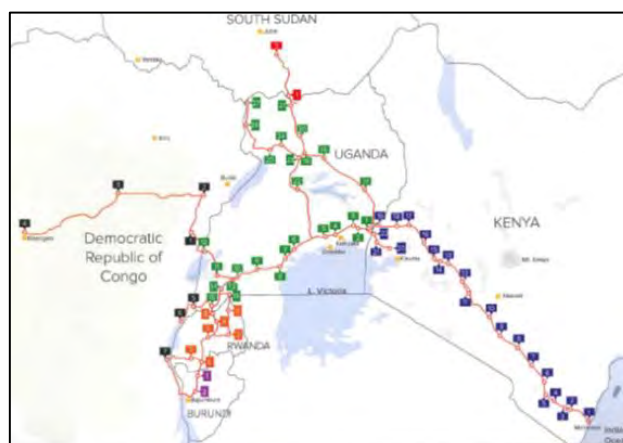
Figure 5.3.25: Location of Candidates for Truck Service Station

Table 5.3.18: Northern Corridor Road Side Stations

Country	Total	Size		
		Large	Medium	Small
Kenya	22	7	9	6
Uganda	27	7	12	8
Rwanda	7	0	3	4
DRC	7	3	4	0
Burundi	2	0	1	1
South Sudan	2	0	0	2
Total	67	17	29	21

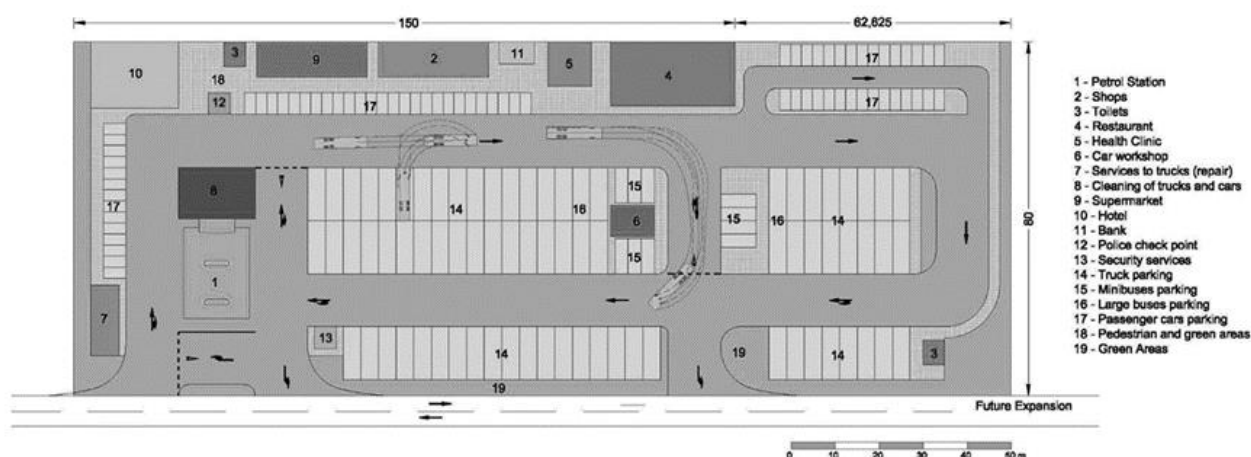
Note: Large size is about 2 ha. Medium size is less than 1ha base on layout plan shown in the plan document.

Source: Northern Corridor Roadside Stations, NCTTCA



Source: Roadside Stations Investor's Conference, 2015

Figure 5.3.26: Proposed Roadside Station

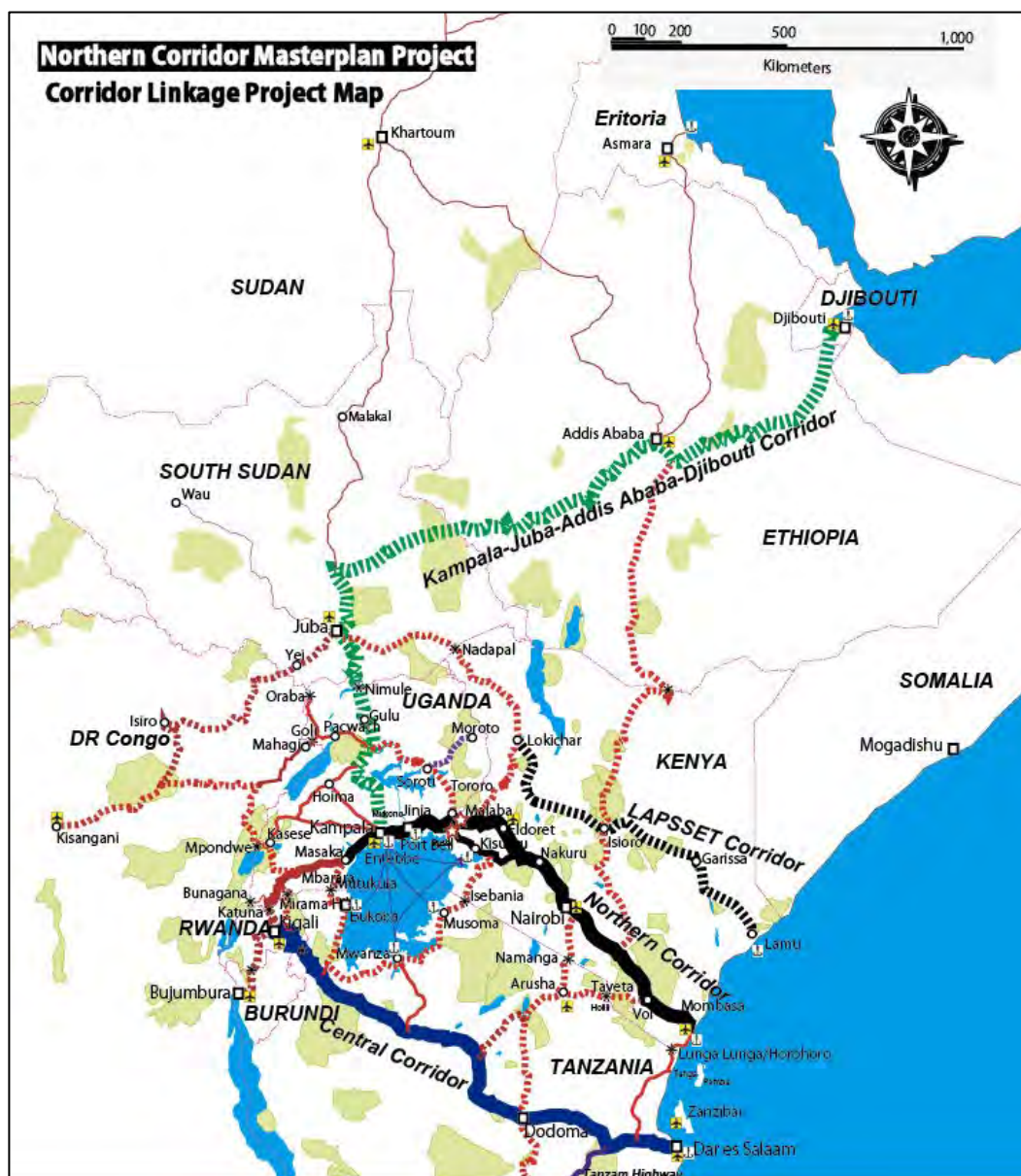


Source: Roadside Stations, NCTTCA

Figure 5.3.27: Proposed Roadside Station Layout (Large Type)

(c) Linking with other Corridors

Furthermore, in order to build a more effective international logistics road network in the East African Countries, the Northern Economic Corridor should be effectively connected with the Central Corridor, LAPSSET (The Lamu Port-Southern Sudan-Ethiopia Transport) Corridor and Kampala-Juba-Addis Ababa-Djibouti Corridor. To link the Northern Economic Corridor with these three other corridors, Lake Victoria Circular Road and Mt. Kilimanjaro Foothill Road should be examined as the useful link between the corridors.



Source: JICA Study Team

Figure 5.3.28: Linkage Northern Economic Corridor with Other Corridors

(3) Railway

A development strategy for the Base Case has several elements:

Short term:

- 1) Determine an operating format for the Mombasa-Nairobi SGR. This is one of the most important aspects of the SGR project. Worldwide experience shows that a well-constructed and consistently enforced contractual structure for operation and maintenance of railways is essential to success of the investment. Conversely, experience shows that a poorly constructed transaction and inconsistent government oversight often leads to failure of the effort.

Africa’s experience with private operation of formerly state owned railways has been disappointing. Some of the problems affecting freight railway restructuring initiatives include the following, according to a study done by the World Bank¹⁶.

- Overestimation of serviceable freight markets.
- Underestimation of investment needs.
- Undercapitalization of concessions [by private companies awarded the concessions].

Operating formats active around the world include:

- (A) The national government owns and operates the railway with government employees.
- (B) The national government retains ownership and operation of railway infrastructure (“below rail operations”) and contracts with a third party or parties for provision of train service (“above rail operation”).
- (C) The national government retains ownership of railway infrastructure and contracts with a third party or parties for operation and maintenance of the infrastructure and provision of train service.
- (D) Railway infrastructure is sold to a third party or provided on a long-term lease (e.g., 30+ years) with the third party responsible for all operations, maintenance and capital investments.

The table below outlines these basic operating formats:

Table 5.3.19: Cargo Railway Ownership and Operation Models

Model	Description	Examples	Advantages	Disadvantages
State ownership: State owned integrated railway	State owns and maintains all assets, operates the railway and employs railway personnel	Historical structure of most railways; Examples today: Indian Railways; China Railway Corporation; Transnet (South Africa)	State control creates opportunity to implement policies that support fair pricing and shipper access to railway transportation	Tendency for political interference in decision making; subject to state authorization of operating and maintenance funds; can be difficult to impose market pricing and efficient operations
State infrastructure management: State ownership and operation of infrastructure Private sector provides railway operations and maintenance of rolling stock and railway equipment	State owns and operates the infrastructure (ROW, track, signaling) Private sector entity or entities provide train service, maintain rolling stock and equipment and employ railway operating personnel	England; Australia interstate line; European Union	Maintains state ownership of an essential public asset; control of infrastructure allows fair access by operators; can create competition amongst several operators; private sector operators have potential to offer quality services that shippers utilize	Infrastructure maintenance and capital investment subject to budget appropriations; limits opportunity to implement social/economic policies; continuing state financial obligation to the railway
Concession: State ownership of infrastructure	State owns the infrastructure, concessions operation and maintenance to private sector entities	Mexico; Australian states; Kenya; Uganda	Maintains state ownership of an essential public asset; long term concessions have potential to attract private entities able to operate	Scope and length of concession can make it difficult to enforce performance; potential disagreement at end of

¹⁶ Railway Concessions in Sub-Saharan Africa: Lessons Learned

Model	Description	Examples	Advantages	Disadvantages
Private sector provides railway operations, operation and maintenance of infrastructure, maintenance of rolling stock and railway equipment	Private sector entity or entities provide train service, maintain infrastructure, rolling stock and railway equipment and employ railway personnel		efficiently and invest in the railway; potential to eliminate state's financial obligations to the railway; state ownership of infrastructure provides a mechanism to offer access to multiple operators, though a single operator is typically the holder of the Concession	Concession regarding compensation to private entities for investments made; limited opportunity to implement social/economic policy after Concession is executed
Private sector ownership	Private sector owns and maintains all assets including land, operates the railway and employs railway personnel	US; Canada	Maximizes operators' ability to manage capital investment with volume requirements; state has no legal financial obligations	Enforcement of regulations necessary to maintain equitable pricing

Source: JICA Study Team

Given the objectives for the SGR project:

- a) Achieve modal shift by switching cargo transportation from road to rail.
- b) Develop a world class transportation and logistics system.
- c) Promote regional development by creating regional hubs of production with superior logistics services.

The Study Team suggests Kenya and Uganda strongly consider the State Infrastructure Management and Concession models presented above. These approaches can bring the private sector's profit motivation to railway services and can be expected to create services that attract shippers allowing the private sector entities to make the on-going investments necessary to sustain effective railway services.

Important steps to implement these approaches include:

- a Choose and prioritize amongst sometimes conflicting objectives:
 - State operation of infrastructure access to maintain fair access and pricing.
 - Minimize state's on-going financial obligation and exposure.
 - Partially fund SGR project with upfront investment by private sector parties.
 - Realize the benefit of private sector operation and management.
- b Gather input from practitioners regarding the best approach for Kenya and Uganda. There are several ways to do this, including (i) visiting railway companies, (ii) an initial Expression of Interest (EOI) that requests railway operators to evaluate various operating models and (iii) bidders' conferences.
- c Understand the risks of each approach and design mechanisms to manage them:

Table 5.3.20: Expected Risk and Risk Management

Risk	Impact	Risk Management
Cargo traffic below expectations	Insufficient cash flow to support investment and repayment of debt taken on to acquire the railway operation	Government conservative when marketing the railway; engage outside railway expertise to evaluate bid submissions; require interested parties to develop forecasts of cargo traffic; contract terms to address shortfalls (e.g., traffic threshold requirements; additional cash support by investors); strong

Risk	Impact	Risk Management
		monitoring regime by government to identify problems early and attempt to develop solutions
Private investment below agreed amount and/or requirements	Degraded infrastructure and rolling stock leading to inadequate service and loss of market share	Government conservative/realistic assessment of railway's condition at time of contracting; include in contract investment and performance requirements, regular KPI reporting (e.g., infrastructure capital investment per ton-kilometer; kms of slow orders; locomotive availability; wagon availability by wagon type); require establishment of investment fund (or set aside portion of upfront payment for investment); strong, enforceable contract terms to address failure to make adequate investments
Private entities undercapitalized	Unable to withstand cash flow problems; potential indication of lack of commitment	Require bidders to indicate how new operating company would be capitalized (identify investors and amounts committed by each); confirm investments, and adequate local cash reserves at time of contract signing; contract terms requiring certain financial resources after a proposed cash distribution (i.e., cash distributions not permitted if certain financial metrics are below required thresholds after giving effect to the distribution)
Private operation and maintenance not sufficient to capture market share	Failure to achieve modal shift; damage to market's perception of railway	Proactively market opportunity to known world class operators; conduct an Expression of Interest (EOI) as first step in bidding process to identify experienced and successful railway operators; require that bid include statement of operating and marketing plans; monitor performance against operating and marketing plan and require documented plans to address performance issues and shipper concerns
Unsafe private operations	Injuries or fatalities to public and employees; increased operating expenses; damage to market's perception of railway	Confirm adequacy of railway safety regulations and government's ability to monitor and enforce the regulations; proactively market opportunity to known world class operators; conduct an EOI as first step in bidding process to identify experienced and successful railway operators; require that bid include statement of safety program and employee training program; monitor performance against safety and training programs and require documented plans to address problems
Private operator's abusive market practices	Unfair pricing for shipper's with limited modal options; damage to market's perception of railway	Confirm adequacy of competition regulations for regulating railway tariffs and government's ability to enforce them; process for multiple operators ("open access") even in Concession/long term lease scenario

Source: JICA Study Team

2) Obtain an operator for Mombasa-Nairobi

The SGR will be operated by CRBC, the Chinese contractor for five years since the opening year. After the following years of the five years, the process for choosing a private entity to operate and maintain the SGR system is as important as the contractual structure. The two most important objectives are to achieve participation from world class operators and to execute a fair and open selection process.

The status of railway cargo transportation in Kenya and Uganda may make it difficult to generate interest but the newly constructed SGR can be expected to attract participation. Advertising the opportunity in international railway and transportation publications, bidders' conferences and marketing trips could be considered. While possibly expensive, visits to operators will publicize the opportunity and should be helpful in gathering information on

general interest and views of how best to structure the transaction. As a final marketing step, and the first step in the bidding process, an EOI may be considered to determine the number and quality of interested parties. Invitations to participate in the EOI could be mailed directly to selected operators to insure they are aware of the opportunity.

Suggestions for executing a fair and open process that has potential to select an effective private operator are:

- a Create a government unit to manage and oversee the process. This could be the existing Project Coordination Unit and Project Management Unit.
 - b Establish the criteria and terms for a successful bid and the basis to choose a bidding party with which to proceed. This may reduce inappropriate influence on the decision.
 - c Engage an outside party to execute the bid: draft bid documents, receive responses, evaluate bids and present recommendations to the PCU/PMU and government agencies. This is typically an investment bank, accounting firm or railway consulting firm.
 - d Establish a calendar with deadlines for certain events (e.g., bidders' responses, evaluation of submissions, preliminary award of the contract). Work hard to stay on schedule.
 - e Document the process: record of mailings, dates submissions received, evaluation of responses and minutes of meetings that decided the preliminary award of the contract.
- 3) Implement SGR from Nairobi to Malaba and Malaba to Kampala

The SGR project is an opportunity to return railway to a meaningful option for transporting goods of all types on the NEC, reduce the overall cost of transportation for shippers and achieve modal shift by shifting truck movements to rail. The sooner the core system reaches Kisumu, Tororo, Jinja and Kampala the sooner the benefits of the SGR project will be realized.

- 4) Involve the private sector in railway investments

This could be major projects such as an ICD or terminal or smaller initiatives like leasing rail wagons and locomotives to the railways and shippers. Private companies are currently leasing tank containers capable of being loaded on rail and truck for transportation of edible oils and petroleum products. This is a relatively small-scale way to leverage the private sector and expand supply of essential railway equipment.

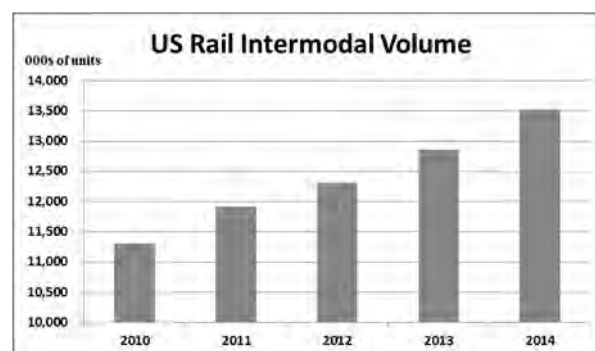
Medium term:

- 1) Implement SGR to Gulu, Pakwach and Nimule
-

2) Implement and operate the ICDs and railway yards identified.

Inland container depots and inland general cargo depots are used to connect two modes of transportation, rail and truck, barge and rail, barge and truck. The management of trucks moving in and out of the terminal, maintaining accurate control of containers and cargo received and forwarded, and achieving efficient operations that completes the modal transfers efficiently and minimizes time required are essential to creating a valuable ICD service.

The United States freight rail and trucking companies have developed one of the premier intermodal services in the world. Intermodal volume on US railroads increased by 6.4% annually from 2010-2014, with a record 13.5 million units transported in 2014. Intermodal growth is the result of heavy investment in port handling facilities, ICDs, locomotives and rolling stock, advanced signal systems, track and



Source: JICA Study Tea

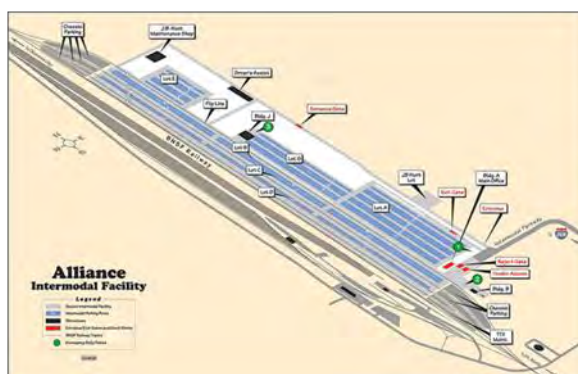
infrastructure. In 2014, intermodal accounted for 22% of railroad revenue, the largest single commodity group¹⁷. International traffic accounted for about 50%.

Innovations include automatic clearance of trucks entering terminal, electronic tracking of container position, and employment of technology to manage cargo movements and control container inventory and storage. BNSF, a large US railroad, moves over four million intermodal units (maritime containers and truck trailers) per year. The company operates 25 intermodal facilities throughout the western and Midwestern US including the Alliance Intermodal Terminal located in Dallas, Texas.

¹⁷ Rail Intermodal Keeps America Moving, Association of American Railroads, May 2015

Alliance Intermodal Terminal, Dallas Texas, United States

Alliance Intermodal Terminal is a major intermodal for BNSF railroad. The terminal handled over



387 acre facility (~155 hectares)
5 truck entry lanes; 2 truck exit lanes
23,920 ft. (7,290 meters) rail unloading/loading track
3,347 truck parking spots
7 cranes; 750,000 + annual lift capacity
7 days/week rail switching/unloading service
Centralized access/check in
24 hr. security; security fencing and barriers
Perimeter security lighting
Closed circuit security cameras
Proprietary inventory management system

Best Practices:

- Automated truck check in – truck enters entry portal; digital photo of tractor, chassis, and container numbers; driver scans thumb print and enters PIN #; receipt printed with shipment details and parking location.
- Truck turn around – entry, deliver inbound container, pick up outbound container, exit – average 30 minutes.
- Free shipper training on proper loading and securing of cargo.
- GPS tracking of containers in terminal.
- Load monitoring during transit.

Source: BNSF website

Figure 5.3.29: BNSF Alliance Intermodal Terminal

Rwanda awarded DP World a 25-year concession to develop and operate the Kigali Logistics Platform¹⁸. The first phase of development will cost an estimated US\$35 million and include the following:

- Located in Masaka area, approximately 17km from the Kigali CBD
- 90,000 m² site
- 12,000 m² container yard
- 19,600 m² of warehouse space; 640,000 tonnes storage
- 50,000 TEUs estimated annual capacity

The logistics center is expected to include space for freight forwarders, bonded warehousing, customs inspection and repair and maintenance facilities for trucks.

Rwanda envisions the logistics platform reducing the time to offload a truck so that trucks can make as many as five (5) deliveries from Mombasa as opposed to two (2) currently.

¹⁸ Announced on Rwanda government website, 16 January 2016 (http://www.minicom.gov.rw/index.php?id=24&tx_ttnews%5Btt_news%5D=1054&cHash=b4cc92f79f5889be2a450e55783d7b01) and by DP World in a press release dated 19 January 2016

3) Develop a plan for meter gauge and standard gauge side-by-side operations

Aside from the MGR maintaining a railway presence during construction of the SGR system it is possible that the MGR system could offer a competitive option to shippers. While MGR's performance has improved somewhat over the last twelve to eighteen months it appears the operator still struggles to make available sufficient locomotive and wagon capacity. The MGR infrastructure is also in poor condition, particularly west of Nairobi. One option is the railways compete head to head across the spectrum of commodities. However, as shown in the table below, SGR has a significant cost advantage versus MGR and will be able to establish tariffs that MGR may not be able to match.

Table 5.3.21: Estimated Cost and Tariff for SGR, MGR and Road Transport

	SGR	MGR	Truck
(US dollars)	(1)	(2014) (3)	(2014) (3)
Operating expense per ton-km (2)	0.0464	0.0643	0.3568
Revenue per ton-km	0.0580	0.0595	0.3757
Revenue per ton	43.13	NA	177.31
Tariff 40' container (Mombasa-Nairobi) (1)	398	1,350	1,915
Operating margin	20.0%	(8.1%)	5.0%
Origin-destination (hours/days) (2)			
Mombasa-Nairobi	132.1/5.5	208.8/8.7	172.8/7.2
Nairobi-Mombasa	85.2/3.6	184.8/7.7	148.8/6.2
Mombasa-Kampala	155.1/6.5	249.6/10.4	199.2/8.3
Kampala-Mombasa	99.3/4.1	242.4/10.1	228.0/9.5

Notes: (1) 2014 costs and 2025 estimated volume; (2) MGR as reported by Qalaa Holdings¹⁹; truck assumes expenses equal 95% of revenue; ton-kilometers assume 13.5 tons per 40' container and a 472 km transit Mombasa-Nairobi; (3) MGR and truck transit time information is for 2015

Source: JICA Study Team analysis and review of public documents

MGR's pricing is apparently more attractive than truck (though the MGR system lost money in 2014) but the origin-destination transit times are longer. More importantly shippers noted to the Study Team that their main issue with MGR is not transit time but operator's inability to maintain a consistent and predictable schedule. MGR will need to operate with consistent transit times (though not necessarily faster than truck) in order to grow its cargo volume. It will also need to reduce its operating costs and improve tariffs in comparison to SGR. This could be difficult especially in the early years of SGR operation when the operator is building market share.

A more productive approach may be to encourage each railway to focus on certain areas. This appears to be happening with SGR's prime access to the new container terminal. SGR as the dominant carrier in the container sector is appropriate because of SGR's ability to run longer trains at faster speeds, both critical in the intermodal container market. This could result in meter gauge having a slightly larger share in bulk sectors where consistency of

¹⁹ FY 2014 Business Review, Qalaa Holdings, 29 April 2015, revenue/ton-km page 26, expense per ton-km calculated based on figures in the document

service is more important than absolute transit time. This could make sense because many bulk rail loading facilities are in place for meter gauge. Duplicating facilities for SGR may be costly and inefficient. MGR will also continue to directly serve Nakuru and Eldoret and could be better positioned to compete for cargo destined to those areas.

For example, SGR would concentrate on moving 95-100 car block container trains from Mombasa to Nairobi and Kampala. As the SGR system is implemented SGR would transport containers to Kigali, Rwanda, Juba, South Sudan, and Kisangani, DRC. The initial service plan in 2020 is for the SGR to operate four (4) northbound container block trains per day from Mombasa to the Nairobi ICD. Each train will have approximately 95 wagons and carry approximately 288 TEUs. Three (3) southbound container trains from Nairobi to Mombasa will operate daily hauling 380 TEUs, primarily empty containers. An additional two (2) northbound and one (1) southbound train will transport general and bulk cargo. The general cargo trains will have approximately fifty (50) wagons. Northbound tonnage is expected to be approximately 3,798 tonnes and southbound 1,162 tonnes reflecting mostly empty wagons being returned to the port.

As Mombasa's throughput increases from 952,000 TEUs in 2014 (excluding transshipments) to an estimated 3,046,000 TEUs in 2030,²⁰ SGR service will expand to seven (7) container trains per day from Mombasa to Nairobi and six (6) trains per day from Nairobi to Mombasa. One to two of these trains will serve Kampala. Much of the increase at Mombasa will be driven by the new container terminal to which SGR will have close access.

SGR is expected to have a significant presence in bulk and general cargo traffic as well. The Study Team estimates in 2025 SGR will originate three (3) trains per day transporting an average of 3,800 tonnes of bulk and general cargo to Nairobi. These trains will also serve Kampala.

Additional sidings may be needed between Mombasa and Nairobi if SGR's share of Mombasa cargo transportation exceeds the Base Case estimate of 40%. If the Optimistic Case of 60% develops, an estimated eleven (11) container trains per day will be needed for cargo moving from Mombasa to Nairobi and nine (9) trains per day to Mombasa.

The meter gauge system, operated by RVR, with its existing access to bulk and general cargo shippers at Mombasa and its marshalling yard infrastructure designed to handle that cargo is in position to develop the non-container market while still participating in container transport. Currently RVR operates an unscheduled train service. In general, RVR does not

²⁰ Study Team's Base Case estimate

start a train, container or bulk/general cargo, before receiving cargo sufficient to build a train near full capacity. As RVR improves its equipment and track and overall volume increases, it is expected that RVR will publish a daily train schedule and adhere fairly closely to that schedule.

According to KPA, RVR currently operates one container train per day averaging 50-60 TEUs and 25 wagons (approximately two (2) 20' containers per wagon). The Base Case estimate indicates RVR will transport approximately 49,000 TEUs per year in 2025 (134 TEUs per day) imported through Mombasa. RVR can absorb the volume increase with one and one-half additional trains per day based on current locomotive and wagon capacities and transit times. However, RVR is improving its capacity and transit times and should comfortably handle the increase in container traffic and perhaps exceed the Base Case estimate.

- 4) Use policies and regulations to support the shift of cargo from
 - Improve enforcement of regulations on truck load weights - truck's tonnage capacity is lower than a single standard gauge railway wagon. Preventing overloading by truck operators will enhance SGR's tonnage capacity advantage. Enforcing truck load restrictions will also reduce wear and tear on road and improve road safety.
 - Consider increasing the fuel tax levy and tolls to fully recover the cost of road maintenance.
 - Consistently enforce truck safety regulations and inspection requirements.

Long term:

- 1) Invest in and maintain the standard gauge railway

The SGR will be operated by CRBC, the Chinese contractor for five years. Nevertheless, a weakness that sometimes occurs with large infrastructure projects is failure to maintain infrastructure and equipment during operation. It is expected that Kenya and Uganda will retain ownership of the SGR infrastructure and contract operations to a private company. As discussed above, the terms on which the contracts are let to private operators can have a large bearing on maintaining investment and the viability of the railway. The two countries should monitor closely the condition of the railway and ensure that sufficient time and expenditure is devoted to maintenance. If the structure adopted allocates infrastructure maintenance to the national governments efforts should be made to provide a stable source of funding for railway maintenance that is insulated to the greatest extent possible from the

politics affecting annual government budget appropriations. Continuation of the railway development levy is one option²¹. Allocating a stated portion of the fuel tax levy is another.

(4) Port

Mombasa port is expected to be one of hub ports in the world in the long term. If Mombasa port has a capacity to handle more than 3million TEUS per year, it is on the course. The following Mombasa Port Projects should be completed as below.

Table 5.3.22: Mombasa Port Projects

Short Term	Medium Term	Long Term
Berth No. 22 and 4 berths for general cargo at current lighter area will be added.	Berth No. 23 and 2 multi-purpose berths at Dongo Kundu area will be added.	Berth No. 24 will be added.
Construction of an access road (approx. 1.6km)		
Dredging works (dredging volume: approx. 3 million cubic meters)		
Construction of a new standard gauge railway linking Mombasa with Nairobi, Kampala and other hinterland destinations		
Construction of a southern by-pass for Mombasa linking the south to north coasts		

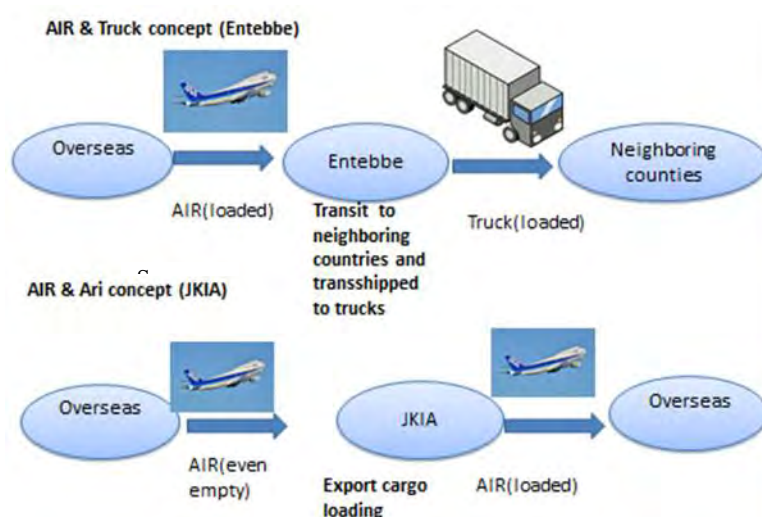
Source: JICA Study Team

(5) Airport

1) Jomo Kenyatta International Airport (JKIA)

In contrast with Mombasa port, Kenyan air cargo is export-oriented. JKIA handles approximately 4 times larger export volume than the import. The main export commodities are cut flowers and fresh fruits. Airlines try to attach and load export cargo to avoid empty carriage return. As a result, JKIA has the potential as the air cargo hub based on the large export potential. This emphasizes the concept of the JKIA becoming the African regional Air-Air hub.

In addition, development of air cargo facility is approaching to world standard. JKIA has already 5 cargo terminals which are already privatized. Users (air carriers) can choose cargo terminals depending on service standard and cost performance. The main



Source: JICA Study Team

Figure 5.3.31: Strategy for Entebbe Airport and JKIA

21 Railway Development Levy, Finance Act 2013, as amended

facilities in air cargo terminals are:

- Export and import warehouse facilities with temperature-controlled facilities;
- Rack management system with barcode inventory control installed in warehouse; and
- Security check is mandatory for exit/entry of facilities.

Above service standards meet world standard level and qualified cargo handling operation. Those facilities and services are absolute key factors to be an Air-Air cargo hub in this region and Africa.

2) Entebbe International Airport

Similar with JKIA, Entebbe Airport is export-oriented airport. However, the performance of handling volume remains only one-sixth of JKIA. The cargo handling volume shows significant progress due to the limitation of resources in the area around Lake Victoria. Cargo facilities of Entebbe are already outdated and accordingly the facilities should be rehabilitated in the new and planned airport development

Taking a look at current JKIA performance and non-modernized facilities of Entebbe Airport, Entebbe Airport should have another strategy. In fact, according to interview to Uganda Civil Aviation Authority in July 2015 Entebbe once tried to become regional cargo hub in past but failed. In order to promote differentiation with JIKA, Air & Truck service seems to be one idea.

Besides the air cargo facility development, border facilitation will have some advantage to realize Air & Truck service. DRC will be the target country, since DRC is not the member of East African Community (EAC) and it is difficult to adopt the EAC practice for border crossing. This shows that One Stop Border Post (OSBP) is not fully implemented for Uganda/DRC borders. Although DRC already adopts ASYCUDA system for customs clearance, their input language is still French and the conversion process is required. The benefit of Air & Truck service is speedy delivery and smooth border crossing is indispensable. Following issues should be considered

- Air cargo terminal development for speedy cargo transshipment from airplane;
- Good combination between forwarders' facility and air cargo terminal for speedy cargo transfer;
- Off dock forwarders facility development to implement speedy dispatch with qualified service (such as processing, sorting or inventory control);
- Qualified van type trucks installment for reliable transport service; and
- Border procedure facilitation for speedy delivery.

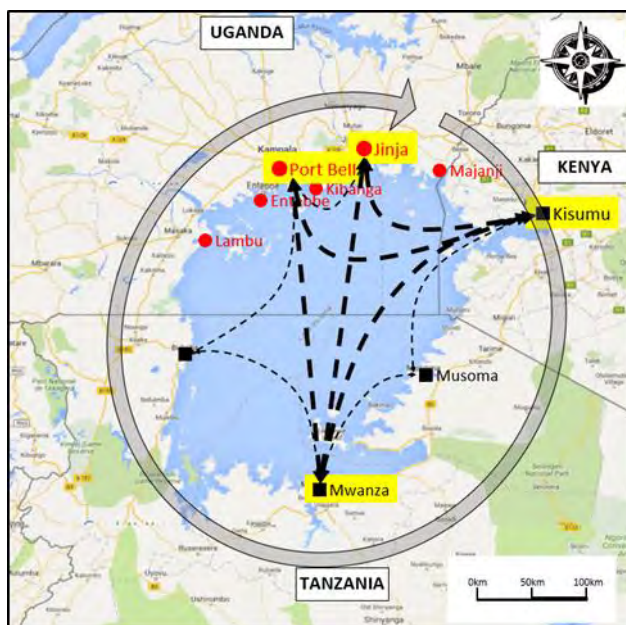
The investment cost for air cargo off dock facility is far less than the similar facilities for other transport mode (such as logistics hub). Financial risk will be small for private sectors.

(6) Waterway

Standard gauge railway has a possibility to activate railway network as a whole of cargo transport and passenger transport in East African Countries. Currently Rehabilitation of Port Bell is supported by World Bank and EU. Development of Mwambani port in Tanga, Musoma Port and New Kampala Port at Bukasa are said to be next projects. Bukasa Port development project as the new Port Bell Project was proposed by MOWT in the past. The project aimed to realize better port functions, expand port-area, and add not only wagon ferries but boats. In addition, a new industrial park is planned to be constructed near the port. Nevertheless, Lake Transport should be examined on how to revive it as railway link. From the view of cargo transport and tourist transport, several alternatives of strategies should be examined. For example, the following strategies can be examined

- Waterway in Lake Victoria should be used more by developing main inland marine ports in Uganda such as Jinja and Port bell. Jinja can be seen as a good place for cargo oriented port because it is located apart from road congested area of Kampala and is an appropriate place where bypass road and railway would be connected with the port in the future.
- Selection of the key line setting for cargo and tourists; The line between Kisumu in Kenya, Jinja and Port Bell in Uganda and Mwanza in Tanzania is definitely the key line for cargo and passengers because the four ports have a good connectivity with Meter Gaged Railway or Standard Gaged Railway in the future. Uganda, Kenya and Tanzania should collaborate to provide appropriate waterway service across the lake linking with railway and road. So-called this triangular or trapezoidal line is the most important line for cargo and passengers. Therefore, the four ports should be redeveloped as the main ports and improved to operate well as a railway transport.
- For Cargo transport, not only waterway but also road transport should be improved in the surrounding area of Lake Victoria. There are a variety of cargo demand in terms of origin and destination. From North West Tanzania around Lake Victoria to Kenya, most of destination of cargo is not Kisumu but Nairobi. If Lake Transport and road network are well connected, it will contribute to the regional economy around the lake more efficiently and effectively. Therefore, Lake Victoria Circulation Road should be developed in order to link Northern Economic Corridor and be well maintained in order to provide intermodal link with waterway.
- For Passenger transport including tourist transport, some ship lines should operate a service for Kisumu, Jinja, Port Bell, Bukoba, Mwanza and Musoma as a circulation line. This type of line can provide complementary services for road or bus service. Furthermore, this will be an attractive line for tourists like sea line tours.

- Based on the above issues relating to Lake Transport, strategic comprehensive transport planning for Lake Victoria should be established. Lake Victoria is located between Northern Corridor and Central corridor. The line between Port Bell in Uganda and Mwanza in Tanzania is on the Central Corridor. There are many arguments about what type of vessel should be provided as wagon ferry, truck ferry, boat or passenger car ferry and which port should be developed as priority project and so on. Therefore, it is a timing that strategic comprehensive transport planning for Lake Victoria will be studied by East African countries from a variety of views such as cargo, passenger and tourist transport, or promotion of trade, sightseeing and industrial development.

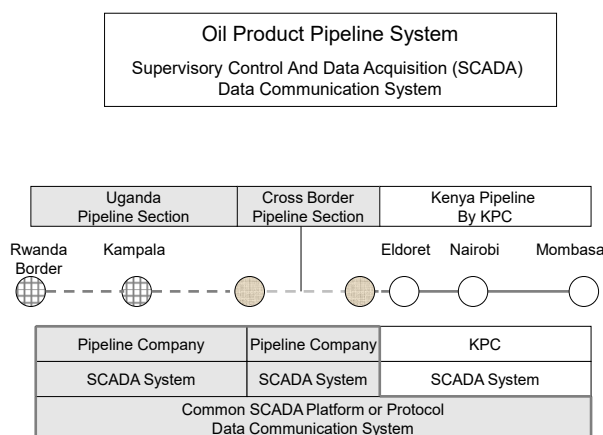


Source: JICA Study Team

Figure 5.3.32: Image of the Future Transport Network around Lake Victoria

(7) Oil Product Pipeline

In an operational point of view, SCADA (Supervisory Control and Data Acquisition) System should be operated on a common platform or protocol. SCADA will monitor and control pump stations as well as pipelines to minimize the loss and maintain the condition. Spare capacity of the SCADA System can be utilized to integrate the system and/or other purposes such includes custom clearance data at each country border needs to be delivered to /from Mombasa Port. Image of the structure is illustrated as follows:



Source: JICA Study Team

Figure 5.3.33: Structure Image of SCADA System

Each country has its own regulations, taxation and product pricing systems. In general, operation of international energy infrastructure including oil pipeline is based on Host Country Agreement between the operator and the government of the country where infrastructure is installed, under the protocol of Energy Charter Treaty.

Operation of Cross Border Pipeline is complex in terms of taxation at the border and also payment status required for custody transfer at the tank terminal. Volume of the product deposit at each tank terminal should be controlled to balance out the product shipment. In view of oil product marketer, pipeline operation must be reliable and custody transfer should be made in a timely manner. SCADA System plays very important role in the pipeline operation.

(8) Border Post

SCT full implementation allows for passing through borders only by a simple electrical seal reading and checking by systems at OSBP. In order to achieve this goal, infrastructure development (road, bridge and OSBP facilities at Kenyan side) is currently underway. After completion of these infrastructure, transit time will depend on the cargo volume expansion. Malaba border is the main branch point for several countries and therefore its congestion is a serious bottleneck for the whole EAC region.

In order to reduce the possibility of congestion, the following two interventions should be considered;

1) Establishing multiple lanes

The border is likely to become the bottleneck for smooth cross border transport even if various facilitation procedures have been promoted. It is a common practice in the world to set up multiple lanes at the border as they help in reducing congestion up to the time of full implementation of SCT.

2) Designated lanes for specific commodities/transporters (Fast lanes)

Dedicated lane (Fast lane) is another option for speedy border crossing for specified cargo/transporters. This will be an incentive for Authorized Economic Operators (AEO). Currently, petroleum represents approximately 20% of total goods at Malaba border crossing. A dedicated lane for petroleum will be beneficial for speeding up its border crossing and even for other commodities.



(Case1) Mongol/China (Zamin Und)

Source: JICA Study Team



(Case 2) Russia/Finland (Vaalima)

Figure 5.3.34: Multiple Lanes



(Case) Thailand/Laos (Savannakhet)

Source: JICA Study Team

Figure 5.3.35: Designated Lane (Fast Lane)

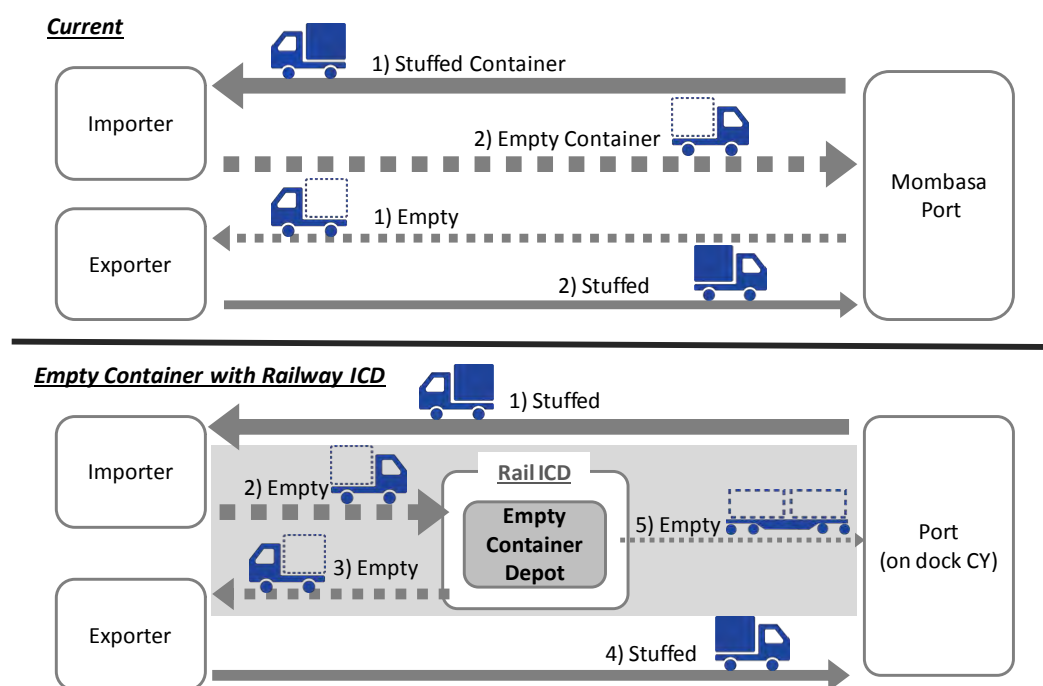
(9) Inland Depots

Short and Medium Term:

ICDs for rail/truck modal shift function are basically established; Kenya- at Nairobi (Embakasi), Uganda at Mukono. ICD can expand the possibility for empty container depot, realization of cheaper empty container delivery between mother ports. Considering the current situation that empty container is delivered from/to Mombasa, the cost reduction effect of empty container depot is remarkable. Eventually, empty container depot should be prioritized.

The container owners, such as shipping lines, have been negative for empty container depot mainly because of absolute low cargo volume (few attractions for business) and low quality inventory control (no-returning containers, uncertainty of identifying container location, unreliable return schedule, etc.). These facts are likely to cause lower container turnaround and loss of business profits for container owners. In this scenario, container owners are unlikely to establish their container depot inland.

It is ideal but unrealistic to carry stuffed container by railway at present, viewing from the customer's demand and railway capacity. On the contrary, empty container does not require high service standard as long as low transport cost is available. Unlike stuffed cargo demanding timely deliver, returning empty containers to main port is available only when the number of containers are collected to the degree where train service can be commissioned. This will be an effective method for reducing transport cost.



Source: JICA Study Team

Figure 5.3.36: Image of Empty Container Depot with Coloration of Railway

An empty container facility is so simple; only land area and a container handling equipment are required. The important issue is to get negotiation power with shipping lines in order to get nomination from them., Collaboration among stakeholders is required to match export/import in order to use the empty containers. In this context, public sector involvement seems necessary at initial stages to some degree until when export industry development is achieved.

Medium and Long term:

SCT plans to conduct customs clearance at port of entry. This means that the role of ICD is eliminated as the place of import customs clearance. Customs procedure is the important revenue resource for ICDs and therefore there has to be a change in business model to maintain the revenue. Already, ICD model change has been initiated to realize comprehensive logistics service. As the result, ICD will have modal shift/empty container depot function, inventory depot function, and inventory/warehouse-oriented service. Such “Logistics hub” concept is regarded as the ultimate goal for an advanced “ICD”.

“Logistics Hub” connects international to domestic “door” delivery through logics center. The total service menus are summarized d as following table.

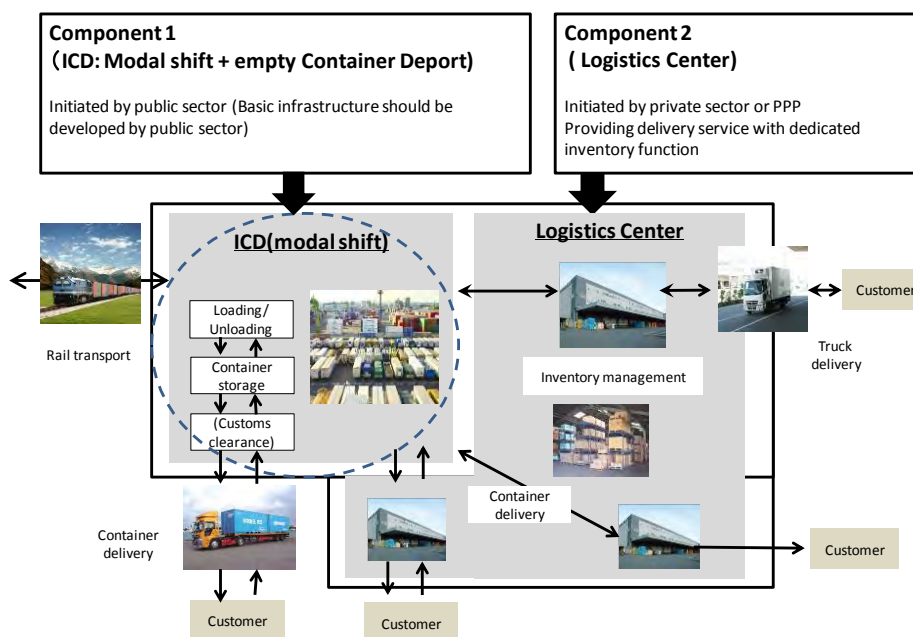
Table 5.3.23: Services of Logistics Hub

Functions	Detailed service	
Rail export and import	Scheduled delivery and its management	
	Loading/unloading	
	Customs clearance (not necessary)	
	Cargo receipt/dispatch	
	Transshipment	
	LCL service	
	Consolidation	
Truck export and import	Truck arrival and dispatch	
	Loading/unloading	
	Scheduled delivery and its management	
Container depot	Empty van depot	
	Stuffed container yard (depot)	
	Container arrival/dispatch	
	Inventory control for empty van	
	Returning empty container to origin port	
Multimodal	Modal sift	
	Tracing the operation	
	Document arrangement upon transferring modes	
Inventory	Inbound	Smooth and short transit cargo receipt
		Scheduled pick-up planning and implementation
		Scheduled truck operation for cargo pick up
		Route planning for efficient route operation
		Quantity and item check upon cargo receipt
	Warehouse	Inventory control and management
		Speedy picking and packing
		Sorting
		Accurate and quick picking
		Order picking
		Re-packing
		Quick dispatch
		Schedule controlling
		Processing
		VMI (Vendor Management Inventory)
Cross-dock		
Package material control		
Return cargo inventory and shipment		
Delivery	Outbound	Just In Time (JIT) delivery
		Returnable package pick-up
		Scheduling and planning delivery route/operation

Note: Block capital indicate target operation for ICD and normal capital for logistics center.

Source: JICA Study Team

The respectable component/role of “Logistics Hub” image representation is illustrated as follows;



Source: JICA Study Team

Figure 5.3.37: Services of Logistics Hub

Although respective logistics hubs have their own roles, all logistics hubs have two common functions; one is Inland Container Depot (ICD) function for modal shift and empty container depot service as far as SGR extension is expected, and the second is logistics center function which focuses on inventory and delivery service whose catchment area is set up approximately 200km in order to achieve one-day delivery. Principally, customs clearance function for ICD will not be required due to the EAC principal that custom procedure is basically conducted at the port of entry. This principal will be also adopted for railway. If railway/truck cargo is expected to transport under the transit status, warehouse regime at logistic center is applicable for custom clearance at logistics hubs. SCT does not necessarily avoid the transit procedure regime; it is simultaneously available with direct import pattern which conducts customs clearance at port of entry.

However, Mombasa's role of logistic hub is different with other inland logistics hub. Mombasa is the gateway not only for Kenya and but also for whole EAC region. Mombasa's major role for EAC region is to release cargo immediately. Current distribution function covering Nairobi or other areas should shift to respective logistics hubs, and current distribution function should be limited for only Mombasa area. Additionally, in order to promote export competitiveness, it is important role for Mombasa to facilitate export cargo and port operation in order to achieve shorter CY cut off time.

The characteristics of respective logistic hubs are taken into account as follows:

1) Nairobi

Nairobi should strengthen current ICD function as well as logistics center function. Logistics center function will be benefit for the region with high potential for consumer activities. Additionally, this area will be focal industrial area with export potential. Export function should be promoted by collaborating empty container functions to be provided by ICD.

2) Kisumu

There is large agricultural production area for export. Therefore, a large portion of the products will be delivered and stuffed in containers at Mombasa port. In the case of tea, Mombasa has an auction function and therefore the container stuffing has been implemented at Mombasa area after the auction. If container stuffing is available in local area, ICD can provide cheaper export cost using empty container stored at ICD. In collaboration with empty container depot function and distribution center function for cargo accumulation, agricultural goods export should be promoted.

3) Tororo

Similar with Kisumu, there is large agricultural production area for export. Therefore, a large portion of the products will be delivered and stuffed in containers at Mombasa port. If container stuffing is available in local area, ICD can provide cheaper export cost by collaborating with empty container depot function and distribution center function for cargo accumulation.

4) Kampala/Jinja

Kampala/Jinja logistics hub should strengthen current Mukono ICD function. Currently, Mukono ICD does have neither enough empty container depot area nor logistics center area. Those developments will be benefit for the region with high potential for consumer activities. In terms of export, this area produces agricultural product for export. If container stuffing is available in this area, agricultural goods export should be promoted.

5) Juba and Mbarara

Those two ICDs should expand their logistics center function beyond the border, targeting not only local but also neighboring counties due to the geographic advantage. The logistic center should provide accurate inventory control and reliable/time dedicated delivery.

The above characteristics of respective logistic hubs are summarized below.

Table 5.3.24: Target of Logistics Hub Service

	ICD function	Logistics center	Additional target
Mombasa	Smooth cargo release	Regional distribution center Warehouse regime for transit railway cargo	Shortening CY cut off time
Nairobi	Modal shift function Empty container depot function	Regional distribution center Warehouse regime for transit railway cargo	Promotion export for industrial goods
Kisumu	Modal shift function Empty container depot function	Regional distribution center Warehouse regime for transit railway cargo	Agricultural goods export promotion
Tororo	Modal shift function Empty container depot function	Regional distribution center Warehouse regime for transit railway cargo	Agricultural goods export promotion
Kampala (Mukono)	Modal shift function Empty container depot function	Regional distribution center Warehouse regime for transit railway cargo	Agricultural goods export promotion
Juba	Modal shift function Empty container depot function	Regional distribution center Warehouse regime for transit railway cargo	Targeting South Sudan distribution
Mbarara	Modal shift function Empty container depot function	Regional distribution center Warehouse regime for transit railway cargo	Targeting DRC distribution

Source: JICA Study Team

5.3.4 Suggested Projects/Programs and Implementation Plan

(1) Road

Logistics Highway Project is the key project suggested by JICA Study team as shown in Table 5.3.24.

Table 5.3.25: Suggested Priority Road Projects

Name of Project/Program	Location	Executing Agency	Project/Program Description	Project/Program Status	Mode of Execution	Term	Cost (Million USD)
Logistics Highway Project (Mariakani-Voi, L=121km)	Mariakani-Voi	Ministry of Transport and Infrastructure / KeNHA	Widening from 2 lanes to 4 lanes of existing Mombasa Road between Mariakani and Voi (approx. 121km)	Planning	Government	Medium/Long Term	277.0
Logistics Highway Project (Nairobi-Nakuru, L=136km)	Nairobi-Nakuru	Ministry of Transport and Infrastructure / KeNHA	Widening from 2 lanes to 6 lanes of existing Mombasa Road between Nairobi and Nakuru. (approx. 136km)	Planning	Government	Medium/Long Term	415.0
Construction of Truck Service Station in Kenya	Voi, Emali (Kenya)	Ministry of Transport and Infrastructure / KeNHA	Installation of 2 roadside service station in Kenya	Planning	PPP	Medium Tem	9.8
Construction of Truck Service Station in Uganda	Bugiri, Masaka (Uganda)	Ministry of Works and Transport / UNRA	Installation of 2 roadside service station in Uganda	Planning	PPP	Medium Tem	9.8
Logistics Highway Project (Mpigi-Masaka L=93km)	Mpigi-Masaka (Uganda)	Ministry of Works and Transport / UNRA	Widening from 2 lanes to 4 lanes of existing Northern Corridor in Uganda	Planning	Government	after year 2030	213.0
Logistics Highway Project (Masaka-Mbarara, L=136km)	Masaka-Mbarara (Uganda)	Ministry of Works and Transport / UNRA	Widening from 2 lanes to 4 lanes of existing Northern Corridor in Uganda	Planning	Government	after year 2030	311.6

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Name of Project/Program	Location	Executing Agency	Project/Program Description	Project/Program Status	Mode of Execution	Term	Cost (Million USD)
Logistics Highway Project (Mbarara-Kabale, L=141km)	Mbarara-Kabale (Uganda)	Ministry of Works and Transport / UNRA	Widening from 2 lanes to 4 lanes of existing Northern Corridor in Uganda	Planning	Government	after year 2030	323.0
Logistics Highway Project (Kabale-Katuna, L=25km)	Kabale-Katuna (Uganda)	Ministry of Works and Transport / UNRA	Widening from 2 lanes to 4 lanes of existing Northern Corridor in Uganda	Planning	Government	after year 2030	57.3
Lapsset Corridor Linkage Project	Makuyu-Moyale (Kenya)	Ministry of Transport and Infrastructure / KeNHA	Road improvement of existing 2 lanes between Makuyu and Moyale (Ethiopia border) L=700km	Planning	Government	after year 2030	798.0
Road Improvement Project (Soroti-Moroto)	Soroti-Moroto (Uganda)	Ministry of Works and Transport / UNRA	Road improvement of existing 2 lanes between Soroti and Moroto L=170km	Planning	Government	Medium/ Long Term	194.0
Logistics Highway Project (Nairobi-Voi, L=300km)	Athi River-Voi (Kenya)	Ministry of Transport and Infrastructure / KeNHA	Widening from 2 lanes to 4 lanes of existing Northern Corridor in Kenya	Planning	Government	after year 2030	687.3
Logistics Highway Project (Nakuru-Malaba, L=280km)	Nakuru-Malaba (Kenya)	Ministry of Transport and Infrastructure / KeNHA	Widening from 2 lanes to 4 lanes of existing Northern Corridor in Kenya	Planning	Government	after year 2030	641.5
Logistics Highway Project (Jinja-Junction of Malaba/Busia, L=130km)	Jinja-Malaba (Uganda)	Ministry of Works and Transport / UNRA	Widening from 2 lanes to 4 lanes of existing Northern Corridor in Uganda	Planning	Government	Long Term	297.8
Road Improvement Project Voi-Taveta (L=90km)	Voi-Taveta (Kenya)	Ministry of Transport and Infrastructure / KeNHA	Road Improvement of existing road	Construction On-going	Government	Short term	97.0 (AfDB)
Road Improvement Project (Athi river-Namanga: L=135km)	Athi river-Namanga (Kenya)	Ministry of Transport and Infrastructure / KeNHA	Road Improvement of existing road	Construction On-going	Government	Short term	93.1 (AfDB)
Lake Victoria Circular Road Project (Kisumu-Isebania: L=240km)	Busia-Kisumu-Isebania (Kenya)	Ministry of Transport and Infrastructure / KeNHA	Road Improvement of existing road	Planning	Government	after year 2030	390.0
Lake Victoria Circular Road Project Masaka-Mutukula: L=90km)	Masaka-Mutukula (Uganda)	Ministry of Works and Transport / UNRA	Road Improvement of existing road	Planning	Government	Medium/ Long Term	100.0

Source: JICA Study Team

(2) Railway

The SGR investments in railway infrastructure, rolling stock and equipment, ICDs and maintenance depots are all important for achieving the vision for the Northern Economic Corridor. However, implementation of certain key projects would likely achieve a majority of the modal shift and economic development envisioned for the NEC.

Table 5.3.26: Suggested Priority Railway Investment Projects

SGR Project	Description	Estimated Completion	Estimated Cost (USD billions) ²²	Status
Mombasa-Nairobi	472 km standard gauge line, locomotives, wagons	2017	3.6	Completion June 2017
Nairobi-Longonot-Narok-Bomet-Sondu-Ahero-Kisumu-Yala-Mumias-Malaba	485 km standard gauge line	2021	5.9	EPC contract and financing discussions in progress; to be constructed in phases
Kampala-Tororo-Malaba	237 km standard gauge line, locomotives, wagons	2019	2.2	EPC contract awarded
Embakasi ICD (Nairobi)	Service for container imports terminating in Nairobi and container exports going on rail in Nairobi	2016	0.3	To be part of an extension of the existing MGR ICD
Nairobi marshalling yard	Service for imported non-container cargo terminating at Nairobi; non-container exports originating in Nairobi; container and non-container import and export cargo terminating or originating west of Nairobi	2017	0.3	Included in Mombasa-Nairobi EPC
Nairobi rolling stock and railway equipment maintenance depots	Primary maintenance facility for SGR rolling stock and railway equipment; locomotive fueling	2017	0.1	Included in Mombasa-Nairobi EPC
Mombasa marshalling yard for new container terminal	Service for inbound and outbound container traffic at new terminal and existing berths 16-19	2017	1.0	
Mombasa marshalling yard for non-containerized cargo	Service for Mombasa Port other than container berths	2017	0.3	Included in Mombasa-Nairobi EPC
Mombasa rolling stock maintenance facility	Minor maintenance, possibly locomotive fueling	2017	0.1	Included in Mombasa-Nairobi EPC
Malaba marshalling yard	Customs inspections	2021	25	Small yard for customs inspections
Kampala marshalling yard and inland terminal	Service for Kampala area cargo; currently planned to be located in the area of Kampala Industrial Park (Namanve); interim distribution point for Tororo, Jinja, Gulu, Pakwach, Juba, Kigali and DRC	2019	0.3	FS complete
Kampala rolling stock and railway equipment maintenance depot	Primary maintenance facility for SGR rolling stock and railway equipment; locomotive fueling	2019	0.3	FS in progress
Tororo marshalling yard and inland terminal	Service for Malaba area cargo; loading and unloading point for container cargo; customs clearance for bonded cargo	2019	25.0	FS in progress
Gulu marshalling yard and inland terminal	Service for Gulu area cargo; loading and unloading point for container cargo; customs clearance for bonded cargo; interim transload site for Pakwach and Nimule	2022	25.0	FS in progress
Tororo-Soroti	New standard gauge rail line; not known if procurement of locomotives, freight wagons, and other railway equipment is expected to be part of the project	2019	0.7	FS complete
Soroti-Gulu	New standard gauge rail line; not known if procurement of locomotives, freight wagons, and other railway equipment is expected to be part of the project	2022	1.6	FS complete

Source: JICA Study Team

²² All costs estimated based on published information and JICA Study Team discussions with government agencies

(3) Port

Mombasa port is expected to be one of hub ports in the world in the long term. If Mombasa port has a capacity to handle more than 3million TEUS per year, it is on the course. The following Mombasa Port Projects should be completed in short or medium term.

- Construction of the Second Container Terminal (depth: 15m and 11m; berth ×.2)
- Construction of an access road (approx. 1.6km)
- Dredging works (dredging volume: approx. 3 million cubic meters)
- Construction of a new standard gauge railway linking Mombasa with Nairobi, Kampala and other hinterland destinations
- Construction of a southern by-pass for Mombasa linking the south to north coasts

Because Mombasa Port Master Plan has just finished in 2015, several projects are suggested as shown below.

Table 5.3.27: Suggested Projects by Mombasa Master Plan and Ongoing Projects

Sector	Location	Executing Agency	Project/Program Description	Project/Program Status	Mode of Execution	Term	Cost (Million USD)
Port	Mombasa, Kenya	KPA	Relocation of Kipevu Oil Terminal	Pre-qualification Tender stage	PPP / EPC	Short Term	200.0
Port	Mombasa, Kenya	KPA	Mombasa Port Development Project (2nd Terminal Kipevu West)- 2nd & 3rd Phases	2nd Phase – On going	Government	Short/Medium/Long Term	800.0
Port	Mombasa, Kenya	KPA	Deepening and Straightening of Berth 1-5 for General Cargo	Master Plan	PPP / EPC	Medium Term	115.0
Port	Mombasa, Kenya	KPA	Deepening and Straightening of Berth 6-10 to Accommodate one Panamax and one post Panamax Vessels	Master Plan	PPP / EPC	Medium Term	76.0
Port	Mombasa, Kenya	KPA	Conversion of Berths 11 - 15 into Container Berths	Master Plan	PPP / EPC	Medium/Long Term	200.0
Port	Mombasa, Kenya	KPA	Development of Lighter Wharf Including G-Section to create capacity - (i) Lighter Wharf; (ii) G-Section	Master Plan	PPP / EPC	Long Term	70.0
Port	Mombasa, Kenya	KPA	Phase 2 of Dredging – to create access to Dongo Kundu for development of free port and Special Economic Zone	Master Plan	Government	Medium/Long Term	150.0
Port	Mombasa, Kenya	KPA	Development of modern Cruise Terminal	Master Plan	PPP / EPC	Short Term	2.0
Port	Mombasa, Kenya	KPA	Phase 2 of Dredging – to create access to Dongo Kundu for development of free port and Special Economic Zone	Master Plan	Government	Medium/Long Term	150.0
Port	Mombasa, Kenya	KPA	Dongo Kundu SEZ – ports (2 Berths)	Master Plan	Government	Medium/Long Term	TBD
Port	Lamu, Kenya	KPA	Container Berth; construction of First 3 Berths No.1-3	Ongoing; Berth No. 1-3 to be completed in 2019	PPP	Short Term	450.0

Source: KPA

(4) Airport

Capacity expansion projects for Jomo Kenyatta International Airport, Eldoret International Airport and Entebbe International Airports are ongoing as shown below.

Table 5.3.28: Ongoing Projects and Others

Sector	Location	Executing Agency	Project/Program Description	Project/Program Status	Mode of Execution	Term	Cost (Million US\$)
Airport	Jomo Kenyatta International Airport	CAA	To increase capacity of JKIA from 6 million passengers per year to 18.5 million passengers per year. Phase one on the GFT will handle 12.7 million passenger capacity per annum	On going	PPP	Short Term	55.6
Airport	Eldoret International Airport	CAA	To expand runway and cargo handling facilities (runway expansion from 3.5km to 4.3km)	On going	PPP	Short Term	19.7 (Ksh. 2 billion)
Airport	Entebbe International Airport	UAA	Terminal Expansion Phase I, Cargo area construction (phase I), Domestic Terminal construction and others	On going	PPP	Short term	201.6
	Entebbe International Airport	UAA	Fuel Farm Construction and others	Planning	PPP	Medium Term	67.5
	Entebbe International Airport	UAA	Terminal Expansion Phase II, Cargo area construction (phase II), MRO area, for A380 and Multistory car park construction and others	Planning	PPP	Long Term	160.6

Source: JICA Study Team

(5) Waterway

Inland waterway transport project at Lake Victoria in Kenya, Uganda and Tanzania (Rehabilitation of 3-6 ports, introducing of new freight vessels) are on the planning stage.

Table 5.3.29: Projects at the Planning Stage

Sector	Location	Executing Agency	Project/Program Description	Project/Program Status	Mode of Execution	Term	Cost (Million US\$)
Inland Water Transport	Lake Victoria	Lake Victoria Basin Commission (LVBC)	Rehabilitation of 3-6 ports and introducing a fleet of modern and purpose built freight vessels	Planning	PPP	Short Term	133.6

Source: JICA Study Team

(6) Oil Product Pipeline

The following two projects are suggested to be implemented.

- Oil Product Pipeline

As stated, oil product pipeline should be managed by an independent entity formulated under PPP scheme and operated in line with the spirit of EAC. Role of the Cross Border Oil Product pipeline system should be confirmed through a separate Feasibility Study. This study will provide ideas and solutions to solve the issues over the international pipeline system and to facilitate the construction and extension of other energy infrastructure in the EAC member nations.

- SCADA for Pipeline and Telecommunication

Volume of communication traffic is increasing rapidly and stability of the data communication is demanded. SCADA system is operated using fiber optics installed along the pipeline system. In general, SCADA system has a larger capacity than what required for operating the pipeline. This spare capacity can be utilized for a telecommunication. Use of Pipeline ROW for telecommunication can be ideal in view of security, maintenance, and easy expansion.

Table 5.3.30: Suggested Priority Oil Product Pipeline and Telecommunication Projects

No.	Name of Project/Program	Sector	Location	Executing Agency	Project/Program Description	Project/Program Status	Mode of Execution	Term	Cost
1	Telecommunication and SCADA System	ICT	Kenya, Uganda, Rwanda	Government of Kenya, Uganda and Rwanda	Large capacity communication system from Mombasa to Kigali, along side of oil product pipeline. Cross border information such includes custom clearance data at each border to be transmitted to/from Mombasa Port.	FS	PPP	Short Term	Minor investment if constructed together with pipeline
2	Oil Product Pipeline from Mombasa to Kigali	Oil and Gas	Kenya, Uganda, Rwanda	Government of Kenya, Uganda and Rwanda	The Project is to review existing oil terminal in Mombasa Port and existing pipeline system by KPC, and review current feasibility studies on refinery and tailing product pipeline to Kampala carried out by the government of Uganda, and all the facilities are required to be optimized in the FS. The product pipeline is also extended to Kigali Rwanda where NEC and Central Economic Corridor meets.	FS	PPP	Short Term, and Middle Term for Mombasa Oil Terminal Relocation if economically justified	Mombasa Oil Terminal Relocation if economically justified, Eldoret - Kampala 325 km, USD 230 million, Kampala-Kigali 450 km, USD 350 million

Source: JICA Study Team

(7) Boarder Post

After completion of OSBPs, multi-lanes access projects at both Malaba and Busia are suggested.

Table 5.3.31: Suggested Priority Boarder Post Projects

Sector	Location	Executing Agency	Project/Program Description	Project/Program Status	Mode of Execution	Term	Cost (Million US\$)
Border Post	Malaba (KE/UG border)	Ministry of Transport & Infrastructure/KeNHA (KE), Ministry of Works & Transport, UNRA (UG)	Construction of Multi-lanes access to Malaba OSBP	Planning	Government	Long Term	US\$ 2 Million
Border Post	Busia (KE/UG border)	Ministry of Transport & Infrastructure/KeNHA (KE), Ministry of Works & Transport, UNRA (UG)	Construction of Multi-lanes access to Busia OSBP	Planning	Government	Long Term	US\$ 2 Million

Source: JICA Study Team

(8) Inland Depot

While Mombasa logistic hub should focus on regional distribution center, the remaining logistics hub should have combined function with ICD and distribution center.

Following assumptions are set up for calculating scale and cost for logistic hubs,

- ICD function:
All railway cargo is utilized and 30 % of trucks are attached with 20% allowance (3 days stock)
- Empty container facilities:
 - 4 stacks and 50% of export container are delivered with 14 days
 - 30% of rail cargo and trucks will use the distribution center
 - Inbound daily turn-around time is 4 with 30% allowance
 - 5 stories storage and 20 days' inventory are considered with 20 % allowance
 - Daily 4 times inbound/outbound operation with temporary storage

The required area and the cost are estimated as follows:

Table 5.3.32: Logistics Hub Scale

	ICD					Logistics Center				
	ICD (m ²)	Empty container area (m ²)	Total area (m ²)	Cost (Million USD)		Truck berth area (m ²)	Storage (m ²)	In/out operation area (m ²)	Total area (m ²)	Cost (Million USD)
Mombasa					Mombasa	1,393	20,904	4,288	26,585	2.5
Nairobi	83,312	30,596	113,909	10.6	Nairobi	12,957	203,046	12,495	228,498	107.5
Kisumu	47,092	19,792	66,884	6.2	Kisumu	10,970	91,912	5,656	108,538	49.1
Tororo	16,097	3,106	19,204	1.8	Tororo	2,448	32,663	1,508	36,619	17.1
Kampala	54,653	23,331	77,984	7.3	Kampala	5,915	75,439	3,482	84,837	39.5
Mbarara	2,992	4,470	7,463	0.7	Mbarara	469	6,336	292	7,097	3.3
Gulu	41,652	4,570	46,222	4.3	Gulu	5,194	41,840	1,931	48,965	22.1

Source: JICA Study team

Based on the estimated cost and scale above, ICD development projects are suggested as following table:

Table 5.3.33: Suggested Logistics Service Projects

Sector	Location	Executing Agency	Project/Program Description	Project/Program Status	Mode of Execution	Term	Cost (Million US\$)
Inland Depot	Mombasa, Kenya	Government/PPP	27,000 m ² distribution center	Not considered	Government/PPP	Short/Medium	2.5
	Nairobi, Kenya	Government/PPP	340,000 m ² logistics hub	Distribution center is not developed	Government/PPP	Short/Medium	118.1
	Kisumu, Kenya	Government/PPP	175,000 m ² logistics hub	Not developed	Government/PPP	Medium	55.3
	Tororo, Uganda	Government/PPP	56,000 m ² logistics hub	Under consideration	Government/PPP	Long Term	18.9
	Kampala, Uganda	Government/PPP	163,000 m ² logistics hub	Railway terminal for MGR is completed	Government/PPP	Short/Medium	46.7
	Mbarara, Uganda	Government/PPP	14,000 m ² logistics hub	Not considered	Government/PPP	Long Term	4.0
	Gulu, Uganda	Government/PPP	95,000 m ² logistics hub	Trade hub concept was proposed by TradeMark	Government/PPP	Long Term	26.4

Source: JICA Study Team

5.4 Logistics Service Improvement

5.4.1 Review of SCT scheme

(1) Import from overseas

The procedure for cargo movement under Single Custom Territory (SCT) scheme is regulated by “SCT procedural manual” issued by EAC secretariat as at July 2014. According to this procedure, import from overseas is facilitated as follows:

- Import customs clearance is conducted at port of entry through joint verification with customs officials of port entry and cargo destination countries
- After duty payment, declaration process can be started
- Cargo movement is traced by Electrical seal while on transit
- Red channel cargo (physical inspection required cargo) are moved to Container Freight Station (CFS)
- Border checks involves only electrical seal data check in order to confirm cargo status,

Those actions will lead to the following significant effects;

- There will be increased workload at the port of Mombasa. This is because all declaration procedures are handled at port of entry. Data transaction between the port and destination countries becomes larger.
- Transit procedure basically becomes unnecessary due to the fact that import custom clearance process is implemented at the port. However, the issue of transit transport rule for bonded storage or bonded warehouse regimes still remains.
- Attaching CFS to Green channel (no inspection required) cargo is unnecessary
- The role of Inland Container Depot (ICD) will be reduced as the place for customs clearance service. Under the SCT scheme, import customs clearance becomes unnecessary at the destination.

(2) Export to Overseas

Export procedure is facilitated as follows:

- Export clearance is conducted at exporting country. Custom authority processes the declaration and gives the permission for loading of goods into vessels.
- Export goods should be covered by regional bond and armed with electrical seal.
- In the case of red channel, verification/scanning should be conducted at country of origin
- Release information is transmitted to customs authority where cargo is exported to
- The cargo may be armed with electrical seal and shipped to destination
- Upon arrival at the port, scanning inspection is indispensable. This is mandatory for all export containers.

The above actions will lead to the following significant effects;

- Customs clearance is conducted at export country and clearance data are transmitted to transit country and to the destination port
- Electrical seal should be attached and checked at border posts.
- Scanning inspection becomes mandatory at the port of export.

5.4.2 Current bottlenecks

(1) Import

Three bottlenecks in imports have been identified as below.

1) Port side time

(Kenya)

The port dwell time is still longer than international standard from the Port charter report, 2014. However, the smooth cargo movement to CFS is achievable. In this context, the port side time depends on customs clearance time. According to the latest data “Northern Corridor Transport Observatory Survey” issued on Dec, 2014 the Data Proceeding Center (DPC) can provide short time for duty assessment (under 2 hours from Jan to Jul 2014), but One Stop shop center’s work still takes longer time for inspection (average 107 hours). CFS’ association indicates that an average of 2.7 days is required.

(Uganda)

The container cargo transit time is long. On average, 5-6 days are required (best case is at 2 days). Import container’s free time at Mombasa port is 2 days for CFS cargo and 7 days for transit, which may imply that the transit procedure takes a long time.

2) Transportation time at Mombasa area

Traffic congestion in Mombasa area is severe. JICA STUDY TEAM GPS survey shows that it takes 12 hours to drive over a distance of 8km. Apart from this congestion, speedy transport is available for both Kenya and Uganda territories.

3) Border crossing at Malaba border

According to JICA STUDY TEAM GPS survey, it takes approximately 1.5 days including night time sleep.

Overall Assessment

JICA study team indicates the benchmark from world standard transit time as shown in the following table to set the target time in development plans.

Table 5.4.1: Benchmark for Import Time (Kenya: from Mombasa to Nairobi)

Activity	Survey result	World benchmark
Port dwell time	2.0-3.0 days	48 hours (world standard)
Arrival to CFS	1.0 day	1.0 days (No benchmark is available, since CFS is not common practice in the world)
CFS dispatch	2.7 days	1.0-2.0 days (considering current custom procedure)
To Nairobi	1.0 day	1.0 day
Total	6.7 days-7.7 days	5.0 days-6.0 days

Source: JICA Study Team

Table 5.4.2: Benchmark for Import Transit Time (Uganda: from Mombasa to Kampala)

Activity	Survey Result	World Benchmark
From vessel arrival to cargo dispatch	4-6 days for transit & dispatch	48 hours for port discharge (world standard) 1-2 days for customs clearance (world standard. SCT scheme conducts customs clearance at port instead of transit procedure)
Land transportation to border	1.5 days (including night sleep) to Kampala	1.5 days
Border crossing time	1.5 days (including night sleep)	0.5 day to 1.0 day (Thailand/Malaysia case requires 1.0 day for customs clearance and cargo transshipment)
Land transportation to destination	16 hours (incl. night rest)	16 hours (incl. night rest)
ICD procedure	3 hours	No (Customs procedure is completed a port side)
Total	7.5 days-9.5 days	6.2days-7.4 days

Source: JICA Study Team

The shorter transit time will cause the high operating efficiency for logistics and operating cost reduction. The continuous EAC regional transit time reduction succeeds in reducing truck delivery cost. NCTTCA shows the relation between the cost reduction and transit time reduction in the following table.

Table 5.4.3: Cost and Transit Time Reduction

From	To	Container transport cost (USD)		Cost reduction ratio(USD)	Transit time Mombasa-to destination (port dwell time + delivery time: days)	
		2009-2010	2014		2009-2010	2014
Mombasa	Nairobi	1300	1,023	-21%	16.2	3
Mombasa	Kampala	3400	2867	-16%	25.2	10.5
Mombasa	Kigali	6512	4515	-26%	26.8	12
Mombasa	Bujumbura	8000	6350	-21%	30.9	15
Mombasa	Goma	9500	6750	-29%	34.9	15
Mombasa	Juba	9800	4678	-52%	36	22

Source: NCTTCA 2015 Aug "Impact Assessment of Northern Corridor Performance Improvement Activities"

Saving payment interest by cutting distribution inventory

In addition, transit time reduction will create benefit for cash flow of importers/distributors. The transit time will reduce from 8.3 days to 6.3 days (Mombasa to Kampala) by 2030 in terms of truck delivery. This will result in reduction of interest payment date by 2 days. The effect is calculated as follows;

$$2 \text{ days 'inventory volume} \times \text{Interest rate} = \text{US\$}58.6 \text{ billion} \times 2 \text{ days}/365 \text{ days} \times 17\% = \text{US\$} 43\text{million}$$

(Note: Import volume: Total US\$46.8 billion (2014: UN COMTRADE statistics), Interest rate: 17% (11-23%: from 2010-2015. Average 17% : Bank of Uganda))

As a result, USD 43million interest payment reduction will be expected.

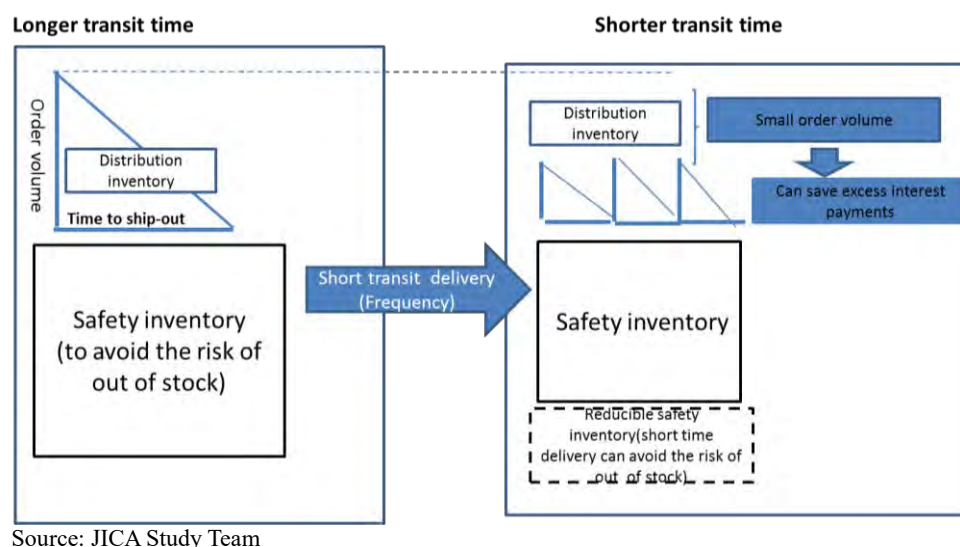


Figure 5.4.1: Image of Inventory Reduction

(2) Export

Three major bottlenecks are observed:

1) Mombasa access road (same as import)

Access to Mombasa port is characterized by road congestion. In addition to export containers, a lot of empty containers are carried by poor-standard towing equipment in order to export them.

2) Border facilitation (same as import)

The required time for border crossing is shorter than import. The transit procedure at Kenyan side takes a little bit longer time than Uganda side.

3) Scanning inspection

Scanning inspection is mandatory at Mombasa port. According to JICA STUDY TEAM interview survey, waiting time is so long with forwarders approximating the time needed at 2 days. This means that exporters have to deliver export containers at least 3 days before ship arrival. In world standards, Container Yard (CY) cut-off date is 1 day before ship arrival date. The extra 2 days at Mombasa port are therefore a serious constrain for export promotion. It is normal in the world that export cargo are allowed to be delivered before Container Yard (CY) cut-off date (one day before ship arrival) so long as the custom clearance had been completed including X-ray scanning or physical check. Reducing waiting time for scanning inspection is indispensable

JICA study team indicates the benchmark from world standard transit time as shown in the following table to set the target time in development plans.

Table 5.4.4: Bench mark for Export Time (Kenya: from Nairobi to Mombasa)

Activity	Survey result	World benchmark
Empty container delivery to exporters premises	1 day for Nairobi	1 day for Nairobi
Custom procedure and vanning	0.5-1.0 day	0.5 day (world standard, which is shorter than import)
Delivery to port	1.0-1.5 day	1.0 day
Port entry	0.5-1.0 day	0.5 day (depends on congestion)
Container yard operation to load vessel	3.0 day (2.0 day for scanning)	1.0 -1.5day (1.5 days is due to scanning waiting. In world standard, loading operation is one day and CY cut-off time is 1.0 day before ship arrival)
Total	6.0-7.5 days	4.0 -4.5 days

Source: JICA Study Team

Table 5.4.5: Bench mark for Export Transit Time (Uganda: from Kampala to Mombasa)

Activity	Survey result	World benchmark
Empty container delivery to exporters premises	1.5-2.0 days	1.0 days
Declaration to truck departure at Kampala	1.0 day (customs declaration: 3-4 h)	1.0 day
Truck delivery from Kampala to Malaba	4.0-5.0 hours	4.0-5.0 hours
Border crossing	1.0 day	0.5 day
Malaba departure to Mombasa port entry	2.0-3.0 days	2.0-3.0 days
Cargo receipt at Mombasa CY to vessel departure	3.0 days (2.0 day for scanning)	1.0-1.5 day (1.5 days are due to scanning waiting. In world standard, loading operation is one-day sand CY cut-off time is 1.0 day before ship arrival)
Total	8.7-10.2 days	6.2-7.7 days

Source: JICA Study Team

(3) Customs procedure

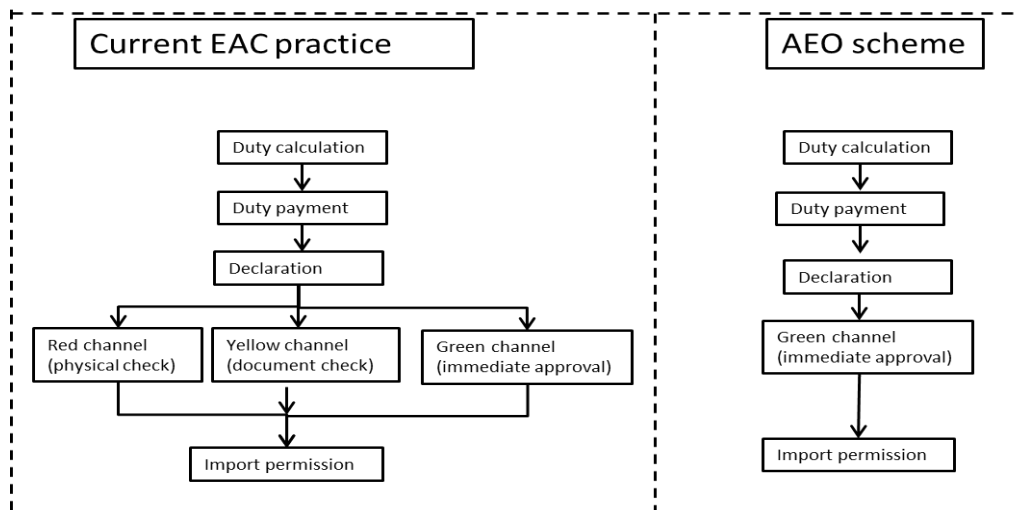
The bottleneck is not only on customs responsibility, but also poor information infrastructure. Power outages, slow speed and unstable data transmission are obstacles to daily operation for importers/forwarders and speedy clearance. EAC has been working with WCO (World Customs Organization) to implement trade facilitation project. Under the support of Swedish International Development Agency (SIDA), risk management, Authorized Economic Operators (AEO) and post clearance audit programs have been promoted.

Risk management development can assess the risk of cargo or importer status from database so that speedy clearance can be attained, contributing to paperless clearance, avoiding yellow (document check), red channel clearance instead of increasing green channel clearance. Audit system aims to monitor and amend finished declaration results so that duty payment amendment becomes easy. These factors increase the possibility of reducing clearance time.

One notable reason for delay in clearance procedure is that duty payment practice is different with developed countries. Usually, developed countries estimate import clearance time to be within a day (in the case of Japanese AEO forwarders, approximately 80-90 % are cleared within 30-40 minutes with “green channel” status). This is partially because forwarders are

likely to pay duty from their account on behalf of importers based on enough financial background and deep relation with importers.

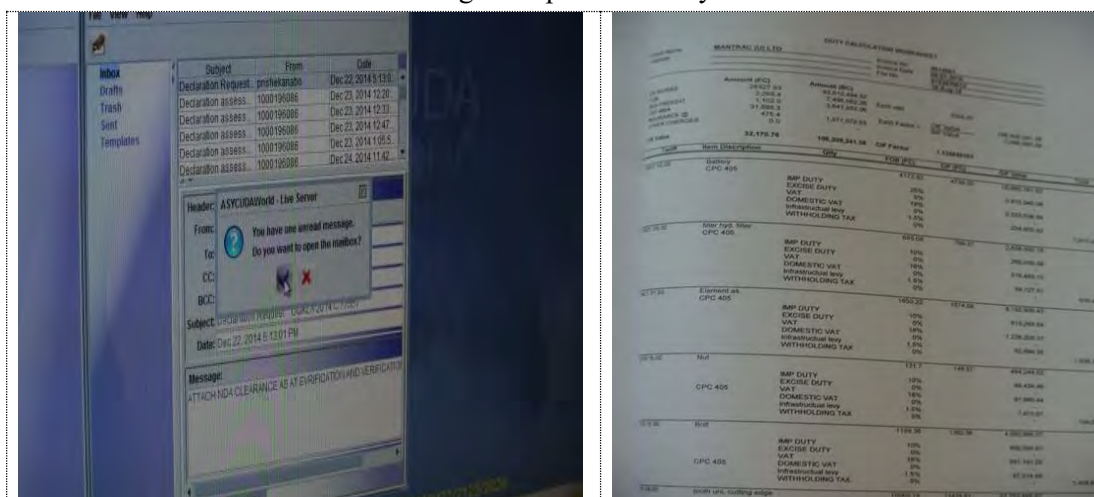
The EAC process on the other hand involves three steps. These are: 1) duty calculation by forwarders ⇒2) Duty payment by importers ⇒3) Customs declaration initiated by forwarders. The conductor of duty payment and declaration process is separated, which is likely to take increase idle time between duty payment and declaration. As for forwarders, overlap paper work is time-consuming and increases workload.



Source: JICA Study Team

Figure 5.4.2: Comparison between Current EAC Practice and AEO Scheme

As shown above, current EAC practice can divide declaration patterns into 3 categories; 1) red channel, 2) yellow channel, and 3) green channel. AEOs basically are guaranteed to get green channel declaration because of their high compliance ability for customs rules.



It is failed screen for accessing to ASYCUDA. System shut-downs are frequent

Prior to completing ASYCUDA data entry, it is necessary to prepare duty calculation sheet for importers to pay duty. After duty confirmation, similar data input is started by ASYCUDA that is overlap paperwork.

Note: ASYCUDA (Automated System of Customs Data)
Source: JICA Study Team

Figure 5.4.3: Photos of ASYCUDA

5.4.3 Development strategy

“Development strategy” represents solutions for improving logistics standard as well as cost reduction.

(1) Empty container depot function

In Kenya, Embakasi ICD already performs an empty container depot function. Two shipping lines use this ICD as their empty container depot. In Uganda, Mukono ICD does not have any an intention of handling empty containers. In remote areas from mother port with trade imbalance, the transport cost becomes expensive due to the fact that long empty container haulage is unavoidable. In order to resolve this problem, collaboration with stakeholders is necessary. In Uganda empty container depot function should be more strengthened based on the public/private cooperation.

In order to get the status of empty container depot, it is necessary to have importer/exporter data to prevent “one-way” cargo transportation from/to Mombasa. Basic data collection therefore is first priority, especially for import. Exporters can find empty containers easily because of trade imbalance so that collecting import information and empty containers will be important. If empty containers are available, export cost is drastically reduced (approximately 40% cost reduction is projected).

Although stuffed export container is most preferred for railway, it is unrealistic to realize the import/export balance. Up to then, it seems necessary to use railway for empty container return to Mombasa from the point of transport cost reduction.

Effect of Empty Container Depot

According to the result of traffic count survey, 500 containers per day are inbound and 80 % would be returned empty at Kampala area. When inland depot can provide empty containers for export, transport cost for export can reduce by half. If this condition is adoptable, 160 containers are returned by rail and remaining is returned as it is. Thus, daily US\$ 226,000 cost saving will be expected in a day. 30 % cost reduction will be achievable. This will be US\$ 830 million cost reduction annually.

Table 5.4.6: Export Cost Reduction (Case 1)

	Current			Empty container depot			
	Truck No.	Current unit cost (USD)	Cost per day	Truck/Rail No.	Transport unit cost (USD)	Cost per day	
Inbound	500	-		500	-		
Outbound	100	2,500	250,000	100	1,200(target: half cost)	120,000	
Empty	400	1,200 (currently including inbound cost)		(Rail)160	600	96,000	
				(Truck) 240	1,200	288,000	
Total			730,000		Total	504,000	
						Saving	226,000

Source: JICA Study Team

If the number of export truck increases from current 100 to 200, trade imbalance is improved. As the result, the cost saving will be limited to US\$130,000 (without railway use) as shown below. Railway role is significant for cost reduction when empty container depot is realized.

Table 5.4.7: Export Cost Reduction (Case 2)

	Current			Empty container depot		
	Truck No.	current unit cost (USD)	Cost	Truck/Rail No.	Transport unit cost (USD)	Cost
Inbound	500			500		
Outbound	100	2,500	250,000	200	1,200	240,000
Empty	400	1,200	480,000	300	1,200	360,000
		Total	730,000		Total	600,000
					Saving	130,000

Source: JICA Study Team

(2) Logistics Hub/Center

ICDs will face to lose business opportunities as the place for import customs clearance when SCT scheme is fully implemented. Thus, it will be necessary to shift their business model to value added operators. The value added operator will work as a wide range of business providers as well as transport modes as shown in the table below.

Table 5.4.8: Value Added Operator Concept

Target Business	Target Transport Pattern
Logistics providers, Traders Wholesalers/Retailers High-end product manufactures	International/domestic Rail/truck, Air/truck Domestic/domestic (small lot delivery) Bonded cargo (SCT warehouse regime)

Source: JICA Study Team

In the developed nations, it is observed that production/consumption activities have been gradually shifted from product-push economy to demand-pull economy. This shift demands logistics provider to provide frequent/small quantity delivery instead of large quantity/one-time delivery. Needless to say, this change is likely to push up logistics cost and to grow the risk of excess inventory.

Logistics providers in developed countries have been making effort to provide accurate and cost-effective inventory operation for handling large variety/small lot commodities while achieving cost reduction. In addition, customers (especially manufactures) are likely to focus on their core activity in order to survive; outsourcing of logistics services becomes the trend. As for logistics providers, inventory and processing operation abilities are key components.

Following after inventory-oriented service, transportation is another important service menu. Logistics hub (center) leads to providing “Just In Time (JIT)” delivery by small-medium sized trucks. This is because the road situation is insufficient for large sized trucks except primary road like Northern Economic Corridor. Procurement of small/medium size trucks is desirable. This has the potential to promote employment opportunities to local drivers.

The operational process of JIT is summarized below:

- Receipt of large lot inbound cargo at warehouse (in order to minimize procurement cost, large lot procurement is sensible)
- Inventory control at warehouse
- On receipt of shipping order from customers, processing operation is conducted (piece picking, sorting, labeling, re-packing, and etc.)
- Cargo dispatch and JIT delivery to customers

It is also possible to reduce dedicated delivery days (for instance in Japan, next day delivery is possible and common).



Source: JICA Study Team

Figure 5.4.4: Image of Logistics Center

(3) CFS development plan

Since customs procedures have to be completed in Mombasa under the SCT, the workload for Mombasa becomes heavier. This is because multiple data transmission for customs procedure is required between Mombasa and the destination/transit countries. Although import containers to Kenya are attached to CFS, transit countries' ones are able to deliver directly from Mombasa port. However, if congestion becomes serious due to the heavy workload at Mombasa port, it will be necessary for transit countries to have their CFS at Mombasa area. Since priority mission of CFS is to decongest Mombasa port, their location have to be limited within 10km from the port under the port's regulation. However, from the practical viewpoints, it is better to locate closer to destination area for CFS owned by transit countries.

If CFS for transit countries can provide a port side service, "Drop-off practice" becomes more familiar because CFS can contribute to the port-side operation. This is beneficial for promotion of export.

“Drop off practice” service, which includes; i) they carry shipping line “A” containers to Mombasa with export goods, ii) amend transit permit and transshipped cargo to shipping line “B” containers, and iii) export by shipping line “B” container. Normally, shipping lines hesitate to rent their containers for shipper who will use another shipping line for export even though empty container is available in domestic transport portion. This practice can realize cost saving by using empty container to main ports.

(4) Port Operation

(Mombasa)

Mombasa is the gateway not only for Kenya but also for whole EAC region. Mombasa’s major role for EAC region is to release cargo immediately. New container terminal can handle 600,000 TEU annually and enables to provide enough space for customs clearance. Thus, CFS’s role as customs clearance area will also enhance cargo clearance. In terms of railway, speedy cargo loading onto SGR is essential from new container terminal to hinterland. Taking a look at export process, smooth cargo acceptance to port is indispensable. The long queue and time wastage at Container Yard (CY) have been made due to waiting for scanning inspection. It is therefore desirable that Mombasa port should take measures for facilitating export cargo and port operation in order to achieve shorter CY cut off time.

(Resolution for port access road congestion)

Here, two practical solutions are taken into account for resolving port access road congestion. One is to promote container stuffing activity by CFS and another is to have wide area for parking lot initiative by Mombasa County. These solutions will be beneficial for mitigating road congestion both for port access and inside the port. In addition, trucks turnover from remote areas will be improved if transshipment service is provided.

(Resolution for long waiting time of scanning inspection)

Although customs officer’s supervision is required at container vaning site, the scanning inspection is still mandatory at the port. Worldwide, double-checking system is likely to be avoided as much as possible. While preventing unofficial export is an important issue, it is possible to skip scanning inspection when an officer’s physical checking is reliable. If AEO status is qualified to skip scanning inspection, then it is an incentive to get AEO status.

5.4.4 Logistics Improvement Plan in Kenya

Logistics improvement plan for Kenya is summarized below.

Table 5.4.9: Improvement Plan for Logistics in Kenya

Target Field	Short term	Middle term	Long term
Port development	- New terminal - Number of gate increases	- Efficient operation	- Facilitate cargo exit process
Target time (Current port dwell time: 2-3 days)	2 days (48 hours)		
Customs procedure at port	- Basic IT infra. development - Risk management - Audit system - AEO system	- Basic IT infra. development - Green channel clearance promotion - Immediate release increment	- Basic IT infra. development - Duty payment practice facilitation
Target time (Current: over 2.7 days)	2 days	1.5 days	1 day
Malaba border	- Infrastructure development - OSBP full implementation	- Multiple lane - Dedicated lane	- Providing information of border congestion
Target time (Current: 1.5 days for import from Mombasa to Kampala; 1 day for export from Kampala to Kenya)	6 hours for procedural time. However, considering night time rest, drivers rest, unexpected risk for congestion, we propose one day as target for whole border crossing time for both export and import		
Export	- Increment scanning machine at port area - Parking lot development - CFS activation for export		- Facilitation on overlap inspection
Target time (CY delivery: 3 days before ship arrival) (Scanning waiting time: 2 days)	- 2 days before ship arrival including scanning waiting time - Scanning waiting time: below 1 day	1 day before ship arrival including scanning waiting time Scanning waiting time: below 6 hours	

Source: JICA Study Team

Table 5.4.10: Development Plan on Logistic Facilities in Kenya

Target Field	Short term	Middle term	Long term
Empty container depot	- Railway service development	- New ICD for SGR	- Embakasi ICD Improvement
Target cost (Current: USD700-1,000 /container from Nairobi)	USD700-1,000	USD500-600 (approximately 30-40% reduction)	
Logistic hub/center		- Logistics hub for Nairobi (based on New ICD) -Kisumu/Eldoret	- Other candidate if any
CFS*			- CFS establishment if port congestion is serious due to the insufficient SCT scheme development

*Remark: Although CFS is located in Kenyan, this would be targeted for Uganda under the condition that there is serious congestion at the port of Mombasa due to SCT scheme development.

Source: JICA Study Team

5.4.5 Logistics Improvement Plan in Uganda

Logistics improvement plan for Uganda is summarized as below.

Table 5.4.11: Improvement Plan for Logistics in Uganda

Target Field	Short term	Middle term	Long term
Customs procedure at port*	- Basic IT infra. development - Clearance at Mombasa under SCT scheme - Risk management - Audit system - AEO system	- Basic IT infra. development - Green channel clearance promotion - Immediate release increment	- Basic IT infra. development - Duty payment practice facilitation
Target time (Current: 4- 6 days including port dwell time)	2.0 days + port dwell time (2 days) have to be added, since 4.0 days are necessary from vessel arrival to cargo dispatch.	1.5 days + port dwell time (2 days) have to be added, since 3.5 days are necessary from vessel arrival to cargo dispatch.	1.0 day + port dwell time (2 days) have to be added since 3.0 days are necessary from vessel arrival to cargo dispatch.

Remark: Transit procedure remains the main constrain for transit countries, which requires long time. SCT scheme however aims to conduct import customs clearances while cargo is still at the port of origin. As a result, transit procedures will implement with customs clearance.

Source: JICA Study Team

Table 5.4.12: Development Plan on Logistic Facilities in Uganda

Target Field	Short term	Middle term	Long term
Empty container depot	- Maritime authority development	- Facility development - Linkage with railway for empty container back	
Target cost (Current: USD2,500/container from Kampala)	USD2,000 (in the case of return container is available by rail)	USD800-1,000 (in the case of return container is available for export)	
Logistic hub/center	-	- Kampala - Gulu	- Tororo - Mbarara

Source: JICA Study Team

5.4.6 Suggested Projects/Programs and Implementation Plan

Construction of ICD facilities are suggested as priority projects. The project information is mentioned in section 5.3.4 (8) above.

5.5 Impact on the Cost Reduction

5.5.1 Nature of the Costs of Transport in NEC

While it is undeniable that prices of goods in the hinterland locations are affected by inland transport cost, the share of the inland transport cost in the total cost varies from product to product. Finished goods with high value may minimize the share of inland transport cost in their total selling price, whereas bulky and heavy raw materials may have to bear relatively large inland transport costs.

As explained in 5.4.2, currently observed causes of excessive times and cost are as listed below:

- Port dwell time at the Port of Mombasa: The dwell time is caused by congestion at the port partially due to the time required for custom clearance and other formalities.
- Border crossing time: The waiting time at the border pushes up the cost of inland transport for transit cargo to Uganda.

5.5.2 Estimation of impacts of various measures on inland transport cost reductions

Based on the analysis, the measures of impact in three areas of improvement on the overall reduction of inland transport cost from Mombasa to Nairobi and Kampala is estimated. Three major cost reducing factors are i) reduction of truck charges, ii) reduction of costs of various procedures and formalities, and iii) reduction of cost due to the use of SGR for returning empty containers. As a result, approximately 15% of the total of inland transport cost is reduced in case of transport from Mombasa to Nairobi and to Kampala. The methods of projection are explained in the following section.

Table 5.5.1: Summary of Estimated Reduction of Inland Transport Cost (USD)

	Current cost(USD)		Reduction of truck charges	Reduction of cost for procedures and formalities	Returning empty containers by rail
Nairobi	1,915	Reduction Rate (USD)	45	200	180
		Amount (USD)	1,870	1,670	1,490
		Reduction Rate (%)	98%	87%	78%
Kampala	3,600	Reduction Rate(USD)	50	400	450
		Amount(USD)	3,550	3,150	2,700
		Reduction ratio	98%	87%	75%

Source: JICA Study Team

(1) Truck charge reduction

The reduction of truck turn-around time occurred during the period of 2010 to 2014 with the reduction of lead time due to reduced dwell time at the Port of Mombasa. It eventually reduced the travel time and truck charges. From the data of 2010-2014 improvement, possible amount of reduction of truck charges per any given day of reduction in lead time is calculated. The result is shown in the table below.

Table 5.5.2: Reduction of Lead Time and Impact on Truck Charge

	Truck charges (USD)			Lead time (day)			Reduced truck charge per day (a/b) (USD) (c)
	2010	2014	(Difference) (a)	2010	2014	(Difference) (b)	
Nairobi	1,300	1,030	270	16.2	7.2	9	31
Kampala	3,400	2,870	530	25.2	8.3	17	32

Source: Calculated by JICA Study Team based on data of NCTTCA

Expected reduction of lead time is further projected based on the assumption of the Port of Mombasa will be more efficient to ease the congestions:

Table 5.5.3: Projected Reduction of Lead Time and Impact on Truck Charge

	Current lead time(days)	Target led time (days)	Expected reduction of lead time time(days) (d)	Expected reduction of truck charge (USD) (d × c)
Nairobi	7.2	5.7	1.5	46
Kampala	8.3	6.7	1.6	51

Source: JICA Study Team

(2) Reduction of cost for through reduced procedures and formalities

Due to the full-fledged implementation of SCT scheme, it is principal that customs clearance is implemented while cargo stays at the Port of Mombasa. As a result, customs clearance in Kenya will not include CFS-related charges as they will not use CFSs. Payment for transit procedures as well as ICD for cargo to Uganda will also become unnecessary.

Table 5.5.4: Estimated Cost Reduction through Reduced Procedures and Formalities

	Saving Contents	Cost Reduction(USD)
Nairobi	CFS usage	200
Kampala	Transit procedure	300
	ICD usage	100

Source: JICA Study Team

(3) Reduction of cost through combination of empty container depots and railway service

Three scenarios are taken into consideration:

- If export cargo can use empty containers accumulated at nearby empty container depots located along NEC, this process will cut the charges added on the truck charge to cover for the cost returning empty containers by half. However, the share of containers utilized through this process is estimated at approximately 20 % of all containers transported to inland due to the large trade imbalance.
- If an empty container can be sent back by rail, it has to pay the cost of transporting container, but cheaper than by truck. The share of containers using this process is estimated as 32 % of the total (our SGR targets share of the container transportation is 40 %. Thus 40 % multiplied by 80% is 32%).
- Remaining 48 % of the total is assumed to be returned by truck, which follows the current process without any change in the cost.

The expected changes in the cost were calculated based on the weighted average of the reduced costs under the above-mentioned three scenarios.

Table 5.5.5: Estimated Cost Reduction through Combination of Empty Container Depots and Railway Transport

	Cost Reduction (USD)
Nairobi	180
Kampala	450

Source: JICA Study Team

5.5.3 Estimated Impact on Operation of the Manufacturing Sector

The manufacturing sector in both Kenya and Uganda utilizes large amount of raw materials. The following analysis reviewed the possible impact of inland transport cost reduction on the total cost of production borne by the manufacturing sector²³. For purpose of the analysis, a product group was selected out of various categories based on the following criteria: i) usage of containers for transport of raw materials, and ii) availability of data both in Nairobi and in Kampala. As an example, plastic industry (HS39) was selected. The industry imports raw materials such as resin through the Port of Mombasa. The data below shows the basic data of plastic manufacturing at two locations. It should be noted that the types of the raw materials and the prices are also different from product to product. CIF value per ton in Nairobi is approximately the same as Kampala. This may be due to the difference in composition and origins of the imported products. According to the estimation, it can be roughly said that the inland transport cost and its share in the total cost in Kampala is 3.5 to 5 times larger than in Nairobi.

23 The total cost of the production includes costs of factors of productions such as raw materials, labour, power, transportation (inland transportation or transportation of procured materials from the domestic sources), operation and maintenance and overhead and sundries.

Table 5.5.6: Basic Data of Imported Plastics Raw Materials

	Current imported raw material volume (2013, '000 MT)	Current imported raw material value per ton (USD)	Current transportation cost per MT (USD)
Nairobi	340	1,580	40~60
Kampala	105	1,550	170~200

Note: The data is the sum of HS3901 to HS3914 in 2013.

Source: JICA Study Team based on the data of UN-COMTRADE (value and volume of imported raw material) and interviews.

Assuming the same degree of reduction of cost per container shown in following table will occur on various types of products, the cost of inland transport per container for plastic materials will reduce to the amount of “After” of “Cost of inland transportation per container” in the table below.

Table 5.5.7: Projection of Reduction of Inland Transport Cost

	Cost of inland transportation per container (USD)		Total cost of production using one container of raw materials (USD)		Percentage of reduced cost in total cost
	Before	After	Before	After	
Nairobi	1,000	780	25,000	24,780	0.9%
Kampala	4,250	3,188	28,333	27,271	3.8%

Note: The inland transportation cost per container is calculated using the lowest price per ton per container obtained through interview. One container is assumed to be 25t of raw materials.

Source: Calculated by JICA Study Team.

In Kenya, approximately 1% of the total production cost reduction can be realized, whereas the cost will shrink by almost 4% in Uganda.

Furthermore, the cost reduction on each unit of raw material import is calculated. Every container of raw material import has to pay inland transportation cost in addition to the import value of the raw material. According to calculation of the statistical data, CIF values of raw material per container to Kenya and Uganda are approximately the same. Each container of raw material import currently pays 2.6% and 11% of their CIF value for inland transportation cost in Kenya and Uganda. It will be possible to enjoy lower rates than the current cost after the projected improvement.

Table 5.5.8: Basic Data of Imported Plastics

Value of raw material per container (CIF, USD)	Cost of inland transportation per container (USD)		Ratio of inland transportation cost to raw material cost (%)	
	Before	After	Before	After
39,000	1,000	780	2.56%	2.00%
39,000	4,250	3,188	10.90%	8.17%

Note: Calculated based on the assumption that each container can take 18MT of raw materials.

Source: JICA Study Team

The result shows that the projected changes at least give the cost reduction to both countries, but probably larger in Uganda.

On the other hand, it should be noted that the impact of transportation and procedural streamlining will also improve the logistics between the factories to customers sometimes across borders. Therefore, the impact should not be limited to the above-mentioned volume. Based on the Value Chain Survey, the shares of major cost items in the production of goods which rely on the imported raw materials are as shown in the table below. The figure of transportation includes not only the inland transportation of raw materials but also the transportation of products to customers. It is clear that the ratio of transport cost for garment industry in Mombasa is the smallest among others. Products which are heavy and bulky tend to show higher ratio of transportation cost than others (e.g., paper). Therefore, any given reduction of the transportation cost should impact on the total cost.

Table 5.5.9: Share of Costs in Total Cost of Selected Products in Kenya

	Transport	Raw Materials	Labor	Maintenance
Garment (Mombasa)	5	50	20	10
Garment (Nairobi)	10	25	25	10
Packaging (Nairobi, Plastic)	15	45	25	3
Packaging (Nairobi, Paper)	20	50	10	5

Source: Panafcon (2015) "Market and Value Chain Survey-Final Report"

CHAPTER 6 INFRASTRUCTURE DEVELOPMENT

6.1 Power Development in Kenya

6.1.1 Overview of Current Status

Currently, the interconnected system in Kenya had a total installed capacity of 2,404MW by the end of 2015 with an effective capacity of 2,335MW to serve a peck load demand of around 1,600MW; made up of 820.9MW of hydro, 891.5MW of thermal, 622.1MW of geothermal, 25.5MW of wind, 44.0MW from cogeneration. There was also 26MW in isolated mini-grids. Hydro accounts for around 34.5% of the total energy supply. Registered interconnected national sustained peak demand was 1,600MW in 2015.

The country's electricity supply industry structure is the single buyer model where all generators sell power in bulk to KPLC for dispatch and onward transmission and distribution to consumers. Currently the transmission network is shared between KPLC and KETRACO. The total transmission network (220kV and 132kV) for KPLC stood at 3,947km by June 2014. KETRACO transmission network stood at 328.5km for 220kV and 428km for 132kV by December 2014. The entire distribution network of 52,850km (as at June 2014) in the country is operated by KPLC. The network consists of 66kV feeder lines around Nairobi and 33kV and 11kV medium-voltage lines elsewhere in the country.

In Kenya, electricity is supplied to about 37% of the total population. This is predominantly middle and upper income groups. The utility's strategy to connect more customers to enhance sales growth is currently under implementation. At present, the number of customers connected to the national grid is 2,766,441 in 2014. Electricity sales for Kenya are 7,244 GWh (Gigawatt Hour) in the year 2013/2014. The share of rural domestic consumers to urban ones is 19%.

6.1.2 Review of Future Projects

In 2013, Updated Least Cost Power Development Plan (2013-2033) was issued by Energy Regulatory Commission (ERC) which is a strategic document in overall planning.

The power demand forecast is shown in the following table.

Table 6.1.1: The Power Demand Forecast of Kenya 2015-2030

Year	2015	2016	2017	2018	2019	2020	2021	2022
Power consumption demand (GWh)	12,146	13,809	15,678	17,719	20,042	22,686	25,687	29,150
Power peak demand (MW)	2,069	2,353	2,676	3,034	3,443	3,910	4,441	5,057
Year	2023	2024	2025	2026	2027	2028	2029	2030
Power consumption demand (GWh)	33,088	37,578	42,698	48,536	55,196	62,793	71,461	81,352
Power peak demand (MW)	5,758	6,561	7,480	8,531	9,735	11,113	12,691	14,446

Source: JICA Study Team based on Updated Least Cost Power Development Plan (2013-20133) by ERC

In order to meet the power and energy requirements, the Kenya government has some big projects as follows:

(1) 5000+MW for Transforming Kenya

The government formulated a 40-Month target to increase the capacity by 5,000MW additional capacity has been under implementation. The target was to achieve this in the period between June 2013 and December 2016 and thereby increase the total installed capacity to 6,762MW. The main objectives of this initiative are to:

- 1) Provide adequate capacity to meet the suppressed and growing demand
- 2) Provide a 30% reserve margin
- 3) Power energy needs arising from activities in the counties.
- 4) Power electrification of rail lines and new economic zones under Vision 2030
- 5) Reduce the cost of generation by displacing fossil thermal energy with cheaper energy.

However, the implementation of the programme is in full swing and only 507.4MW (~10% of target) has been commissioned under the programme by 2015.

(2) Generation Projects under Feed in Tariff (FiT) Policy

The Government of Kenya incorporated the Feed in Tariff as a strategy to promote the contribution of the renewable energy sources in generation of electricity. In this planning period the FiT projects for capacities below 10MW will contribute 134.85MW.

(3) Regional Power Trade Projects

The Ethiopian Electric Power Company and Kenya Power have a Power Purchase Agreement (PPA) for export of 400MW to Kenya through a 500kV HVDC line spanning over 1,100 km. The line is currently being developed by KETRACO on the Kenyan side and it is expected to be commissioned by 2018. Kenya Power has signed a PPA with the Rwanda power utility Rwanda Energy Group Limited for export of 30MW through the Ugandan transmission line.

(4) Generation Projects under Prefeasibility and Feasibility Studies

Hydro projects

- High Grand Falls Multipurpose dam (500MW)
- Magwagwa Multipurpose dam (120MW);

- Aror Multipurpose dam (60MW);
- Nandi Forest Multipurpose dam (50MW).

Nuclear Electricity

Kenya Nuclear Electricity Board is currently conducting a Pre-Feasibility Study with the objective of assessing the current status of development of the national infrastructure against the guidelines recommended by the International Atomic Energy Agency (IAEA) and to propose measures to mitigate the gaps identified in the 19 infrastructure issues which include National Position, Electrical Grid, Siting and Procurement among others.

Geothermal potential

The East Africa Rift Valley contains significant geothermal potential. Kenya is endowed with tremendous geothermal potential estimated at 8,000 to 12,000 MW spread over 14 prospective sites along the Kenyan Rift Valley; Kenya is one of the top 10 producers of geothermal energy in the world. Geothermal has numerous advantages over other sources of power: it is not affected by drought and climatic variability; has the highest availability (capacity factor) at over 95 %; is green energy with no adverse effects on the environment; and is indigenous and readily available in Kenya, unlike most thermal energy that relies on imported fuel. This makes geothermal a very suitable source for base load electricity generation in the country.

Baringo - Silali Geothermal development block project: The objective of this project is to develop 800MW of steam equivalent. The financing of the project is being sourced from the government. The required financing is mainly for acquiring additional rigs.

(5) The Eastern Africa Power Pool (EAPP)

The Eastern Africa Power Pool (EAPP) was established with the signing of an Inter-Governmental Memorandum of Understanding (IGMOU) by ten Eastern Africa countries, namely: Burundi, Democratic Republic of Congo (DRC), Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania, Libya and Uganda. EAPP's main objectives are: (i) to secure power supply for the region's countries; (ii) optimize the usage of energy resources available in the region by working out regional investment scheme in power generation, transmission and distribution taking into account the environment effects;(iii) to increase power supply in the region in order to increase access rate of the population to electricity in Eastern Africa; (iv) to reduce electricity production cost in the region by using power system interconnection and increase power exchange between countries; (v) to provide efficient coordination between various initiatives taken in the field of power production, transmission as well as exchange in the region; (vi) to create, in the framework of New Economic Partnership for African Development (NEPAD), a conducive environment for investment in order to facilitate integration projects financing in the fields of

power generation and transmission in the region; and (vii) facilitate, in the long term, development of Electricity Market in the region.

With the role of state corporation to plan, design, construct, own, operate and maintain new high voltage electricity transmission infrastructure that will form the backbone of the national transmission grid & regional interconnections (UETCL in Uganda, KETRACO/KPLC in Kenya, TANESCO in Tanzania), the following projects should be implemented:

- 500kV DC Ethiopia - Kenya line: A new transmission line will connect in future the neighbouring countries Ethiopia and Kenya. The objective is to cross-link both national energy supply systems, and to help developing Ethiopia's great hydropower potential for the whole region.
- 400kV Kenya Tanzania double circuit transmission line connecting Namanga in Kenya to Singida in Tanzania: The Governments of Republic of Kenya (GoK) and the United Republic of Tanzania (GoT) have applied for financing from the African Development Fund (ADF) and the Japan International Cooperation Agency (JICA) in various currencies towards the cost of Kenya – Tanzania Power Interconnection Project. This project is included of plant design, supply, construction, installation and commissioning of a total of 510 km - 400kV Double Circuit Overhead HVAC Transmission Line Project.
- 400kV Olkaria –Lessos transmission line including substations: The line, which is rated at 400kV, will evacuate geothermal energy from Olkaria to the Western region of Kenya, greatly improving the power supply. This project will also serve as the backbone for regional power interconnection among the countries in the region. The line will run from Olkaria to Lessos (near Eldoret), connecting to Tororo in Uganda via the Kenya-Uganda interconnector and further to Rwanda. It shall also connect to the Ethiopia-Kenya interconnector which terminates at Suswa substation, via the Olkaria-Suswa project.
- 220kV Lessos-Tororo-Bujagali Transmission Line: The Mbarara-Nkenda & Tororo-Lira Power Transmission Lines Project is located in west, north and eastern Uganda respectively. It will expand the coverage of the national transmission grid and enable UETCL to transmit electricity from upcoming 85 MW power plants and to improve the electricity access, reliability, and quality of supply to consumers in the country.
- 220kV Mbarara-Mirama (Rwanda): The project involves construction of (i) 66km 220kV Double Circuit transmission line from Mbarara to Mirama Hills; (ii) Mbarara 220/132kV substation; (iii) Mirama 220/132/33kV Substation. This project have applied for financing from the African Development Bank (ADB) and the Japan International Cooperation Agency (JICA).

- EAPP connecting to Southern Africa Power Pool (SAPP) and future: The Eastern Africa Power Pool and the Southern Africa Power Pool are the two active power pools in the Eastern and Southern Africa regions, respectively, comprising of member countries from the Common Market for Eastern and Southern Africa (COMESA) and the Southern African Development Community (SADC). As with other power pools in the continent, the two power pools are operating under the umbrellas of the two regional organizations, COMESA and SADC respectively for EAPP and SAPP. The EAPP and SAPP have thus initiated this study to identify issues and recommendations pertaining to the safe operation of the interconnected network and power trade across the two regions.

Gaps in Regional power system integration

Gaps in Regional power system integration such as: (i) shortage of power for trading in the market in first years; (ii) limited number of participants trading in the power market; (iii) limited transmission capacity for wheeling, and few interconnectors available in the region; (iv) delays in Increase of Financial Contribution for running the EAPP by the Members; (v) duplication of activities among the development partners and regional institutions; (vi) poor access to electricity, hence low sales volume; (vii) lack of SCADA facility to monitor power flow tools for the market operations, monitoring of system operation, planning; (viii) lack of Continuation in Capacity building in power market and systems Operations for The Technical Committees, EAPP – General Secretariat and Utilities staff; (ix) financial constraints and challenges to finance power infrastructure at the utility level; (x) lack of harmonization in the regulatory, as well as network operation, planning and design processes despite the existence of EAPP Grid Code; (xi) lack of funds to implement studies and regional projects.

6.1.3 Development Scenario As Base Case

Based on Updated Least Cost Power Development Plan (2013-2033), the peak demand of base case is forecast to grow from 1,600MW in February 2014 to 14,446MW in 2030. The Base Case expansion analysis was performed respecting the limitation in number of geothermal plants per year, maximum number of nuclear plants in the period, project lead times among other constraints.

In order to meet the power and energy requirements, the generation expansion planning is planned with the installed capacity by 2020 is 4,860MW, by 2025 is 9,070 and by 2030 is 16,982MW. The development scenario as base case in Table 6.1.2 is utilized.

Table 6.1.2: The Development Scenario as Base Case of Power System in Kenya

Year	2015 (Current)	2020	2025	2030
Peak Demand	1,600MW	3,910MW	7,480MW	14,446MW
Installed Capacity	2,404MW	4,860MW	9,070MW	16,982MW
Generation mix:				
Hydro power plant	820.9MW	839MW	979MW	979MW
Geothermal	622.1MW	2,019MW	3,279MW	5,331MW
Thermal	891.5MW	698MW	1,408MW	2,968MW
Wind	25.5MW	686MW	786MW	1,486MW
Cogeneration	44.0MW	18MW	18MW	18MW
Import		600MW	1,400MW	2,000MW
Coal			900MW	2,400MW
Nuclear			300MW	1,800MW

Source: JICA Study Team based on Updated Least Cost Power Development Plan (2013-2033) by ERC

6.1.4 Alternative Scenarios

The power demand focus is revolving around 3 scenarios: Low scenario, Reference scenario and High scenario. All the above scenarios have been considered in developing updated Least Cost Power Development Plan (LCPDP) (2013-2033). In implementing the updated LCPDP, the government of Kenya through Project 5,000MW initiative, the government of Kenya reorganizes the timing of the projects as indicated in the updated LCPDP (2013-2033). The reorganizations were made on the assumptions of demand driven projects. To guide this implementation, there was a 5 years Power Sector Expansion Plan (2015-2015) as short term plan and a 10 years Power Sector Expansion Plan (2014-2014) as midterm plan to address the challenges that are being experienced in energy sector evolution. With the confirmation of ERC, the reality of 2030 Power demand is long term plan as depicted in the updated LCPDP (2013-2033), and this document should be used as a reference material for long term power demand focus.

6.1.5 Gap Assessment and Future Bottlenecks

Power sector of Kenya faces several challenges in three fields: generation, transmission and distribution as follows:

(1) Generation challenges:

- Inadequate infrastructure for power supply in the locality of generation plants.
- Underdevelopment of the immense potential of renewable energy for power generation.
- Thermal power generation causes environmental pollution which requires costly mitigation measures.
- High price volatility of petroleum products affecting electricity generation cost.
- Thermal power plants have a relatively short life span.
- Stringent emergency power plan conditions.
- Thermal power plants have relatively lower conversion efficiencies of less than 50% compared to hydropower plants which have over 90% efficiency.
- Nuclear plants require high upfront capital cost and nuclear waste is highly radioactive and non-biodegradable.

- (2) Transmission challenges:
- Weak, inadequate and poorly integrated transmission infrastructure.
 - Displacement of population and settlements.
 - Vandalism on transmission network.
 - Land and way leaves acquisition.
 - Undeveloped legal, regulatory and institutional framework for a competitive wholesale electric power market.
- (3) Distribution challenges:
- Weak distribution network characterized by limited redundancy and aging.
 - Frequent and prolonged supply interruptions.
 - High distribution system losses.
 - Illegal power line connections and theft of electricity.
 - Scattered nature of population in rural areas.
 - High costs of rural electrification projects

6.1.6 Development Strategy

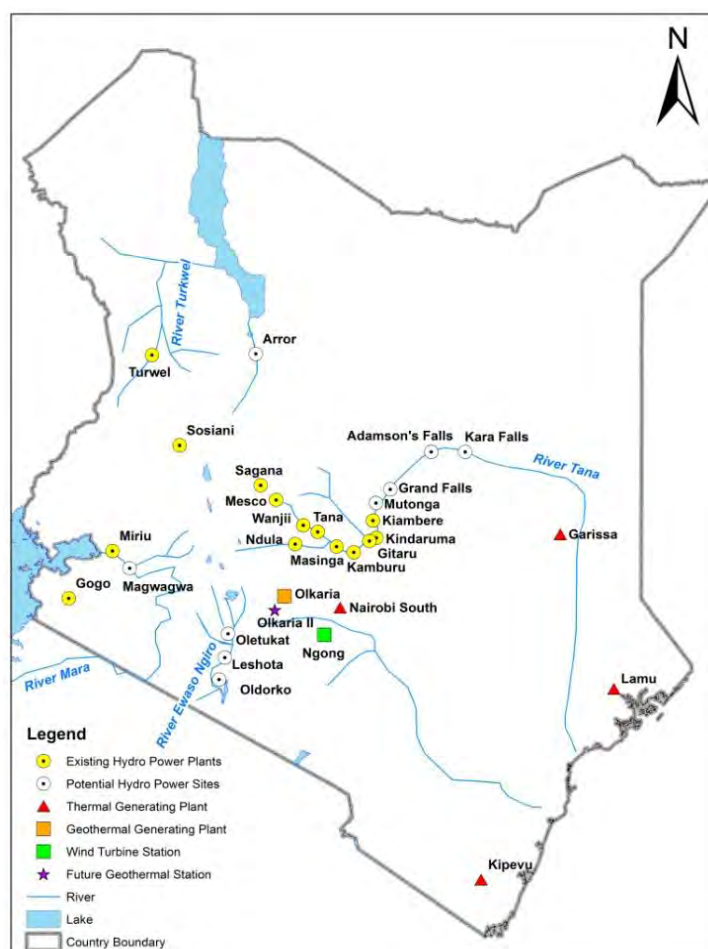
Power demand is expected to increase meteorically as Kenya's economic activities are accelerated. New sources of energy will include exploitation of geothermal power, coal, renewable energy sources, nuclear and connecting Kenya to countries in the region for energy trade. They comprise of a mixture of public developed projects, private developed or both. They are in different stages of development and hence have different completion timelines. As a strategy for timely implementation of these projects, they have been categorized and prioritized as follows: Short term by 2020, Midterm by 2025 and Long term by 2030.

The development strategy of power system and map of power system development are presented in Table 6.1.3 and Figure 6.1.1 below.

Table 6.1.3: The Development Strategy of Power System in Kenya

Year	Descriptions
Current (2015)	
Peak Demand	1,600MW
Installed Capacity	2,404MW
Key projects:	Olkira 4 (70MW); Olkira 1B (70MW); Olkaria Well Head (40MW); Prunus (50MW); SMHYD (25MW); Kipeto (100MW); Aelous (60MW); Kipevu 1&2 (100MW)
Short term (2020)	
Peak Demand	3,910MW
Installed Capacity	4,860MW
Rural electrification	22%
Key projects:	Olkaria 4 (70MW); Silali (150MW); Olkaria 4 (140MW); Eburru (26MW); Lake Turkana Wind (300MW); Fit wind (50MW); Menengai (400MW); Import (600MW); Menengai Well Head (40MW); OLKV (140MW); Agil (140MW) Olkaria 1 (45.9MW); Geothermal (280MW); Munias (26MW); Wind (100MW);
Midterm (2025)	
Peak Demand	7,480MW
Installed Capacity	9,070MW
Key projects:	Hydro power plant: 1410MW; Geothermal: 1260MW; Thermal: 710MW; Wind: 100MW; Import: 800MW; Coal: 900MW; Nuclear: 300MW
Long term (2030)	
Peak Demand	14,446MW
Installed Capacity	16,982MW
Key projects:	Geothermal: 2052MW; Thermal: 1560MW; Wind: 700MW; Import: 600MW; Coal: 150MW; Nuclear: 1500MW

Source: JICA Study Team based on Updated Least Cost Power Development Plan (2013-2033) by ERC



Source: Ministry of Energy and Petroleum (MEMD)

Figure 6.1.1: Map of Existing and Proposed Power Generation in Kenya

6.1.7 Suggested Projects and Implementation Plan

The power generation of power sector is mainly by hydro power, thermal and geothermal power. For ensuring the power supply to current load demand of 1600MW, the power generation mix of power sector is mainly by hydro power, thermal and geothermal power with total 98% of installed capacity in Kenya. However, with future load demand of 14,446MW by 2030, if only use power generation from fossil fuels will not suffice. Therefore, the need to develop alternative energy sources such as renewable energy.

In addition, the current electrification rate in Kenya is about 44% of the total population with rural areas constituting only 19% of the total (predominantly middle and upper income groups). And the road map of power sector will accelerate access to quality electricity to more than 50% of Kenyans by 2030. To solve these issues, suggested projects and implementation plan are shown as follows:

(1) Accelerate connectivity

Objectives

- In order to reduce the cost burden of increased connectivity on KPLC, as well as reduce the amount paid by the customer to connect to the grid, the plan is to extend the distribution network to as near the customer as possible using external or government funding to get the target of electrification more than 50% by 2030.

Development Items

- Extending the low voltage network on existing and other upcoming distribution transformers to reach households lying within transformer protection distance
- Building low voltage lines both single phase and three phases along rural access roads.

(2) Extension of the National Transmission Network

Objectives

- Improve quality and reliability of electricity supply throughout Kenya by ensuring adequate evacuation capacity.

Development Items

- Develop new transmission lines comprising of about 5,000km in the short term and 16,000km by 2030.
- Provide interconnection links with the neighboring countries in order to facilitate power exchange and develop electricity trade in the region
- Open up off-grid areas in order to ease connectivity to electricity by constructing transmission lines to link them up to the national grid.

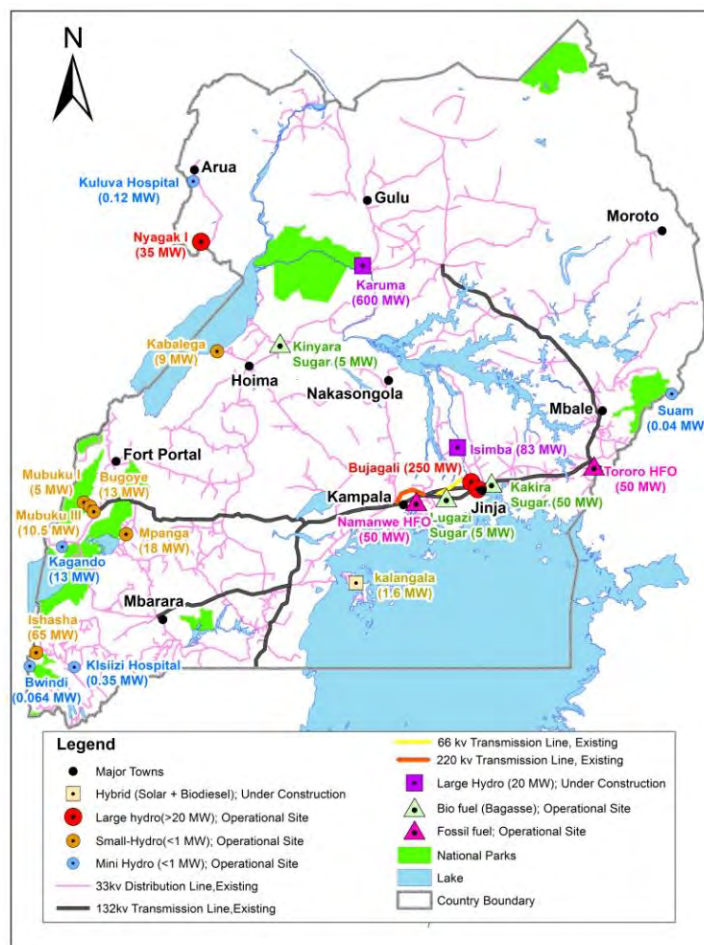
6.2 Power Development in Uganda

6.2.1 Overview of Current Status

Currently, Uganda has stable electricity supply which is provided from large and mini hydropower resources as well as cogeneration plants. The existing supply from renewable energy sources is sufficient to meet the current demand. The total system demand in 2015 is about 560MW. The Generation mix by 2015 stood at 873.34MW, of which 695MW were from hydro, 118.84MW from petroleum-based thermal and 59.5MW from biomass co-generation sources. Total energy generated in 2014 was 3,257,710MWh, slightly higher than the previous year's generation by 7.2%. Most of this energy came from large hydro power plants (78.6%), while small proportions of 16.1%, 4.2% and 1% came from embedded generators, thermal generators and imports, respectively. Energy exports were 125,064MWh while imports stood at 32,696MWh.

Umeme is the biggest distribution company. By the end of December 2014, the biggest proportion of Energy (94.6%) had been sold to Umeme. Besides, Umeme sold the largest portion (45.8%) of energy to large industries since they do heavy work that requires plenty of energy to run the machines. This was followed by commercial and medium industries consumers (30.4%), domestic consumers (23.7%). The least energy (0.1%) was used for street lighting. On balancing the purchases and sales, the distribution system incurred energy losses amounting to 619,402MW in 2014.

The Figure 6.2.1 shows the energy utilities in Uganda by 2014.



Source: Ministry of Energy and Mineral Development (MEMD)

Figure 6.2.1: Energy Utilities in Uganda by 2014

6.2.2 Review of Future Projects

In 2014, UETCL issued The Grid Development Plan 2014-2030 which is a strategic document in overall planning. It details the future grid requirements in terms of projects and investment costs to meet the national load growth, generation developments and regional interconnection requirements. It presents the latest demand forecast update, generation expansion plan, Demand – Supply Balance for the current and subsequent years, power system analysis results, financial projections, the Grid Investment Plan and Implementation Schedule.

The power demand forecast is shown in the following table.

Table 6.2.1: Power Demand Forecast of Uganda 2015-2022

Year	2015	2016	2017	2018	2019	2020	2021	2022
Domestic (MW)	548	652	708	770	837	914	905	987
Total (MW) (Domestic + Export)	560	665	721	785	902	1,030	1,022	1,208
Year	2,023	2,024	2,025	2,026	2,027	2,028	2,029	2,030
Domestic (MW)	1,097	1,216	1,272	1,338	1,478	1,551	1,622	1,707
Total (MW) (Domestic + Export)	1,367	1,436	1,523	1,589	1,729	1,802	1,872	1,957

Source: The Grid Development Plan 2014-2030 by UETCL

In the Grid Development Plan, the generation mix by 2030 is forecasted as Hydro power plant with 86%, Thermal power plant with 10% and Cogeneration with 4%. So, Hydro power plant occupies a very large proportion of power generation system in Uganda.

Table 6.2.2: List of Future Projects of Power System in Uganda

Power plants	Status	Financier
Large Hydro power plants		
Karuma (600MW)	Under construction	China EXIM Bank
Isimba (183MW)	Under construction	China EXIM Bank
Ayago (600MW)	Planned	China EXIM Bank
Oriang (500MW)	Planned	
Kiba (500MW)	Planned	
Uhuru (650MW)	Planned	
Small Hydro power plants		
Nyamwamba; Kikagati; Kakaka; Lubilia; Kagando; Sipi; Waki; Nengo Bridge; Nshogenzi; Nyamba B; Muzizi; Maziba	The sites feasibility studies have been completed and now at the stage of financial closure.	

Source: JICA Study Team based on Power Sector Report by UETCL

6.2.3 Development Scenario as Base Case

Based on the Grid Development Plan 2014-2030, the peak demand of base case is forecast to grow from 560MW in 2015 to 1957MW in 2030. And the rural electrification is currently at 7%. The rate is expected to be 22% by 2022 basing on Government of Uganda Rural Electrification Strategy and Plan. It is estimated that the rural electrification rate will be 31% by 2030. Besides, with the new generation and transmission projects, it will reduce non-technical and technical losses, non-technical losses will reduce to 3% by 2020 and that distribution technical losses will reduce to 14% by 2020. Thereafter losses are assumed to remain at these levels to 2030.

In order to meet the power and energy requirements, the generation expansion planning is planned with the installed capacity by 2020 is 1563MW, by 2025 is 2,171MW and by 2030 is 2,520MW. The development scenario as base case in Table 6.2.3 is utilized.

Table 6.2.3: The Development Scenario as Base Case of Power System in Uganda

Year	2015 (Current)	2020	2025	2030
Peak Demand	549MW	1,030MW	1,523MW	1,957MW
Installed Capacity	873MW	1,563MW	2,171MW	2,520MW
Generation mix:				
Hydro power plant	89%	80%	86%	86%
Thermal power plant	3%	15%	10%	10%
Cogeneration	8%	5%	4%	4%
Rural electrification	7%	22%	22%	31%
Non-technical losses	3.4%	3%	3%	3%
Technical losses	20%	14%	14%	14%

Source: The Grid Development Plan 2014-2030 by UETCL

6.2.4 Alternative Scenarios

The Grid Development Plan 2014-2030 presents an outlook of four scenarios showing their planned implementation strategy and recommendations, such as:

- 1) The base case scenario looks at the normal business as usual case.
- 2) The National Development Plan (NDP 2010-2015) scenario that aims at transforming Uganda from a peasant to a modern and prosperous country with set targets to be implemented within 5 years, with the target of installed capacity of 22,222MW by 2030.
- 3) The Electricity For All scenario in which 100% of the Uganda population has access to Electricity by 2035 as per energy policy directive, with the target of installed capacity of over 17,00MW by 2025.
- 4) The Uganda's VISION 2040 scenario that aims at transforming Ugandan Society from a Peasant to a Modern and Prosperous Country within 30 years, with the power demand forecast up to 41,738MW by 2040.
- 5) With the confirmation from Electricity Regulatory Authority (ERC) and Ministry of Energy and Mineral Development (MEMD), base case scenario is more realistic. However, if the country oil industry, Standard Gauge railway project and other large scale projects such as iron and steel industry take off, the high case is possible.

6.2.5 Gap Assessment and Future Bottlenecks

Despite the significant structural reforms implemented in the power sector, Uganda still faces several challenges in this sector, which are affecting growth, such as:

- Inadequate public financing to develop electricity supply projects to match growing demand. The government prefers to maximize private investment in infrastructure in order to allocate more resources to the social sector.
- Low electricity coverage throughout the country, especially in rural areas.
- High technical and non-technical losses.
- Delayed way leaves acquisition is a major hindrance to timely project completion
- High subsidy cost of the power sector arising from its inability to service its long-term debt.
- Securing funding for new investments
- Rampant vandalism.

- Lengthy procurement processes
- Depreciation of the Uganda Shilling against foreign currencies
- The Bulk Supply Tariff is not cost reflective.
- High taxes on power imports/exports and infrastructure projects.

6.2.6 Development Strategy

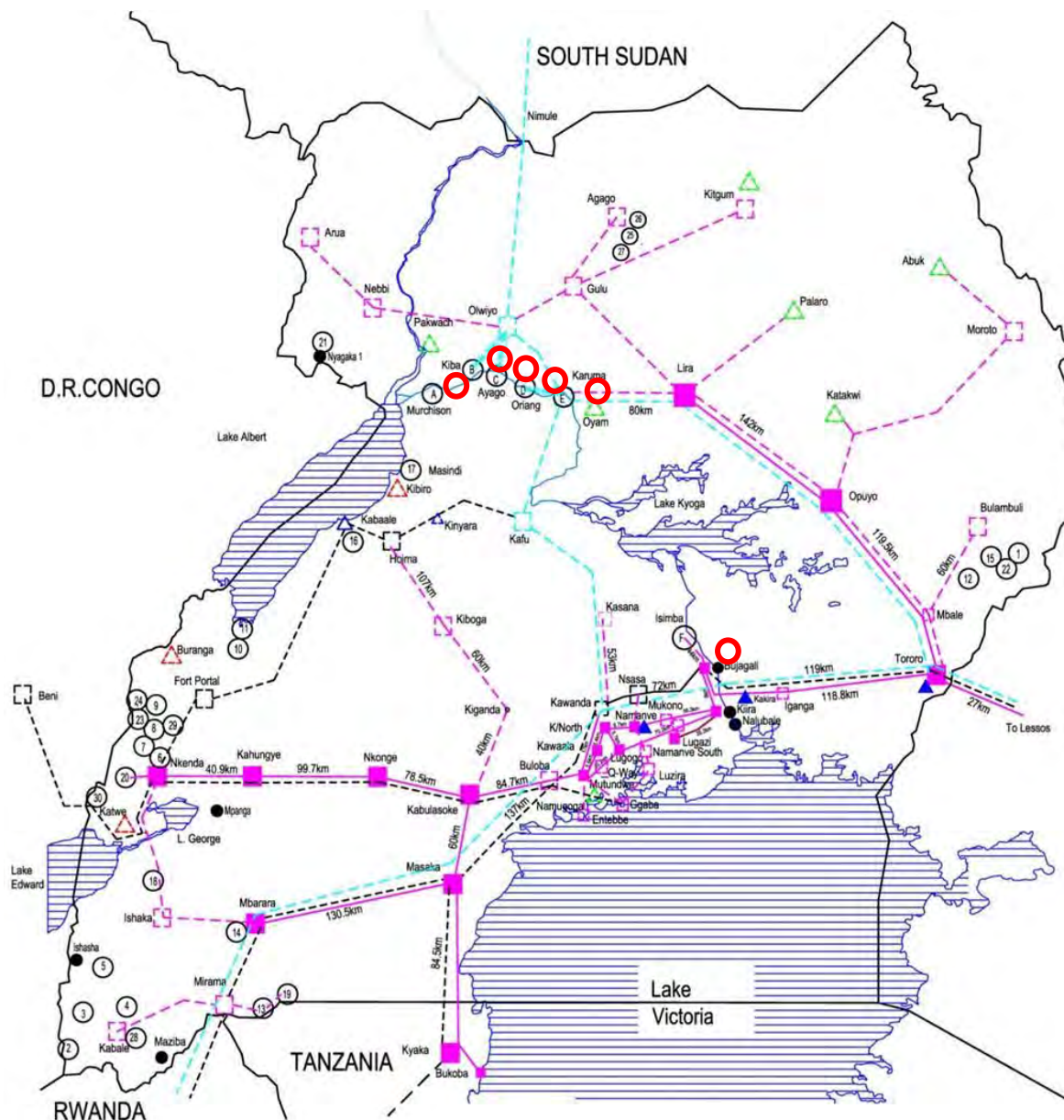
To fulfill the development of power system, there are numerous power projects that have to be implemented. As a strategy for timely implementation of these projects, they have been categorized and prioritized as follows: Short term by 2020, Midterm by 2025 and Long term by 2030.

The development strategy of power system and map of power system development are presented in Table 6.2.4 and Figure 6.2.2 below.

Table 6.2.4: The Development Strategy of Power System in Uganda

Year	Descriptions
Current (2015)	
Peak Demand	560MW
Installed Capacity	873MW
Rural electrification	7%
Energy losses	Non-technical losses: 3.4%; Technical losses: 20%
Short term (2020)	
Peak Demand	1,030MW
Installed Capacity	1,563MW
Rural electrification	22%
Energy losses	Non-technical losses: 3%; Technical losses: 14%
Key projects:	
Generation	Large hydro: Karuma (600MW); Isimba (183MW); Agago/Achwa (88MW); and Ayago (600MW); Medium scale: Kabaale/Albatros/Albertine (53MW); Katwe Geothermal (50MW); Kinyara upgraded to 35MW; Mini-hydros: 11 power plants with capacity of 155.1MW; Small scale: 9 power plants with capacity of 66.7MW;
Transmission	400kV transmission line: 4 projects 220kV transmission line: 7 projects 132kV transmission line: 15 projects
Midterm (2025)	
Peak Demand	1,523MW
Installed Capacity	2,171MW
Rural electrification	22%
Energy losses	Non-technical losses: 3%; Technical losses: 14%
Key projects:	
Generation	Oriang (500MW)
Transmission	400kV transmission line (2 projects): Karuma – Tororo (400kV); Kenya-Uganda-Rwanda interconnection upgraded to 400kV. 220kV transmission line (2 projects): Mutundwe Kabulasoke-Nkenda (220kV); Hoima-Kinyara-Kafu upgraded to 220kV
Long term (2030)	
Peak Demand	1,957MW
Installed Capacity	2,520MW
Rural electrification	31%
Energy losses	Non-technical losses: 3%; Technical losses: 14%
Key projects:	
Generation	Kiba (500MW)

Source: The Grid Development Plan 2014-2030 by UETCL



Legend:

Proposed Large Hydro Power Plants (important projects): A: Murchison; B: Kiba; C: Ayago; D: Oriang; E: Karuma; F: Isimba
 Proposed Mini Hydro Power Plant: 1: Siti; 2: Nyamabuye; 3: haisero; 4: Kisisi; 5: Nengo Bridge; 6: Bugoye; 7: Mubuku; 8: Kakaka; 9: Ngete; 10: Sogahi; 11: Muzizi; 12: Muyembe; 13: Kikagati; 14: Ruizi; 15: Sipi Falls; 16: Buseruka; 17: Waaki; 18: Kyambura; 19: Nsongezi; 20: Nyamambwa; 21: Nyagak 3; 22: Siti 2; 23: Sindira; 24: Ndugutu; 25: Achwa 1/Agao; 26: Achwa 2/Agao; 27: Achwa 3/Agao; 28: Kabale Peat; 29: Rwimi; 30: Lubilia

Source: Ministry of Energy and Mineral Development (MEMD)

Figure 6.2.2: Map of Power System Development in Uganda

6.2.7 Suggested Projects and Implementation Plan

Access to the national grid remains low due to limited national power grid coverage. In terms of Rural –Urban divide, only 7% of the household in the rural areas have access to grid power as compared to 40% of urban households. While access is higher in urban areas a significant proportion of households still rely on non-renewable energy sources. To solve these issues, suggested projects and implementation plan are shown as follows:

(1) Accelerate rural electrification

Objectives

- Expand the grid to the rural areas to get the target of rural electrification up to 31% by 2030.

Development Items

- Extend the grid to District Headquarters; maximize connection of major economic centers and social service facilities.
- Implement community schemes.
- Provide subsidies to independent power producers operating the mini grids.
- Invest in energy transmission to rural and urban areas.

(2) Promote Energy Efficiency

Objectives

- Reduce power losses to get the target of total energy losses as low as 17% by 2030.

Development Items

- Reduce technical power losses mainly through revamping the transmission and distribution system.
- Review policy, legal and institutional frameworks to attract more private investment into the power sector. This will among others, improve coordination of institutional planning to incorporate key sectors affected and those that contribute to the energy sector.

(3) Promote Renewable Energy

Objectives

- Promote and facilitate the use of Renewable Energy Technologies (biomass, solar, gasification technologies and stoves) at household and institutional level.

Development Items

- Develop and implement a strategy for bio fuels crop growing.
- Provide subsidies for solar PV systems.
- Provide subsidies and loan systems for bio gas systems.
- Develop database for wind energy and its characteristics

(4) Promote and regulate peaceful application of atomic energy.

Objectives

- Carry out specialized training of human resource in nuclear energy.

Development Items

- Carry out specialized training of human resource in nuclear energy.
- Seek authorization of atomic energy practices with proper monitoring.
- Monitor atomic energy applications.

6.3 Water Sector Development in Kenya

6.3.1 Overview of Current Status

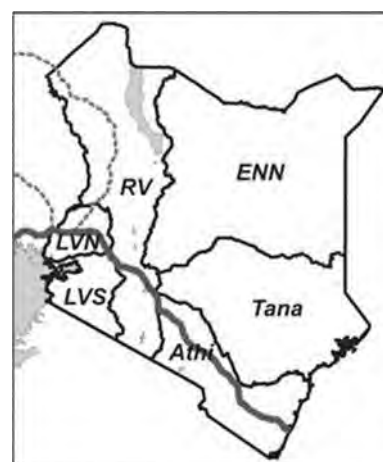
Kenya is classified as a chronically water-scarce country. Although the UN recommends per capita available water resources of 1,000 m³/year, Kenya has only 586 m³/year as of 2010. To overcome this water stress situation, the National Water Master Plan 2030 (NWMP 2030) was formulated in 2013.

With the promulgation of the Constitution of Kenya (CoK) 2010, all existing laws and public institutions had to realign to the new provisions. With the realignment, the Ministry of Water and Irrigation (MWI) drafted a Water Policy and Water Bill 2014. As of January 2016, the Bill is awaiting the final enactment for it. Accordingly, the water sector's administrative structure is in the progress of reconstituting.

From the aspect of water, the most likely bottleneck for the development of the NEC is considered to be the volume of available water resources in the country. The NWMP 2030 provides the result of water balance study by comparing the years 2010 (present) and 2030 (projection). It indicated that most sub-catchments along the NEC particularly the areas between Nairobi and Mombasa suffer from water deficit even in 2015.

It is evident from the result of NWMP 2030 that even present water demands are exceeding available water resources under the conditions of existing water resources structures. The NWMP 2030 provided a clear water resources development plan toward 2030 for the respective six catchment areas¹, which is presented in Figure 6.3.1. The real issue here is whether it will be implemented by 2030. Even the initial National Water Master Plan formulated in 1992 had slow progress up to its target year of 2010.

Based on the recent water sector review report as well as discussions with the MWI, the low development rate against the target is referable to the following factor and it could be issue on the supply side: a) social challenges with affected communities within the potential infrastructure sites. On the other hand, key issues on the demand side are analyzed by the NWMP 2030 as follows: b) insufficient water saving, and c) high level of non-revenue water.



Source: JICA Study Team

Figure 6.3.1: Catchment Areas

¹ The country consists of the six catchment areas, namely a) Lake Victoria North Catchment Area (LVNCA), b) Lake Victoria South Catchment Area (LVSCA), c) Rift Valley Catchment Area (RVCA), d) Athi Catchment Area (ACA), e) Tana Catchment Area (TCA), and f) Ewaso Ng'iro North Catchment Area (ENNCA).

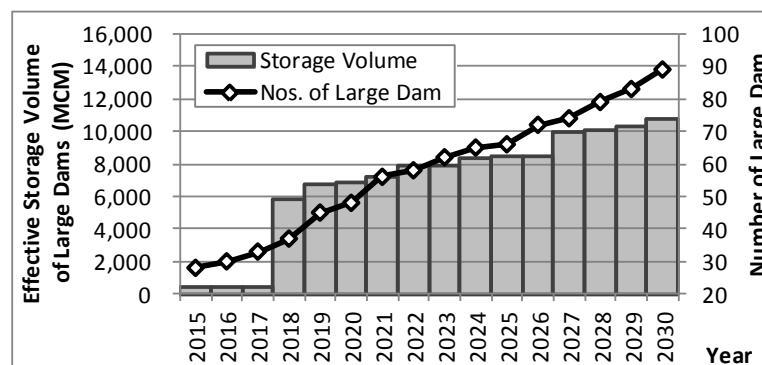
6.3.2 Review of Future Projects

To meet the rising water demand, the NWMP 2030 proposed 59 dam schemes and 10 water transfer schemes to be constructed by 2030 across the country. According to its implementation schedule, those dams are expected to be completed sequentially after 2017 as summarized in Table 6.3.1 and Figure 6.3.2 below.

Table 6.3.1: Proposed Dam Scheme

Catchment Area	Proposed Dam	
	Nos.	Effective Storage Volume (MCM)
LVNCA	7	1,080
LVSCA	10	1,000
RVCA	10	659
ACA	16	1,689
TCA	11	5,729
ENNCA	5	522
Total	59	10,679

Source: NWMP 2030 (JICA, 2013)



Source: JICA Study Team based on NWMP 2030 (JICA, 2013)

Figure 6.3.2: Storage Volume and Nos. of Dam

As seen in the graph, the total storage volume abruptly increases in 2018 because the High Grand Falls dam in TCA was expected at the study stage of NWMP 2030 to be completed in 2017. It has a storage volume of 5,000 MCM functioning as domestic and industrial water supply, irrigation (106,000 ha), power generation (700 MW) and flood control. However, not much progress has been reported since signing the contract with China State Construction Engineering Corp Ltd in May 2014 and therefore the completion will be delayed.

Out of the proposed 59 dam schemes, 15 dams have made the following progress as of January 2016 after the formulation of NWMP 2030.

- Construction commenced: 3 dams (Siyoi: LVNCA, Ruiru-A: ACA, Thiba: TCA)
- Procurement on-going: 2 dams (Thwake: ACA, Mwache: ACA)
- Financial arrangement agreed with donor: 1 dam (Itare: LVSCA)
- Detailed design completed: 3 dams (Nzoia-34B: LVNCA, Nzoia-42A: LVNCA, Nyando: LVSCA)
- Feasibility study completed: 6 dams (Londiani: LVSCA, Upper Narok: RVCA, Kamii-1: ACA, Stony Athi: ACA, Nyahururu: ENNCA, Rumurti: ENNCA)

Although the projects proposed in NWMP 2030 have not been implemented completely as scheduled, the government has been steadily advancing the water resources development projects putting priority on the flagship projects mentioned in the Kenya Vision 2030.

6.3.3 Development Scenario as Base Case

Based on the national development target described in the Kenya Vision 2030, the NWMP 2030 estimated the water demand by sub-sector for the years 2010 and 2030 as summarized in Table 6.3.2. The irrigation demand of 8,063 MCM/year in 2030 was estimated so as to fall within the available water resources through the water balance study because it was revealed that the amount of available water resources is not enough to fulfill the water demands required for the 1.2 million ha irrigation area mentioned in the Vision.

Also, it must be noted that the domestic, industrial and irrigation water demands were estimated in expectation of demand-side improvements by 2030. The non-revenue water (NRW) ratio was set at 20% for 2030 in line with the Water Sector Strategic Plan 2009 though it was 45% in 2010. The overall irrigation efficiency should be increased from 60% in 2010 to 70% in 2030 considering the successful introduction of water saving methods.

Table 6.3.2: Projected Water Demand by Sub-sector in Kenya

Sub-sector	Water Demand (MCM/year)				Basic Condition for Projection		
	2015	2020	2025	2030	Major Index (2010 / 2030)	2010	2030
Domestic	1,530	1,874	2,217	2,561	Population (million person)	38.53	67.84
Industrial	164	203	241	280	Industrial activity level by district	-	-
Irrigation	3,217	4,833	6,448	8,063	Irrigation area (ha)	141,900	765,575
Livestock	316	376	437	497	Livestock population / consumption and export	-	-
Wildlife	8	8	8	8	Wildlife population by species	-	-
Fisheries	50	58	66	74	Pond surface area (km ²) / population growth	19.01	-
Total	5,284	7,351	9,417	11,483	-	-	-

Note: The 2015, 2020, 2025 water demands are computed with the linear-proportion between 2010 and 2030 data of NWMP 2030.

Source: JICA Study Team based on NWMP 2030 (JICA, 2013)

6.3.4 Alternative Scenarios

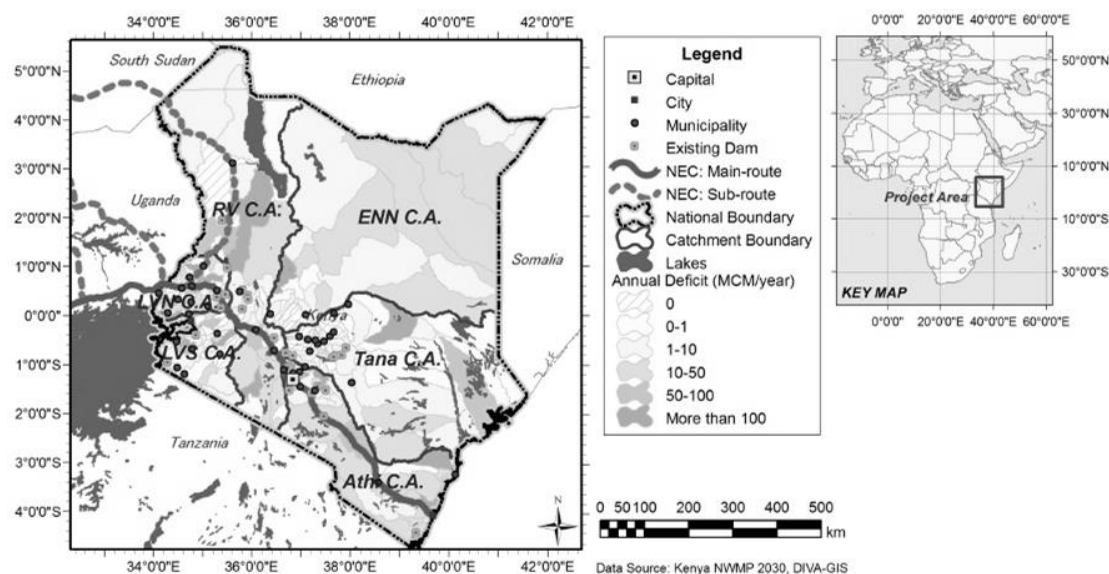
Although there is almost no change in external factors influencing the water resources development sector after the formulation of NWMP 2030, the projects proposed in the NWMP 2030 are implemented slightly behind schedule as of 2016. Accordingly, alternative scenarios may be set from the following two sides:

Supply Side: Since 59 dams were proposed to be constructed by 2030, almost four dams in average should be completed every year. However, in the fiscal year 2014/15, only two dams were commenced. Therefore, it is necessary to consider the case that dam and water transfer schemes are advanced at a half pace compared to the original implementation schedule.

Demand Side: The NWMP 2030 assumed the improved NRW ratio of 20% and irrigation efficiency of 70%. As an alternative scenario, the case without those improvements shall be compared. The domestic and industrial water demands are estimated with the NRW ratio of 45% and the irrigation water demand is estimated with the irrigation efficiency of 60% for this case.

6.3.5 Gap Assessment and Future Bottlenecks

Considering the above water demand in 2030 for the base case, water deficit was computed by sub-catchment under the existing structures conditions as shown in Figure 6.3.3. It indicates that many areas will have severer deficits in 2030 compared to 2010 with few exceptions if the condition of water resources structures would be unchanged.

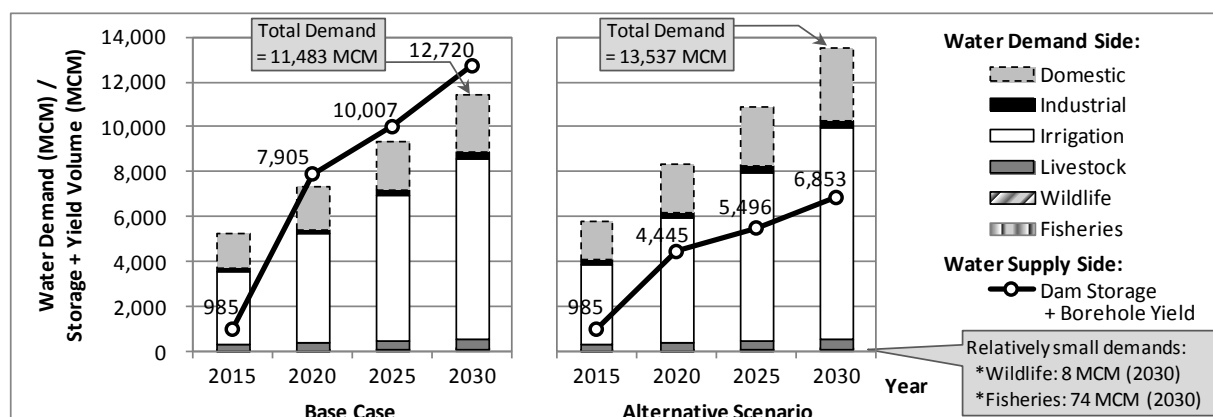


- Notes:
1. NWMP 2030 initially calculated deficit in 2030 only in the case of 1.2 million ha irrigation area. Thus the deficit in the above figure was re-estimated by deducting the reduction of irrigation water demand from the initial deficit in 2030.
 2. Irrigation demand in 2030 in some sub-catchment areas was decreased compared to 2010 through the water balance study.

Source: JICA Study Team based on NWMP 2030 (JICA, 2013)

Figure 6.3.3: Annual Deficit by Sub-Catchment in 2030 under the Existing Structures Conditions

To fulfill these deficits, the NWMP 2030 has proposed various water resources structures including dams, water pans, water transfer, boreholes and desalination. Figure 6.3.4 below provides the comparison between projected water demands and planned water storage and yield volume up to 2030. The storage and yield volume in the graph consist of i) the effective storage volume of large dam, ii) storage volume of small dam and water pan, iii) annual yield volume of borehole, and iv) annual treatment capacity of desalination.



Notes: 1. The dam storage volume in 2015 is estimated excluding hydropower dams.
2. The completion year of Umaa and Badasa dams, which are initially scheduled to be completed in 2013, was set as 2016 due to the delay in the on-going construction works.
Source: JICA Study Team based on NWMP 2030 (JICA, 2013)

Figure 6.3.4: Projected Water Demand and Planned Water Storage and Yield Volume

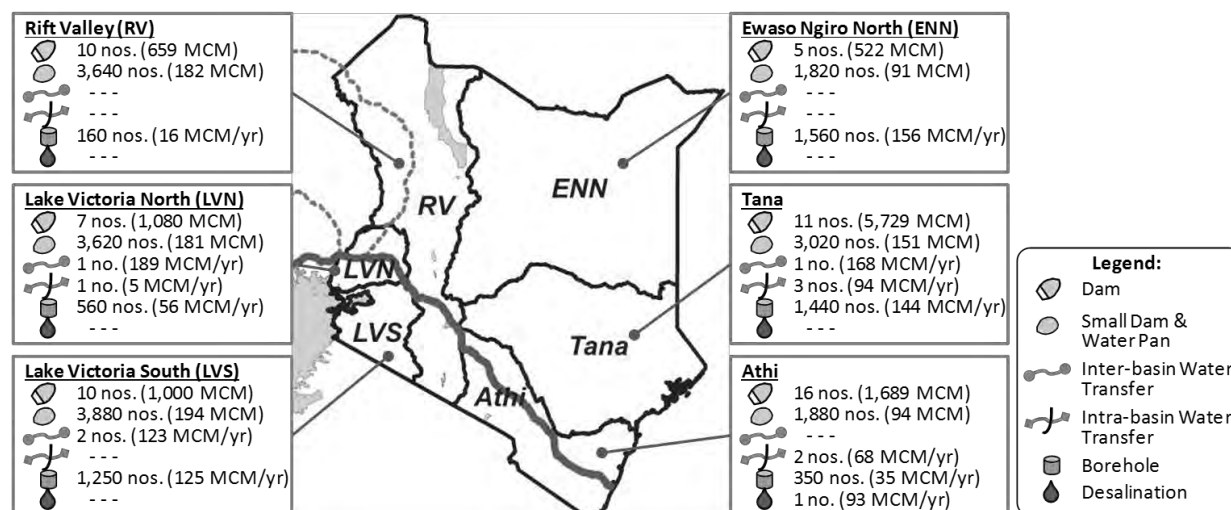
It must be noted that the effective volume of large dam includes some environmental maintenance flow which is not available for any water use, while the actual water supply volume to be allocated to each sub-sector include surface water from river and lake in addition to the storage volume. Although the storage and yield volume in the graph does not directly indicate net supply capacity, in either case the NWMP 2030 has been formulated so as to satisfy the entire water demand by 2030 if all the proposed structures are completed as scheduled.

As seen in the above graph, if the supply and/or demand sides are not improved by 2030 as planned, almost half of water demand would not be satisfied.

Major future bottlenecks in implementing the respective water resources development schemes proposed in the NWMP 2030 are considered i) social issues including resettlement of affected communities and ii) financial arrangement, as is now the case in many large infrastructure projects in the country.

6.3.6 Development Strategy

The NWMP 2030 has been formulated after taking into account all the water-related issues as well as regional development in the entire country. The development strategy in the water sector of the NEC MP is therefore to follow the plans proposed by the NWMP 2030. The water demand is scheduled to be met in 2030 by pressing ahead with the NWMP 2030 as well as the on-going projects. Its water resources development plan is summarized in Figure 6.3.5 below. Although it is not divided into short, mid and long terms, the expected achievements for each term can be approximately read from Figure 6.3.4 above. In addition, the NRW ratio and irrigation efficiency should be improved so as to minimize future water demand.



Source: JICA Study Team based on NWMP 2030 (JICA, 2013)

Figure 6.3.5: Summary of Water Resources Development Plan Proposed by NWMP 2030

6.3.7 Suggested Projects and Implementation Plan

(1) Overall Proposed Projects

The NWMP 2030 proposed 59 dam schemes and 10 water transfer schemes over the entire country to meet the water demand in 2030. Since they are located along the NEC or within the accessible area to the NEC, all of them were incorporated into the NEC MP. On the other hand, 23 water supply development projects covering 57 urban centres were selected for the NEC MP from the 137 centres proposed in the NWMP 2030. The total project costs for the water sector are summarized in Table 6.3.3 below.

Table 6.3.3: Project Cost for Water Sector in Kenya

No.	Type of Project	Nos. of Project	Cost
1	Dam scheme	59 schemes	USD 5,094 Million
2	Water transfer scheme	10 schemes	USD 1,837 Million
3	Water supply development	23 urban centre groups	USD 4,985 Million
	Total	92 projects	USD 11,916 Million

Note: NWMP 2030 estimated cost in Kenya Shilling. The JICA exchange rate as of January 2016 was applied (USD1=Ksh100.75).

Source: JICA Study Team based on NWMP 2030 (JICA, 2013)

Out of these projects, in order to clarify high priority water-related projects for the NEC MP, several projects that are strongly linked to the key industries and water-hungry industries proposed in the NEC MP were further extracted in the following clause.

(2) Process of Selecting Suggested Projects

In view of water consumption volume, the water sector of NEC MP focused attention on the rice production areas and the large scale industrial parks. The processes of selecting projects for the respective purposes are described below.

Since rice production areas always consume huge water volume, all the proposed six rice production areas were examined as described in Table 6.3.4. Out of these areas, only two areas, namely Bunyala and Tana, require new dam construction. Accordingly, the Nzoia 42A and High Grand Falls dams were nominated as suggested projects.

Table 6.3.4: Process of Selecting Projects for Rice Production Area in Kenya

No.	Rice Production Area	Irrigation Scheme Name in NWMP 2030	Designed Water Source for Irrigation Scheme	Status of Dam Scheme	Flagship Dam in Kenya Vision 2030
1	Bunyala	Lower Nzoia Irrigation Project	Weir and Nzoia 42A Dam	D/D completed	Yes
2	Ahero	Ahero and West Kano Irrigation Project	Weir and Pump	No dam	-
3	West Kano				
4	Perkera	Perkera Irrigation Extension Project	Aram and Chemususu Dams	Existing	-
5	Mwea	Mwea Irrigation Extension Project	Thiba Dam	Under construction	Yes
6	Tana	High Grand Falls Dam Irrigation Project	High Grand Falls Dam	D/D completed	Yes

Source: JICA Study Team based on NWMP 2030 (JICA, 2013)

With regard to water for industrial parks, the six priority parks were selected as presented in Table 6.3.5 below. Although several water sources may contribute to the respective industrial parks and surrounding areas, the most contributive scheme was selected as a key scheme for each park in consideration of location, status of scheme, and the flagship of the Kenya Vision 2030.

As seen in Table 6.3.5, the Athi River EPZ has a lot of water sources. Since the NEC MP put weight on industrial water rather than domestic water, it is necessary to select water sources contributing to industrial water. Out of the industrial sector, heavy chemical industries generally require large amount of water supply compared to the other industry types. The heavy chemical industries for the Athi River EPZ are largely located at south-east part of Nairobi city along the northern outside edge of the Nairobi National Park. In consultation with the MWI, the Stony Athi and Upper Athi dams that are closer to the industrial areas were selected as key scheme. Although these dams are neither defined as flagship project nor advanced in terms of status, their locations are favorable for the NEC's industrial development.

Table 6.3.5: Process of Selecting Projects for Industrial Park in Kenya

No.	Industrial Park	Major Water Sources for Industrial Park (excluding the existing structures)	Key Scheme	Status of Key Scheme	Flagship Dam in Kenya Vision 2030
1	Athi River EPZ	Ruiru-A, Kimiti 1, Stony Athi, Kikuyu, Upper Athi, Ruaka (Kiambaa), Mouuni, Ndurugu, Maragua 4, Karimenu 2, Chania-B, Thika 3A, and Ndiara Dams	Stony Athi Dam	F/S completed	No
			Upper Athi Dam	Conceptualized	No
2	Mombasa	Mwache, Rare, and Pemba Dams / Mzima Spring / Desalination Plant	Mwache Dam	Under procurement	Yes
3	Kisumu	Nandi Forest, Kibos, and Koru (Nyando) Dams	Nandi Forest Dam & Inter-basin Transfer	D/D completed	No
4	Nakuru	Itare, and Londiani Dams	Itare Dam & Inter-basin Transfer	Design under progress	Yes
5	Naivasha	Malewa Dam	Malewa Dam	F/S completed	No
6	Konza ICT park	Thwake Dam	Thwake Dam	Under procurement	Yes

Source: JICA Study Team based on NWMP 2030 (JICA, 2013)

On the other hand, demand side projects/ programs also need to be considered in addition to the above supply side projects. The water resources development plan of NWMP 2030 was formulated under the premise that 1) non-revenue water (NRW) ratio is improved from 45% to 20%, and 2) irrigation efficiency is improved from 60% to 70%. Regarding the improvement in NRW ratio, aside from the water supply system rehabilitation projects proposed by the NWMP 2030, JICA conducted the project for management of NRW in Kenya from 2009 to 2014, which achieved certain results in the selected three pilot areas. Since its second phase will be commenced nationwide after a short time, the NRW ratio is expected to be improved from the both hard and soft aspects. Similarly, irrigation efficiency should be improved through introduction of water saving methods (piled, sprinkler and drip methods) in implementing the respective irrigation schemes.

(3) Suggested Projects for Water Sector

In consequence of the above selecting process, the suggested water resources development projects are summarized in Table 6.3.6. The details are outlined in “Suggested Project List for NEC”. It must be noted that development of water supply network necessary to supply those water sources to target area should be included in the project, though the costs in Table 6.3.6 denote only construction cost for dam and water transfer scheme.

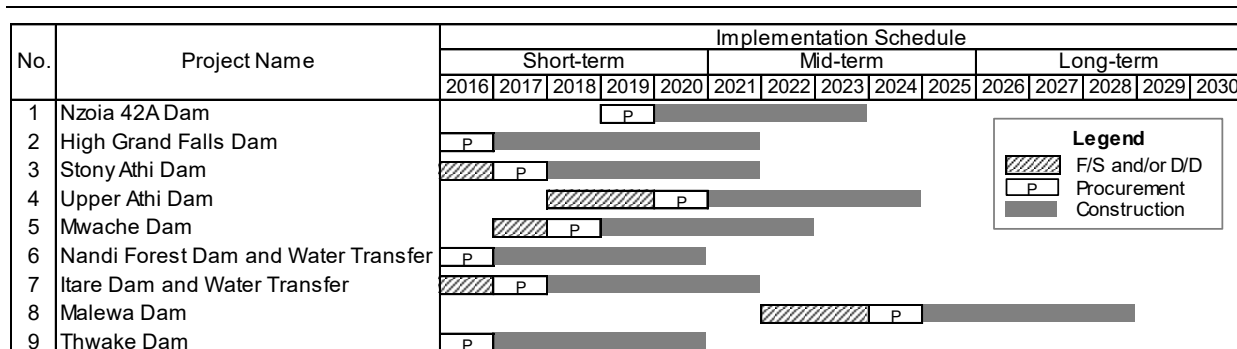
Table 6.3.6: Suggested Water Resources Projects in Kenya

No.	Name of Project	Intended Water Use	Status	Cost (USD mil.)	Remarks
1	Nzoia 42A Dam	Bunyala rice production	D/D completed	89	-
2	High Grand Falls Dam	Tana rice production	D/D completed	989	Financed by Chinese corp.
3	Stony Athi Dam	Athi River EPZ	F/S completed	40	-
4	Upper Athi Dam	Athi River EPZ	Conceptualized	28	-
5	Mwache Dam	Mombasa industrial park	Under procurement	44	Financed by World Bank
6	Nandi Forest Dam and Water Transfer	Kisumu industrial park	D/D completed	175	-
7	Itare Dam and Water Transfer	Nakuru industrial park	D/D under progress	306	Financed by Italian banks
8	Malewa Dam	Naivasha industrial park	F/S completed	43	-
9	Thwake Dam	Konza ICT park	Under procurement	89	Financed by AfDB
Total		-	-	1,803	-

Source: JICA Study Team based on NWMP 2030 (JICA, 2013)

(4) Implementation Plan of Suggested Projects

In line with the NWMP 2030, the implementation plan of the suggested projects is prepared as illustrated in Figure 6.3.6. The NWMP 2030 prepared the implementation plan considering the following priority criteria; 1) projects whose finances for implementation were ready, or almost ready; 2) projects whose D/D or F/S were completed implying that the Kenyan side put higher priority on these projects; and 3) projects whose implementation is desired from the requirements of domestic and industrial water supply or irrigation water supply.



Source: JICA Study Team based on NWMP 2030 (JICA, 2013)

Figure 6.3.6: Implementation Plan of Suggested Water Resources Development Projects for NEC in Kenya

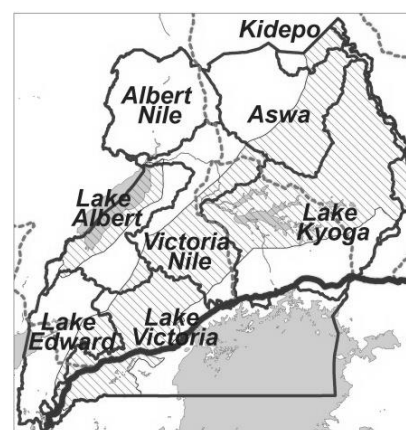
6.4 Water Sector Development in Uganda

6.4.1 Overview of Current Status

With a mean annual rainfall of around 1,200 mm, Uganda may be considered to be endowed with significant freshwater resources. However, their uneven spatial and temporal distribution coupled with the ever increasing pressure on the resource due to rapid population growth, increased urbanization and industrialization, and so forth still remains a big challenge to the sustainable water resources management and development.

As water-related concerns are growing in recent years, the study on National Water Resources Assessment (NWRA) was conducted and its final report was issued in 2013. Based on the study result, the National Water Resources Development and Management Strategy has been formulated² aiming to provide a framework for integrated management and development of the country's water resources. The strategy sets the stage for the development and management of Uganda's water resources up to the year 2040.

The 2013 assessment report provides the result of water balance study between water demands and internal renewable water resources (IRWR) by comparing the years 2009 (present) and 2030 (projection). Based on the said assessment, further water balance study on a monthly basis was conducted in this report by reviewing and modifying the future water demand. As a result, the overall water utilization rate in 2015 stands at 6.6% as summarized in Table 6.4.1. Even monthly utilization rate, which is referred to as exploitation index (EI) in the assessment report, does not exceed 100% in any catchment areas. The current situation is by no means



Notes: 1. The country consists of the eight catchments.
2. Shaded areas show cattle corridor.
Source: JICA Study Team

Figure 6.4.1: Catchment Areas

² The strategy has been already finalized but it has not been reflected to this report because it has not been provided to JICA Study Team except for its Annex-3 regardless of the repeated requests since July 2015.

critical, though shortages can be experienced at local levels at some points in time. Particularly so-called cattle corridor³ is considered to be water-scarce area and therefore a lot of valley dams and valley tanks have been constructed along the cattle corridor. The cattle corridor is shown in Figure 6.4.1.

Table 6.4.1: Annual and Monthly Water Balance by Catchment in 2015

No.	Catchment Area	Demand (MCM)	IRWR (MCM)	Annual EI (%)	Monthly Exploitation Index (%) in 2015												
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Max
1	Lake Victoria	288	1,680	17.1	38	24	12	10	12	49	54	26	16	15	11	18	54
2	Lake Kyoga	381	2,320	16.4	59	40	16	11	12	22	13	12	14	13	15	44	59
3	Victoria Nile	92	1,440	6.4	30	22	6	5	6	11	8	4	4	4	4	14	30
4	Lake Edward	78	4,470	1.7	6	2	1	1	2	4	6	2	1	1	1	2	6
5	Lake Albert	32	2,890	1.1	5	5	1	1	1	2	2	1	1	1	1	4	5
6	Aswa	40	1,770	2.2	11	11	4	2	1	2	1	1	2	2	3	11	11
7	Albert Nile	105	450	23.4	84	84	54	26	24	27	7	15	16	15	29	84	84
8	Kidepo	5	210	2.4	7	7	7	2	1	2	1	1	2	4	7	7	7
-	Miscellaneous	15	360	4.1	11	11	6	2	2	4	2	2	5	5	7	11	11
Total / Average		1,036	15,590	6.6	22	14	6	5	5	11	7	6	5	5	5	12	22

- Notes: 1. The Exploitation Index (EI = demand/IRWR) is calculated with the internal renewable water resources (IRWR); whereas in many studies it is considered in relation to the total renewable water resources.
2. IRWR represents the annual flow of rivers and recharge of aquifers generated from precipitation over the land area of Uganda. The IRWR figures are not corrected for possible losses or net contributions from the major lake surfaces.
Source: Computed by JICA Study Team based on the National Water Resources Assessment (MoWE, 2013)

From the past relevant studies as well, the current situation on water resources is not severe in a macro perspective. Although water shortage has been reported in the cattle corridor, the situation is still manageable, according to the Ministry of Water and Environment (MoWE).

6.4.2 Review of Future Projects

In terms of water resources development, key projects that may become promotional factors for the regional and industrial developments along the NEC areas are summarized as follows:

(1) Water for Production (WfP) for Rural Areas

MoWE through the WfP department is undertaking several programs to improve the livelihoods of the people in rural areas through construction/rehabilitation of dams, valley tanks, bulk water transfer schemes and irrigation schemes. As of January 2016, there are two on-going projects, one project under procurement and 14 planned projects to be implemented in the next five years for multi-purpose dams. Out of these, dams with storage of more than one MCM are summarized in Table 6.4.2 below.

Table 6.4.2: Multi-Purpose Dams to be Constructed by WfP with Storage of more than One MCM

No.	Name of Dam	District	Storage (MCM)	Status	Progress	Remarks
1	Ongole dam	Katakwi	2.5	On-going Works	10%	
2	Andibo dam	Nebbi	3.3		74%	
3	Bigasha dam	Isingiro	13.7	Under Procurement	-----	
4	Namalu dam	Nakapiripirit	4.0	Works Planned in the Next 5 Years	-----	
5	Katabok dam	Abim	2.3			

³ Cattle Corridor is the areas where animals are always on the move in search of pasture and water and is known as water-scarce area.

No.	Name of Dam	District	Storage (MCM)	Status	Progress	Remarks
6	Buteraniro dam	Sembabule	2.5			
7	Kabuyanda dam	Isingiro	10.0			Collaboration with NBI4
8	Acanpii dam	Oyam	2.5			

Source: Department of WfP, MoWE

(2) NBI⁴-led Multi-purpose Water Resources Projects

Since some part of Uganda's river basin boundaries are shared with the surrounding counties, international organizations are also conducting several studies on multi-purpose water resources development:

i) Nyimur Multi-purpose Water Resources Project

This is a trans-boundary project conducted through the NBI's Nile Equatorial Lakes Subsidiary Action Program (NELSAP)⁴ in the Aswa River basin between Uganda and South Sudan. The objectives of the multipurpose dam include flood mitigation, irrigation, hydropower, fisheries development as well as water supply and sanitation. The feasibility and design studies which started in February 2015 will be completed by December 2017.

ii) Nile Cooperation for Results (NCORE) Project

ENTRO⁵, NELSAP-CU5 and Nile-SEC5 are jointly implementing the project between February 2013 and April 2017. One of its three components aims to undertake feasibility and design studies for water resources development in the NEL5 region. The project includes two multi-purpose dams in Uganda, namely, Kabuyanda Dam (irrigation 4,300 ha; hydropower 0.1 MW) in Isingiro district and Nyabanja Dam (irrigation 5,500ha; hydropower 47 kW) in Tororo district.

(3) Water Supply Projects by NWSC

National Water and Sewerage Corporation (NWSC) intends to implement infrastructural growth projects in the next three years in several towns located along the NEC as enumerated in Table 6.4.3 below.

Table 6.4.3: Key Infrastructural Growth to be Implemented by NWSC in 2015-2018

Undertakings and Deliverables	Time Frame
Delivery of Kampala Water (Lake Victoria WATSAN project) including refurbishment of Gaba I & II and limited water network interventions, Katosi water treatment plant, and WATSAN Improvements in urban poor areas	December 2017
Substantial Completion of Uganda Water Management & Development Project in the towns of Gulu, Bushenyi, Arua and Mbale	June 2017
Integrated Project to Improve Living Conditions in Gulu (IPILC): substantial completion of phase-1 and work commencement of phase-2	June 2018

4 The NELSAP is an investment program under the Nile Basin Initiative (NBI) that promotes investments with the overall objectives of poverty reduction and economic growth. The program covers water resources management, management of lakes and fisheries, agricultural development, control of water hyacinth, and the reversal of environmental degradation. It also consists of a program area for power exchange within the region and supports the study and implementations of interconnectors.

5 ENTRO: Eastern Nile Technical Regional Office, NELSAP-CU: Nile Equatorial Lakes Subsidiary Action Program-Coordinating Unit, Nile-SEC: Nile Basin Initiative Secretariat, NEL: Nile Equatorial Lake

Undertakings and Deliverables	Time Frame
South West Water & Sanitation Project (Mbarara-Masaka Corridor): completion of FS & pre-design, work commencement	June 2018
Completion of New Intake for Soroti	October 2016
Preparation of bankable project proposals for expanding water and sewerage infrastructure in priority towns: Fort portal, Kasese, Lira, Kitgum, Bugiri and Soroti	June 2018

Source: Abstracted by JICA Study Team from the NWSA Corporate Plan July 2015 - June 2018

6.4.3 Development Scenario As Base Case

The future water demands by sub-sector were estimated mainly based on the socio-economic frameworks set in the National Water Resources Assessment (NWRA 2013) as summarized in Table 6.4.4. The domestic and irrigation water demands in 2030 have been estimated in the NWRA 2013 based on the population projected by UNPD⁶ and the potential irrigation schemes identified by Hydromel⁷, respectively. The industrial and livestock water demands in 2030 were modified in line with the respective sector GDP growth rates projected by the JICA Study Team because NWRA 2013 set exactly the same demands for both 2009 and 2030 without apparent reason. Besides, the wildlife and fisheries water demands were newly estimated by using wildlife population and fish pond's surface area, respectively, because NWRA 2013 did not estimate them.

Table 6.4.4: Projected Water Demand by Sub-sector in Uganda

Sub-sector	Water Demand (MCM/year) ^{*1}				Basic Condition for Projection		
	2015	2020	2025	2030	Major Index (2009 / 2030)	2010	2030
Domestic	286	401	516	630	Water production / Population (million person)	33.8	60.8
Industrial	46	63	85	111	Water production / GDP growth [Ave. 5.9% ^{*4}]	-	-
Irrigation	396	706	1,016	1,326	Irrigation area (ha)	4,124	249,048
Livestock	264	311	361	409	Livestock population/ GDP growth [Ave. 3.0%]	-	-
Wildlife ^{*2}	1.5	1.5	1.5	1.5	Wildlife population by species	-	-
Fisheries ^{*3}	42	49	56	63	Pond surface area (km ²) / population growth	16	-
Total	1,036	1,532	2,035	2,540	-	-	-

Notes: *1. The 2015, 2020, 2025 water demands are computed with the linear-proportion between 2009 and 2030 data based on the NWRA report (MoWE, 2013).

*2. Calculated based on Uganda Wildlife Authority (UWA) survey reports and assumed that future water demand will remain constant as efforts are being made to sustain the wildlife population.

*3. Calculated as the amount of water required to compensate for the evaporation and percolation losses from the surface of fish ponds for aquaculture production.

*4. The industry growth rate for no oil production factor was used for estimating industrial water demand because oil development itself consume little water resources.

Source: JICA Study Team based on NWRA 2013 (MoWE, 2013), Technical reports for aerial wildlife surveys (UWA, 2009/2014)

6.4.4 Alternative Scenarios

In the course of formulating the National Water Resources Development and Management Strategy, according to its draft version, four scenarios were prepared in order to assess the hydrological and environmental impact and economic benefit. The scenarios are outlined in Table 6.4.5 below, though there is a difference in the target years:

⁶ UNPD: United Nations Population Division

⁷ Upper Nile Hydromel Survey Project (1967-1982) supported by UNDP/WMO

Table 6.4.5: Outline of Alternative Scenarios for Water Resources Development

No.	Scenario	Sub-sector to be Considered	Notes for Estimation of Water Demand
1	S0	Include 2040 domestic, livestock and oil & gas water demands as well as the existing hydropower and irrigation development	---
2	S1	S0 + addition of 2040 hydropower potential	Hydropower is a non-consumptive use of water.
3	S2	S1 + addition of 2040 wetland irrigation potential (247,000 ha)	Irrigation water demand for 247,000 ha is almost included in the base case.
4	S3	S2 + addition of full 2040 upland irrigation potential (437,000 ha)	Irrigation water demand for 437,000 ha has not been estimated and it should be calculated as needed after the details including locations, crop types and cropping patterns are determined.

Source: JICA Study Team based on National Water Resources Development and Management Strategy (MoWE, draft as of 2013)

In general, hydropower generation is a non-consumptive use of water. Thus the major difference between the scenarios in terms of water demand is whether wetland and/or upland irrigation potentials are added or not. Since the irrigation areas estimated for the base case in the previous section 6.4.3 correspond approximately to the above wetland irrigation (S2), the issue here is whether the upland irrigation is further added or not.

According to the NWRA 2013 report, the upland irrigation potential area of 437,000 ha was estimated to be 10% of the existing cultivated area and therefore does not represent an actual resource assessment. Also, the National Irrigation Master Plan 2010-2035 (MoWE, 2011) set up a target of 253,000 ha by 2035. Accordingly, the upland irrigation potential should not be included in the development scenario for this master plan, though it remains possible that upland irrigation might be added to a development plan toward 2040 as needed.

6.4.5 Gap Assessment and Future Bottlenecks

Considering the above water demand in 2030, annual and monthly water utilization rates were estimated by catchment as summarized in Table 6.4.6. Unlike the Kenya's case described in the previous section, the existing water storage capacities are not taken into account in the water balance study for Uganda. Although there are a number of water resources structures across the country, their storage capacities have not been clearly identified and also many of them have relatively small capacities for water balance study. Furthermore, it must be noted that the internal renewable water resources used in the calculation does not consider deducting environmental maintenance flow.

Table 6.4.6: Annual and Monthly Water Balance by Catchment in 2030

No.	Catchment Area	Demand (MCM)	IRWR (MCM)	Annual EI (%)	Monthly Exploitation Index (%) in 2030												
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Max
1	Lake Victoria	635	1,680	37.8	82	51	25	23	26	110	110	59	37	34	25	39	110
2	Lake Kyoga	1,023	2,320	44.1	154	105	42	31	33	63	34	31	38	35	38	118	154
3	Victoria Nile	228	1,440	15.8	72	54	14	13	15	29	19	9	10	9	10	36	72
4	Lake Edward	177	4,470	4.0	13	5	3	2	4	9	14	5	3	2	3	6	14
5	Lake Albert	61	2,890	2.1	9	8	2	1	2	3	3	2	1	1	1	7	9
6	Aswa	81	1,770	4.6	25	25	7	3	3	4	2	3	3	4	6	25	25

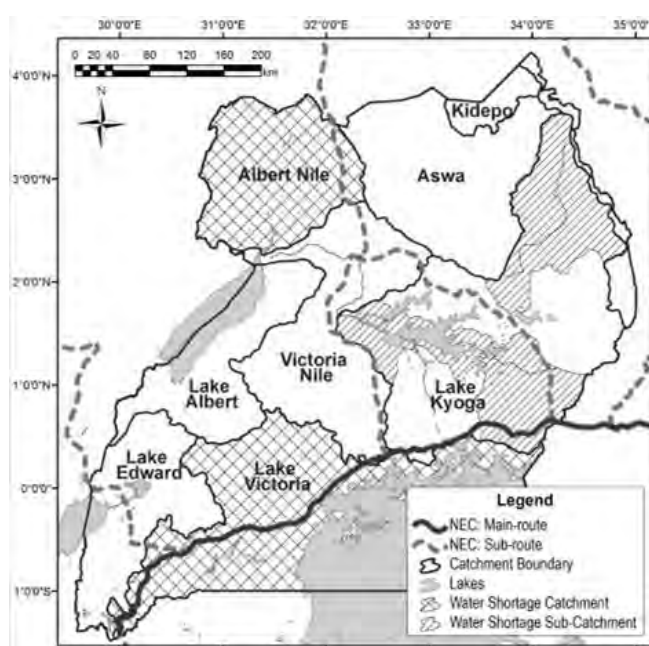
No.	Catchment Area	Demand (MCM)	IRWR (MCM)	Annual EI (%)	Monthly Exploitation Index (%) in 2030												
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Max
7	Albert Nile	301	450	66.8	222	222	160	77	72	79	14	42	47	42	84	222	222
8	Kidepo	9	210	4.2	13	13	13	3	3	3	2	2	4	6	13	13	13
-	Miscellaneous	26	360	7.3	20	20	11	5	4	7	4	4	8	10	12	20	20
Total / Average		2,540	15,590	16.3	52	33	15	12	14	29	16	14	12	11	12	30	52

Notes: 1. The Exploitation Index (EI = demand/IRWR) is calculated with the internal renewable water resources (IRWR); whereas in many studies it is considered in relation to the total renewable water resources.
2. IRWR represents the annual flow of rivers and recharge of aquifers generated from precipitation over the land area of Uganda. The IRWR figures are not corrected for possible losses or net contributions from the major lake surfaces.
Source: Computed by JICA Study Team based on the National Water Resources Assessment (MoWE, 2013)

As seen in the table, monthly exploitation index (EI) exceeds 100% for a few months in the following three catchment areas. This means that available water resources will not be sufficient for the future water demand in 2030, though the annual EI values of less than 100% give a false impression as if demands were satisfied. Furthermore, OECD (Organization for Economic Co-operation and Development) defines the situation as “under severe water stress” in case the annual EI exceeds 40%. The respective water shortage areas are presented in Figure 6.4.2.

In the Lake Kyoga catchment, which stands at the second highest annual EI of 44.1%, a comprehensive study⁸ on water resources development and management was conducted in 2009-2011. The study also concluded that the exploitable volume of water resources even for the 1/3 probable drought year is only able to meet the water demand until around 2025. According to the said study, 5 sub-catchment areas of Lake Kyoga catchment will have water deficit particularly between December and March. In this regard, the above monthly water balance study represents a similar result and therefore it is considered reliable, though there is a difference in computed accuracy between catchment and sub-catchment.

Although the water deficit in the Lake Victoria catchment is not large and limited to the dry season between June and July, the main route of NEC pass through this area and thus it is considered important catchment area for this master plan. Particularly this catchment accounts for 89% of total industrial water demand of the country. Also the catchment is characterized by the high



Source: JICA Study Team

Figure 6.4.2: Water Shortage Areas in Uganda

⁸ Development Study on Water Resources Development and Management for Lake Kyoga Basin (JICA, March 2011)

proportions of domestic (34%) and industrial (15%) water demands out of the total demands of the catchment.

The Albert Nile catchment has high EI values because this area has fairly large irrigation potential areas compared to relatively little rainfall amount. The groundwater level in this area is considered high and therefore the farming activities mostly rely on groundwater as well as water pumped from local stream. Currently, as far as MoWE recognize, the Albert Nile catchment has very few reservoirs and it does not have even future plans for large scale water resources development.

Since this water balance study is rough calculation at catchment level, it is desirable to conduct more detailed assessment at sub-catchment level particularly in the areas that have high EI values. In addition, as pointed out by the NWRA 2013 report, it is further important to bear in mind that not all renewable water resources can be exploited.

6.4.6 Development Strategy

Based on the above gap assessment, the development strategy is set for three catchment areas where water shortage is anticipated in the future as follows.

(1) Lake Kyoga Catchment

The above-mentioned Kyoga study⁸ has been carried out for the specific area on the basis of more detailed studies than those of this NEC study. As a consequence of the study, the Basic Plan on Water Resources Development and Management for Lake Kyoga Basin was formulated. Therefore, the NEC study will follow the line suggested by the basic plan. It decided that groundwater should be used mainly for rural domestic water, while surface water from river and lake should be used for agricultural and urban domestic water. Although no specific measure for agricultural water use is planned in the Kyoga study, it proposed to carry out the rehabilitation and the study for newly construction of earth dams and valley tanks in the five priority sub-catchments, which were identified through a detailed water balance study. One of the candidate dams will be the Nyabanja dam written in the section 6.4.2. The components proposed by the Kyoga study related to the water use in the regional development for the NEC master plan are summarized in Table 6.4.7 below.

Table 6.4.7: Components of the Kyoga Study Related to the Regional Development for NEC

Component		Descriptions	Short-term	Mid-term	Long-term
1. Comprehensive Water Resources Management	1-1 Water Resources Assessment	Gauging station and monitoring network for river, lake, groundwater and meteorology	✓		
	1-2 Organization Strengthening for WRDM	1) Setting up sub-basin liaison council 2) Capacity development of DWRM	✓	✓	
2. Effective, Stable and	2-1 Controlling Water Demands	1) Effective water use 2) Introduction of water-saving technology 3) Awareness of water user	✓	✓	(✓)

Component	Descriptions	Short-term	Mid-term	Long-term
Equitable Water Supply	2-2 Increasing Water Supply through WRDM 1) Urban water supply (small town dominant) 2) Rural water supply 3) Agricultural water supply	✓	✓	(✓)

Notes: WRDM = Water Resources Development and Management, DWRM = Directorate of Water Resources Management
Source: Abstracted and summarized by JICA Study Team based on the JICA Kyoga Study (JICA, 2011)

(2) Lake Victoria Catchment

There has been neither specific water resources assessment nor development plan for the Lake Victoria catchment so far. Although the Victoria Lake provides water resources to some extent to the lakeside area, the intake volume from the lake should be controlled in accordance with the internationally agreed rules. Therefore, it would be necessary to take water before it flows into the lake by constructing water storage structures. Firstly, it is required to conduct water resources assessment at sub-catchment level as an action in the short-term. Thereafter, water resources development will be planned and implemented in the mid to long-terms as needed depending on the result of assessment. As mentioned in the section 6.4.2, currently the feasibility and design studies on the Kabuyanda dams, which will be located in Isingiro district within the catchment, is being conducted. It should be incorporated into the catchment plan depending on the study result, though it may cover only a part of irrigation areas. Key factors in the assessment and planning for this catchment will be the water-saving method in domestic and industrial water use.

(3) Albert Nile Catchment

As is the case with the above Lake Victoria catchment, neither specific assessment nor plan for the Albert Nile catchment has been prepared. However, the reason why the water resources are not insufficient in this area is that all the potential irrigation areas are incorporated into the water balance study. The balance is not computed based on an actual irrigation development plan. And those potential areas are not included in the rice production areas for the NEC MP. Therefore, the Albert Nile catchment will require more detailed water resources assessment at sub-catchment level once the irrigation development plan become clear in the future.

6.4.7 Suggested Projects and Implementation Plan

(1) Overall Proposed Projects

The NEC MP focused attention basically on the relatively large-scale water resources development projects, which are principally led by NBI, because the WFP activities steadily cover small-scale development for rural water use for domestic, small irrigation and livestock purposes. The projects list includes an integrated study on water resources development and management for the Lake Victoria catchment. On the other hand, two water supply development projects and two related studies covering 13 major cities in total were selected for the NEC MP. The total project costs for the water sector are summarized in Table 6.4.8 below.

Table 6.4.8: Project Cost for Water Sector in Uganda

No.	Type of Project	Nos. of Project	Cost
1	Dam scheme	3 schemes	USD 270 Million
2	Study on water resources	1 study	USD 1 Million
3	Water supply development	2 projects	USD 367 Million
4	Study on water supply development	2 studies	USD 2 Million
Total		8 projects	USD 640 Million

Note: The JICA exchange rate as of January 2016 was applied (USD1=EUR0.91).

Source: JICA Study Team based on NWSC and NBI documents

As with the case of Kenya, some projects that are strongly linked to the key industries proposed in the NEC MP were further extracted in the following clause.

(2) Process of Selecting Suggested Projects

In view of water consumption volume, the water sector of NEC MP focused on the rice production areas and the large scale industrial areas as described below.

The major four rice production areas proposed in the NEC MP are neither the existing irrigation areas nor the potential irrigation areas identified in NWRA 2013. This means that rain-fed rice cultivation and/or small-scale irrigation using valley tanks have been performed in those areas. Therefore, no particular water resources development for the NEC's rice production areas will be required. However, out of the three planned dam schemes, the Nyabanja and Kabuyanda dams are very close to the NEC main route. Those dams were therefore selected as suggested projects because they are considered contributive to the regional development along the NEC.

With regard to industrial water use, the major water-hungry industries proposed in the NEC MP are outlined in Table 6.4.9 below. Although particular water requirement for the petroleum industry in Hoima is not counted in the water balance calculation, its monthly water replacement is approximately estimated at 0.84 MCM/month based on the average petroleum industries in Japan because the recycle rate of petroleum industry is quite high. Considering the high IRWR of more than 50 MCM/month and the low monthly EI of 9% at maximum in the Lake Albert catchment, the required water is readily supplied by surface water.

Table 6.4.9: Process of Selecting Projects for Industrial Area in Uganda

No.	Key Industrial Area	Type of Industries	Catchment Area	Status of Key Scheme
1	Kampala to Jinja	Miscellaneous	Lake Victoria	Further assessment study is required.
2	Hoima	Petroleum processing & product	Lake Albert	Sufficient surface water resources are available.
3	Nakasongola	Agricultural processing & product	Lake Kyoga	Included in the Kyoga basic plan8.

Source: JICA Study Team

Accordingly, only the study on water resources development and management for the Lake Victoria catchment was selected. Since the industrial areas between Kampala and Jinja are located close to the catchment boundaries, it will be necessary to consider water transfer scheme from the adjacent parts of Victoria Nile and Kyoga catchments as needed.

(3) Suggested Water Resources Development Projects

In consequence of the above selecting process, the suggested water resources development projects are summarized in Table 6.4.10. The details are outlined in “Suggested Project List for NEC”.

Table 6.4.10: Suggested Water Resources Projects in Uganda

No.	Name of Project	Intended Water Use	Status	Cost (USD mil.)	Remarks
1	Study on Water Resources Development and Management in the Lake Victoria Catchment	Industrial areas between Kampala and Jinja	Conceptualized by NEC MP	1	Cost for study
2	Nyabanja Dam	Rice production / Industry	Feasibility and Design Studies under progress	95	-
3	Kabuyanda Dam	Rice production / Industry		55	-
Total		-	-	151	-

Source: JICA Study Team based on NBI documents

(4) Implementation Plan of Suggested Projects

In consideration of the current status of projects, the implementation plan of the suggested projects is prepared as illustrated in Figure 6.4.3 below.

No.	Project Name	Implementation Schedule														
		Short-term					Mid-term					Long-term				
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1	Study on WR in Lake Victoria CA															
2	Nyabanja Dam															
3	Kabuyanda Dam															

Legend

- F/S and/or D/D
- P Procurement
- Construction

Note: WR = Water Resources, CA = Catchment Area

Source: JICA Study Team based on NWMP 2030 (JICA, 2013)

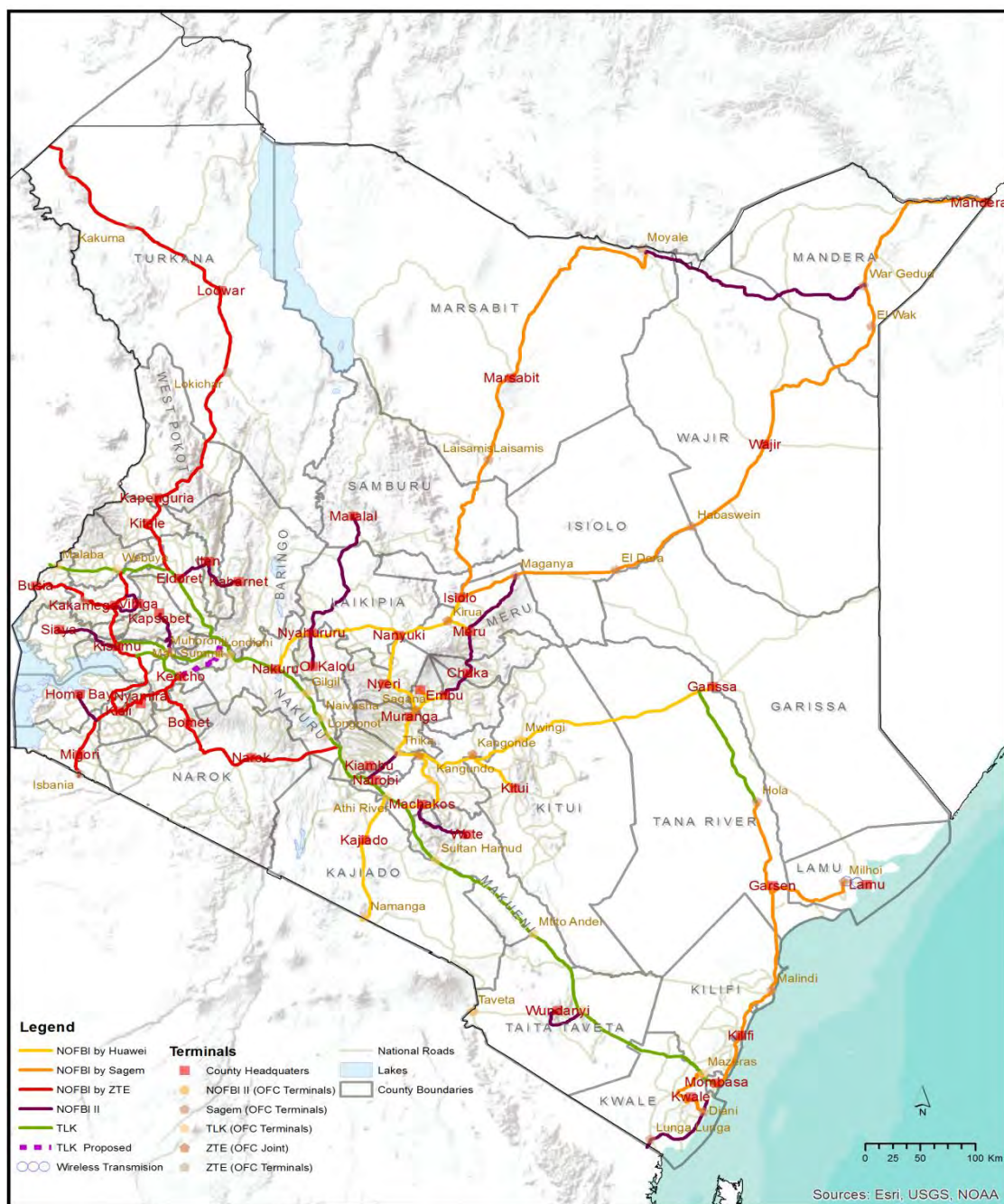
Figure 6.4.3: Implementation Plan of Suggested Water Resources Development Projects for NEC in Uganda

6.5 Review of Information, Communication and Technology (ICT)

6.5.1 Overview of Fiber Cable Network in Kenya

Currently, Kenya is connected to the international broadband highway through the SEACOM, TEAMS (The East African Marine System, EASSY (Eastern Africa Submarin Cable System), and LION (Lower Indian Ocean Network) undersea fiber cables.

Most major towns in Kenya are connected through the National Optic Fiber Backbone Infrastructure (NOFBI). NOFBI is a project being implemented by the ICT Authority for the Ministry of ICT and it aims at ensuring connectivity in all the 47 counties. The implementation of this project aims to ease communication across counties as well as improve government service delivery to the citizens. This project once fully implemented, will cover 2,100 km of fiber cable in all 47 Counties. The NOFBI Backbone Fiber Optical Transmission Network is shown in the Figure 6.5.1.



Source: ICT Authority of Kenya

Figure 6.5.1: NOFBI Backbone Fiber Optical Transmission Network

There are two phases of NOFBI:

1) NOFBI Phase I

Phase I of the project established a NOFBI with access points in most of the district headquarters and some border towns.

Total distance of cable: 4,300 km – completed in 2009. Fiber backbone passes through 57 towns in 35 counties across Kenya.

2) NOFBI Phase II

NOFBI Phase 2 was to further increase the coverage and safety protection of the existing transmission network, so as to enable the local government departments of the 47 counties to form an efficient transmission network with the central government.

Total distance of NOFBI Phase II cable: 2,100 km – currently under implementation to be completed in Dec 2015. The objectives of Phase 2 are:

- Project to cover all 47 county Headquarters
- Will provide Last Mile Fiber Connectivity to County Headquarters from the Backbone
- Will also provide network redundancy for NOFBI phase I links

As at end of May 2015, there are 18 counties remaining and they ought to be completed by December 2015.

6.5.2 Overview of Fiber Cable Network in Uganda

Fiber cable network deployment in Uganda is around 5,110.65 km which is laid by both the Government and Private Sector. The Government of Uganda, through the National Information Technology Authority - Uganda (NITA-U) is implementing the National Data Transmission Backbone Infrastructure and e-Government Infrastructure Project (NBI/EGI) whose major objective is to connect all major towns and Government agencies within the country onto a high speed Optical Fiber Cable based Network.

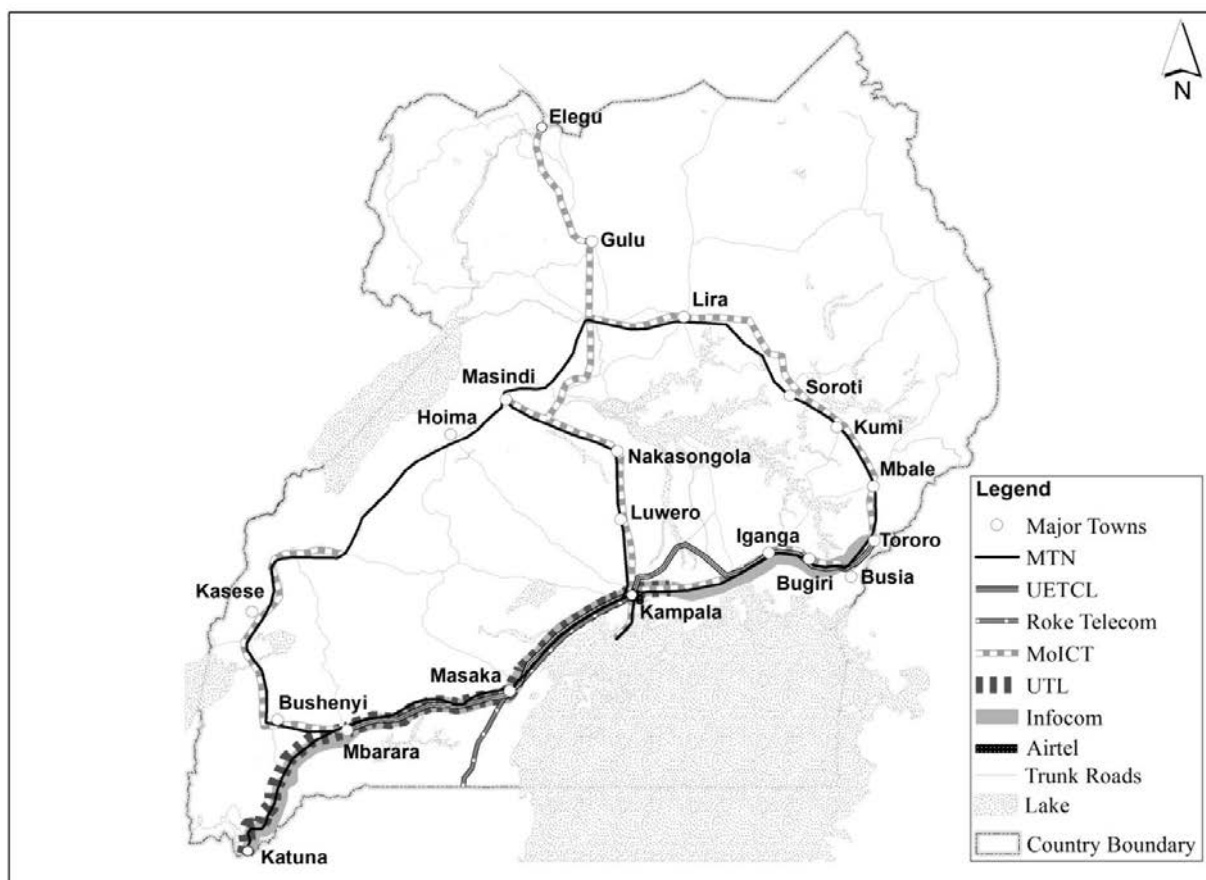
Currently NITA-U has extended connectivity to a total of 48 Government entities which are now utilizing the Internet Bandwidth provisioned through the National Data Transmission Backbone Infrastructure (NBI).

NBI/EGI is being implemented in 3 phases.

- **Phase I:** Connected Kampala, Mukono, Jinja, Bombo and Entebbe and 27 Government Ministries and Departments to a 198km of optical fiber cable.
- **Phase II:** Connected Busia, Tororo, Mbale, Malaba, Kumi, Soroti, Lira, Gulu, Elegu, Masindi, Kyenjojo, Fort Portal, Kasese, Bushenyi and Mbarara to a 1,400 km of optical fiber cable.
- **Phase III (on-going):** NITA-U will extend connectivity to the towns of Masaka, Mutukula, Mbarara, Kabale and the Katuna Border Post.

The main issue of fiber cable in Uganda is the duplication of long-haul fiber along major road routes with metro networks in Kampala and Wakiso districts. With 5,110.65 km of fiber cable, most of this is route duplication, reducing to just over 2,100 km. There are about 282 km of Kampala's metro fiber network, and about 57 districts have no fiber on their land (57%) and 1031

sub-counties do not have any fiber traversing any of their boundaries. The map of optic fiber cable in Uganda is shown in the Figure 6.5.2.



Source: ICT Sector Strategy and Investment Plan (2015 – 2020)

Figure 6.5.2: Map of Optic Fiber Cable in Uganda

6.5.3 Development Scenario for NEC

As discussed above, the National Optic Fiber Backbone Infrastructure (NOFBI) of Kenya and the National Data Transmission Backbone Infrastructure (NBI) of Uganda has been connected to the district headquarters of both Kenya and Uganda. The optic fiber cable network should be extended to cover the entire of Northern Corridor. The Ministries responsible for ICT infrastructure in the member states agreed to incorporate fiber optic access facilities particularly the ducts in regional infrastructure projects. In Kenya, they have drafted a bill that will enable ICT infrastructure to be incorporated in the Northern Corridor Integration Projects. And in Uganda, installation of the fiber access facilities particularly has the ducts already been included in the Standard Gauge Railway (SGR), oil pipelines and power lines projects. The ducts will be installed parallel to standard gauge railway lines, oil pipelines and power lines. In future, fiber will be installed in such ducts by the Government or private sector

The development scenario of ducts for optic fiber cable assumes installed parallel to standard gauge railway as follows:

Short term (2020):

- Implement the ducts along SGR from Mombasa to Kampala (the main route).
- Issue a bill that will enable ICT infrastructure to be incorporated in the Northern Corridor Integration Projects.

Medium term (2025):

- Implement the ducts along SGR from Gulu to sub-route.

Long term (2030):

- Implement the ducts along SGR from Kampala to sub-route.

6.5.4 Development Strategy for NEC

A development strategy for NEC as in the Table 6.5.1:

Table 6.5.1: Development Strategy for NEC

Year	2015	2020	2025	2030
Route		Mombasa-Nairobi Nairobi-Naivasha Nairobi-Bomet-Eldoret Nairobi-Nakuru-Eldoret Eldoret-Malaba Naivasha-Kisumu Kampala-Tororo-Malaba Tororo-Soroti	Soroti-Gulu Gulu-Pakwach Gulu-Nimule	Kampala-Kasese Bihanga-Mirama Hills Mirama Hills-Kigali
Total length (km)		1,864	493	744

Source: JICA Study Team

6.5.5 Suggested Projects and Implementation Plan

Currently, the fiber optic cable network was built by both the government and private sectors. This will lead to duplication and sometime overprovision especially in the urban areas, leaving rural communities underserved. The traditional licensing framework that required voice and data service providers to deploy their own infrastructure was a barrier to entry for new players into the ICT market. In addition, weak enforcement of infrastructure sharing has led to high costs of network expansion and has limited innovative approaches to expansion. To solve this issue, sharing infrastructure should be developed and implemented.

Sharing ducts

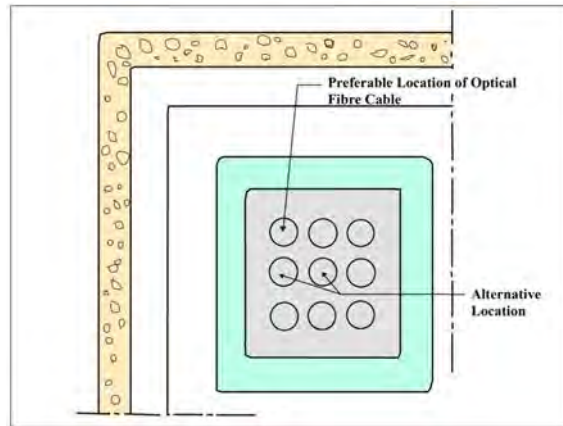
Objectives

- Reduce costs and digging buried optic fiber cable and minimize the dubbing of optic fiber cable.

Development Items

- Issue a bill that will enable ICT infrastructure to be incorporated in the Northern Corridor Integration Projects.
- Construction the ducts which runs along the Northern Corridor

The typical duct is shown in Figure 6.5.3



Source: Guidelines for Installation and Maintenance of external Communication Infrastructure

Figure 6.5.3: Typical Duct

CHAPTER 7 ORGANIZATIONS

7.1 Organizations Related to Northern Economic Corridor

7.1.1 Overview

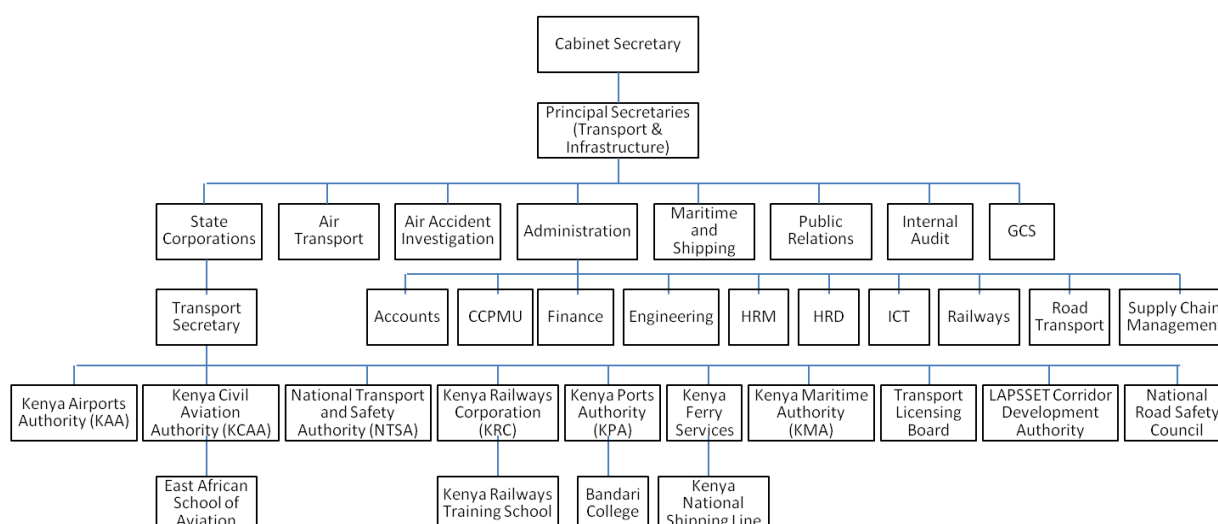
Though government ministries and organizations, private sector, communities of various sectors are related to Northern Corridor development, description here is focused on 3 essential sectors: transport, industry and logistics/customs.

(1) Organizations in Kenya

Below are list of major stakeholders in the transport sector, industry sector and logistic sector in Kenya.

Transport

Ministry of Transport, Infrastructure, Housing and Urban Development (MoTIHUD): consists of five State Departments: Transport, Infrastructure, Public Works, Maritime and Housing & Urban Development; its key task is to position Kenya as the logistics hub of the East African region by creating a modern and efficient transport system for goods and services within the country and also with other countries in the region. (See Figure below for the organizational structure.)



Source: Ministry of Transport and Infrastructure, Kenya

Figure 7.1.1: Organizational Structure of Ministry of Transport and Infrastructure, Kenya

Kenya Roads Board (KRB): established to control the Road Maintenance Levy Fund; its main objective is to oversee the road network in Kenya and thereby coordinate its development, rehabilitation and maintenance and to be the principal adviser to the Government on all matters related thereto.

Kenya National Highway Authority (KeNHA): autonomous road agency, responsible for the management, development, rehabilitation and maintenance of international trunk roads linking centres of international importance and crossing international boundaries or terminating at international ports (Class A roads), national trunk roads linking internationally important centres (Class B roads), and primarily roads linking provincially important centres to each other or two higher-class roads (Class C roads).

Kenya Urban Roads Authority (KURA): mandated to manage, develop, rehabilitate and maintenance all public roads in the cities and municipalities in Kenya except national roads.

Kenya Rural Roads Authority (KeRRA): mandated to offer guidance in the construction, rehabilitation, maintenance and management of the rural roads (Class D, E and Others) network in the country.

Kenya Port Authority (KPA): manage and operate Ports in Kenya and Inland Container Depots (ICD)/Dry Ports.

Kenya Aviation Authority (KAA; construct, control and manage aerodromes and relative facilities), Kenya Railways Corporation (KRC; provide railways service) are also key players besides above organizations.

Industry

Ministry of Trade, Industry and Cooperatives (MoIED): mandates to formulate the appropriate policy, legal and regulatory framework to create an enabling environment for a globally competitive, sustainable Industrial, enterprise and co-operative sector.

Ministry of Agriculture, Livestock and Fisheries (MALF): regulates some key agro-processing sectors which require licensing for processing and trading.

Agriculture, Fisheries and Food Authority (AFFA): mandated to regulate, develop and promote agricultural and aquatic products. They collect and collate related data, maintain a database, and also advise the national and county governments on agricultural and aquatic levies.

Logistics/ Customs

Kenya Revenue Authority (KRA): charged with the responsibility of collecting revenue on behalf of the Government of Kenya. Focusing at the Mombasa Port, it manages the customs procedure and bonded warehouse/area as well as CFS.

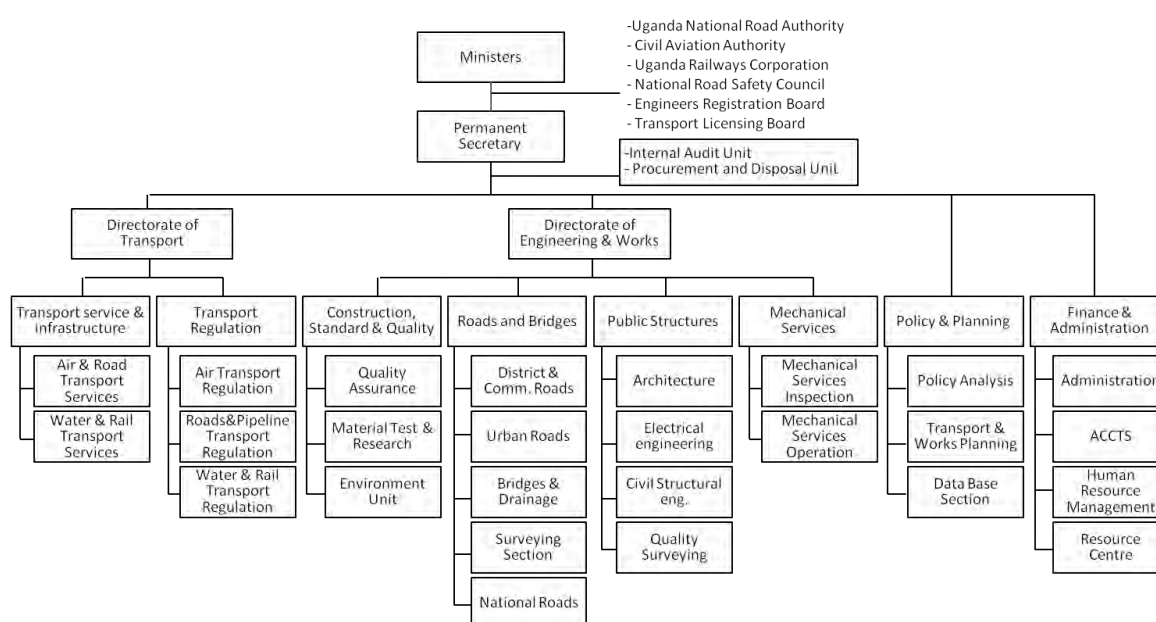
Kenya Bureau of Standard (KEBS): mandated to provide standardization and conformity assessment services through promotion of standardization in commerce and industry, product and system certification, and so on.

(2) Organizations in Uganda

Below are the list of major stakeholders in transport sector, industry sector and logistic sector in Uganda.

Transport

Ministry of Works and Transport: responsible for planning, developing and maintaining transport infrastructure and engineering works in Uganda. They engage in the monitoring and provision of transport infrastructure support functions, regulatory functions and research activities related to roads, rail, water or air transport and other engineering works. (See Figure 7.1.2 for the organizational structure.)



Source: Ministry of Works and Transport, Uganda

Figure 7.1.2: Organizational Structure of Ministry of Works and Transport, Uganda

Uganda National Roads Authority (UNRA): develop and maintain a national roads network that is responsive to the economic development needs of Uganda, to the safety of all road users, and to the environmental sustainability of the national roads corridors.

Uganda Road Fund (URF): provide adequate financing for maintenance of public roads.

Civil Aviation Authority (CAA; construct, control and manage aerodromes and relative facilities), Uganda Railways Corporation (URC; provide railways service) are also key players besides above organizations.

Industry

Ministry of Trade, Industry and Cooperatives (MoTIC): mandated to formulate, review and support policies, strategies, plans and programs that promote and ensure expansion and

diversification of trade, cooperatives, environmentally sustainable industrialization, appropriate technology development and transfer to generate wealth for poverty eradication and benefit the country socially and economically.

Uganda Industrial Research Institute (UIRI): undertake applied research and develop and/or acquire appropriate technology to create a strong, effective and competitive industrial sector in Uganda.

Management Training and Advisory Centre (MTAC): establishment having a range of different diploma and certificate courses, which are instrumental in the industry and other economic sectors in improving management practices and assisting Ugandans become entrepreneurs and job creators.

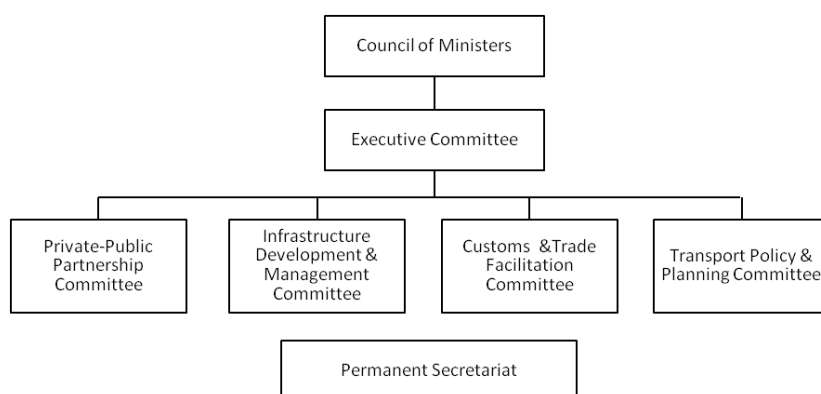
Logistics/ Customs

Uganda Revenue Authority (URA): asses and collect specified revenue, enforce the related laws and provide for related matters.

(3) Organizations for NEC Regional Areas

Several organizations have been established in order to cover NEC regional area. Below are the key stakeholders.

Northern Corridor Transport and Transit Coordination Authority (NCTTCA): formed by 6 member countries (Kenya, Uganda, Rwanda, Burundi, DR Congo and South Sudan) and established under the legal framework of NCTTCA to coordinate the implementation of the Agreement to overcome transit transport constraints affecting 6 countries and to promote an efficient, cost-effective and reliable transit transport system and to carry out decisions and resolutions reached by policy organs of the Authority. There are 11 protocols such as road, railway, inland waterways, custom, port, etc. The Authority is based in Mombasa and its three key organs comprise the Council of Ministers, the Executive Board and the Executive Secretariat. The Executive Secretariat is headed by an Executive Secretary, supported by three Technical Experts and other nontechnical staff. The Council of Ministers have been held 28 times and last one was held in June 2016. In addition, there are Specialized Technical Committees as illustrated in Figure 7.1.3.



Source: NCTTCA

Figure 7.1.3: Organizational Structure of NCTTCA

The budget of NCTTCA is mainly consist of taxes from exported cargos at Mombasa Port and the budget by state countries which means these assures a certain amount though not a drastic advance. Their activities are therefore, more concentrated to the role of coordination than that of project implementation.

Northern Corridor Integration Project (NCIP): initiative led by the Presidents of three countries (Uganda, Rwanda, and Kenya), which was established in June 2013 in order to cooperate and speed-up the development in the region. South Sudan became a member in October 2013, and each country established a special office to coordinate the initiative. The NCIP is to implement and fast-track project with the leadership from the Heads of the State. Their vision is Northern Corridor being fully integrated to facilitate the competitiveness of the region in the global market.

There are 16 projects being coordinated under the NCIP) namely; i) Projects Coordinated by Uganda: Standard Gauge Railway, ICT Infrastructure, Oil Refinery Development, Fast Tracking Political Federation, Financing, ii) Projects Coordinated by Kenya: Power Generation, Transmission and Interconnectivity: Crude Oil Pipeline Development, Refined Petroleum Products Pipeline Development, Commodities Exchange, Human Resource Capacity Building, Land, iii) Projects Coordinated by Rwanda: Immigration, Tourism, Trade, Labour and Services (ITTLS), Single Customs Territory, Defence Cooperation, Peace and Security Cooperation, Air Space Management. Financing of these projects is jointly coordinated by Ministers of Finance of the Partner States but spearheaded by Uganda.

While the NCIP facilitates the fast-tracking of projects using political will, the NCTTCA works closely with NCIP in monitoring the infrastructure projects along the NEC.

East African Community (EAC): a regional international organization, officially established under Article 2 of the Treaty for the Establishment of the EAC in 2000. Member countries are Uganda, Kenya, Tanzania, Burundi and Rwanda. The Article 3 of the Treaty stipulates the objectives of the Partner States to undertake the establishment of “a Custom Union (CU), a Common Market, subsequently a Monetary Union and ultimately a Political Federation in order

to strengthen and regulate the industrial, commercial, infrastructural, cultural, social, political and other relations of the Partner State”. The implementation of CU began in January 2005. Another milestone is the establishment of the EAC Common Market (EAC CM). The Protocol on its establishment entered into effective in 2010.

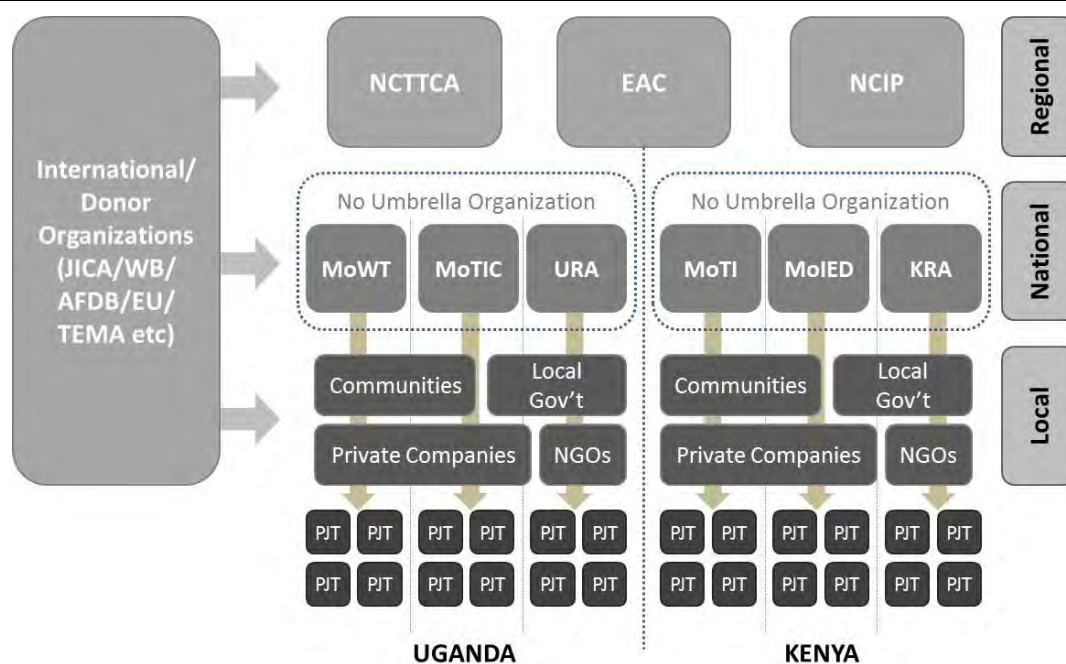
Trade Mark East Africa (TMEA): funded by a range of development donors from Belgium, Canada, Denmark, Finland, Netherlands, Sweden, UK, USA with the aim of growing prosperity in East Africa through trade. TMEA works closely with EAC institutions, national governments, the private sector and civil society organizations to increase trade by unlocking economic potential through (i) increased physical access to markets, (ii) enhanced trade environment, and (iii) improved business competitiveness. Considering their mission, it is likely to say TMEA put more emphasis on private sectors’ activities.

(4) Private Sectors

A considerable number of companies are involved in transport, logistics, and industry sectors. They are the key drivers for the realization of policies, objectives, and earnings and a lot depends on how they can maximize their performance. It is therefore crucial to have an environment that enables them to participate in policy making and implementation and also to enhance their participation in investments along the Northern Corridor.

Private firms in both Kenya and Uganda have formed associations such as Kenya Ships Agents Association and Uganda Commercial Truck Owners Association with the aim of consolidating collaboration among themselves, better communication with public sector agencies, and so on. These associations or companies have participated in public-private organizations/projects such as PPP Committee. However, participation have not yet been fully mobilized to make meaningful contribution to policy/project formulation and implementation.

Relations within overall organizations shall be shown as in Figure 7.1.4.



Source: JICA Study Team

Figure 7.1.4: Organizational Structure of Major Stakeholders Related to NEC

7.1.2 Preliminary Organizational Assessment

Preliminary organizational assessment shall be defined as below:

- 1) Regional organization for NEC have already been discussed in its function

According to NCTTCA, coordination and working relationship with Ministries of Transport and Infrastructure in Member states is good. In fact, they are coordinating various projects on behalf of member states such as the Road Side Stations Project, Transport Observatory and Transport Monitoring, Implementations of the Northern Corridor Infrastructure Master Plan to mention but few.

On the other hand, one of the major challenges in terms of coordination of programs and mobilization of stakeholders in Northern Corridor is lack of enough financing for programs for effective coordination as well as limited mandate to enforce compliance to treaty provisions and to implement the decisions of policy organizations. There is also lack of a proper constituted organizations of stakeholders in the countries such as the National Logistics associations which can form an umbrella regional organization. There is need to form apex organizations for promoting dialogue between government and private sector associations such as the Northern Corridor Public Private Stakeholder Forum which is currently being formulated by NCTTCA.

- 2) There are existing regional coordination mechanisms

Organizations such as EAC, NCTTCA, NCIP have intergovernmental character. Currently, NCIP has a very strong influence in terms of regional infrastructures as well as regional integration along the Northern Economic Corridor. NCTTCA coordinates with NCIP

thorough provision of monitoring results on infrastructure development and trade facilitation. According to 13th NCIP summit held among Uganda, Kenya, Rwanda and South Sudan in April 2016 in Kampala, the following topics were discussed and further actions were recommended, namely i) SGR, ii) ICT, iii) Oil refinery, iv) Political federation, v) Financing, vi) Power, vii) Crude oil pipeline, viii) Refined petroleum products pipeline, ix) commodity exchange, x) human resource capacity development, xi) Land, xii) Immigration, tourism, trade, labor and service, xiii) Single customs territory, among others. The discussion results show that a functional regional coordination mechanism has already been established.

- 3) There is no authority/unit in the Ministries of Transport with the aim of implementation and monitoring future MP projects

Presently, neither MoTI nor MoWT have at an umbrella organization which straddles related sectors (transport, industry, ICT, water, and so on

- 4) There is an on-going action for involvement of private sectors

During the 13th NCIP summit in April 2016, involvement of private sector was discussed. The main appreciations were to: i) contribute the improved environment of doing business cross NCIP partner states, and ii) how to participate in the investment in the projects. Kenya Private Sector Alliance (KEPSA), Private Sector Foundation Uganda (PSFU), and Rwanda Private Sector Alliance (RPSA) were identified as national Apex bodies. In the summit, infrastructure projects including SGR, energy, mining, oil and mining, ICT were picked up for further consideration for private sector investments. In addition, issues of SCT were discussed in terms of warehousing, system breakdown, and the effectiveness and cost of SCT.

According to KEPSA, the NCIP approach may be effective to solve issues related to private sector since discussions were held at very high level. The role of KEPSA are:

- KEPSA coordinates NCIP Private Sector Committee with 18 members cutting across the sector.
- The sector committees and MSFs also deal with specific issues of relevant areas such as transportation and trade logistics.
- KEPSA participates in the NCIP summit. Before the summit, KEPSA also facilitates discussion among the members.

The above shows that the involvement of the private sector in the NEC is being appreciated.

- 5) There is an on-going action to formulate a kind of platform

TradeMark East Africa seeks to formulate a logistic platform called “Freight Logistic Platform (FLP)” in Uganda. It is expected to enhance and then consolidate the country’s logistics level by reducing the cost of logistics while enhancing the quality of logistics

services, so as to enable the country become competitive in EAC countries and further in international market.

FLP has 3 key areas:

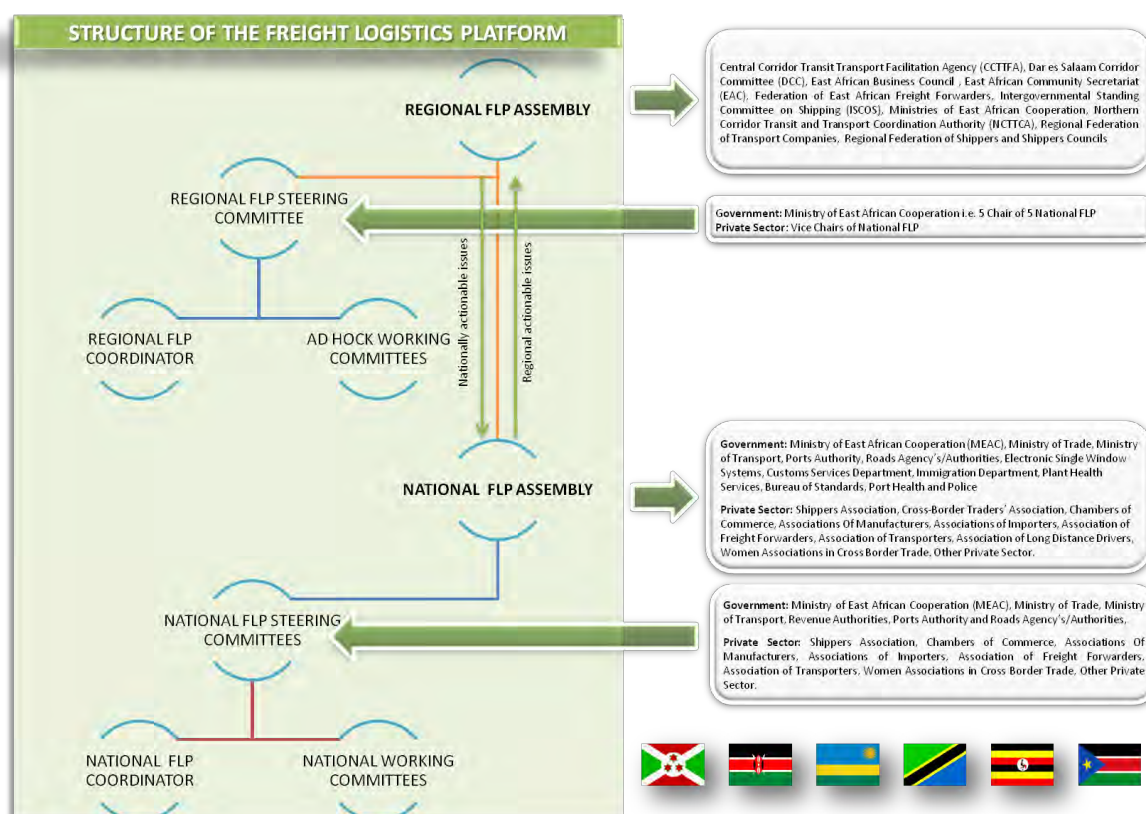
1. Policy: Since Uganda does not yet have strategies on logistics at national level, its formulation is one of the objectives for FLP. To realize this, the database development of research papers as well as the advocacy is also taken in consideration.
2. Capacity development: FLP will work as, for stakeholders, a linkage of international standards, catching-up new information. To realize this, the operation of the platform itself is also one of the target areas.
3. Increasing awareness: Drivers' training is also a key area, because having technique/knowledge of EAC level is indispensable for them, practitioners of policies and strategies.

The followings are detailed purposes (Table 7.1.1) and structure (Figure 7.1.5) of proposed FLP.

Table 7.1.1: Purpose for FLP

1.	Coherently articulate logistics challenges from the perspectives of the shippers, freight forwarders and transporters;
2.	Creating a logistics environment that encourages investment in the logistics industry;
3.	Develop FLP strategy and associated annual work plans;
4.	Development of a coherent and unified advocacy agenda in logistics;
5.	Devise communication strategies to different target groups
6.	Finding lasting solutions to the extraordinarily high logistics costs in East Africa;
7.	Fostering strong partnerships and cooperation between the logistics industry the EAC, corridor authorities and government.
8.	Highlight to logistics stakeholders emerging issues and trends relevant to stakeholders
9.	Identify priorities, challenges faced by the logistics industry;
10.	Monitor progress towards resolving challenges facing the industry;
11.	Promote the sharing and adoption of best practices in logistics;
12.	Provide feedback on the impact of FLP action plans
13.	Strengthen the regional collective bargaining of shippers, freight forwarders and transporters;
14.	Where appropriate, act as a pre-policy development 'sounding board
15.	Other relevant issues as they arise.

Source: Uganda National Logistics Platform Workshop, April 2015



Source: Uganda National Logistics Platform Workshop, April 2015

Figure 7.1.5: Structure of FLP

According to TMEA Uganda office, FLP is currently in the final internal approval process and expected to start up from January 2016. Similar plans have also been raised in both Rwanda and Burundi though detailed discussion have not been recognized. TMEA has not seen specific challenges regarding public procurement process because of the support from URA or the Public Procurement and Disposal of Public Assets Authority (PPDA).

- 6) There is no mechanism to promote community participation in the NEC regional development.

Such a mechanism will be important especially when it comes to the implementation stage. Mechanism such as SHM being held parallel to this MP Study as a part of SEA might be an option.

7.1.3 Organizational Framework

NEC development will become a large scale and multi-sector initiative involving all kinds of stakeholders such as the private sector, central government ministries and organizations, provincial and district governments, donors, communities and neighbouring countries such as Rwanda, DR Congo, South Sudan, Burundi and Tanzania. Therefore, effective and efficient coordination is essential to promote integrated development across the areas. It should be noted that regional coordination mechanism and private sector involvement are being developed

through NCIP. Therefore, considering the current situation, some recommendations for organizational framework are proposed.

1) Spatial Level Coordination System

Regional level: As mentioned before, NCTTCA has a character of monitoring, and covering the regional area involving related key stakeholders as members. Therefore, it is suitable that they should be in charge of monitoring the whole Corridor after the implementation of the MP. Thus, there should be an agreement with NCTTCA regarding suggested projects proposed by the MP. These monitoring results should be shared with the public as well as NCIP summits. NCIP has a strong political influence since participants are drawn from minister/permanent secretary level. Therefore, all the issues identified through monitoring results by NCTTCA should be discussed and recommendations issued.

National Level: Once the MP is approved and implementation commenced, there must be a monitoring and evaluation mechanism. It is essential therefore, under the initiative of MoTI / MoWT, to establish a taskforce covering various ministries/agencies in charge of transport, finance, trade, industry, agriculture, mining, energy, water etc as well as private sector organizations and NCTTCA. The working group and steering committee members established under the MP study will be good examples. It is recommended that the working group and steering committee should be maintained after the JICA study as the further monitoring and implementation mechanism. In addition, the authorization of MP through a cabinet memo in Uganda or vision 2030 in Kenya will be one of the important roles of the task force.

Sector Level: Since the MP covers a range of sectors, it would be difficult for the above task force to cover all the projects in detail. Therefore, projects should be supervised by the responsible ministries, and necessary information should be shared with the task force and NCTTCA. Decision on jurisdiction of project will be according to its scale.

Ground level: The information of NCR should be provided for at county/district level as highlighted by the comments from the Stakeholder Workshops during SEA process. MoTI / MoWT should discuss information designations Ministry of Devolution and Planning and Ministry of Local Government in Kenya and Uganda respectively. The feedbacks from county/district should be reported in the meetings of taskforces for further consideration by the responsible ministry/agency.

2) Appropriate Role Distribution to Public and Private Sectors

Appropriating the right roles to both public and private sectors and differentiating those that are essential to be given to both sectors in order to maximize their capacities is essential for sectors development.

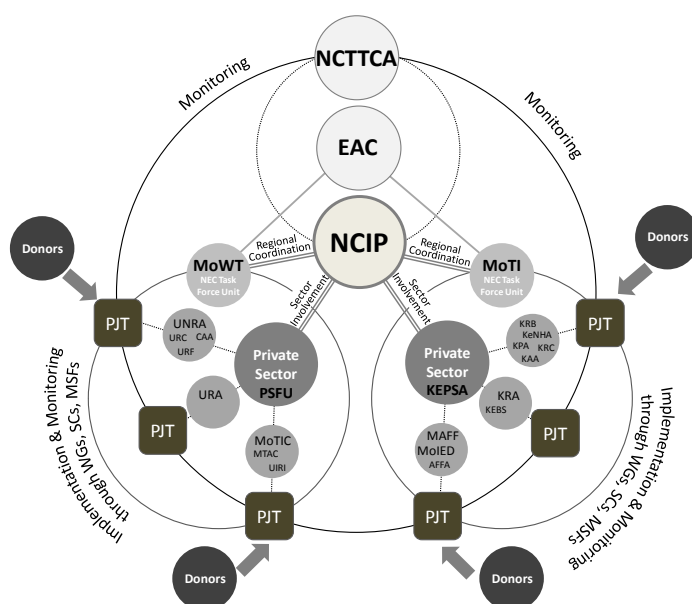
The roles of public organizations are mainly classified into three: (1) arrangement of business environment: establish the laws, regulations, implement the industrial

infrastructure; (2) follow-up and monitoring the projects, if necessary correction; (3) coordinating between countries.

In response to this provided environment, the private sector has three roles: (1) implementing/operating the projects; (2) reporting comments as practitioners' side; (3) own capacity development.

Although the roles of the private sector will be independently identified, constant communication amongst them must be maintained through task force meetings as well as Ministerial Stakeholder Forums (MSFs). It should be noted that FLP will be a model type where private sectors are concerned not only on the implementation side but also the policy establishment side in effect.

The overall organizational framework is illustrated below.



Source: JICA Study Team

Figure 7.1.6: Image of Future Organizational Coordination

7.1.4 Capacity Development

Through the MP study, the following three items were identified as necessary for capacity development, namely: i) PPP, ii) Land Acquisition and Resettlement, and iii) Single Custom Territory (SCT). The following table shows current issues and necessity actions for the capacity development.

Table 7.1.2: Necessity Actions for Capacity Development in terms of PPP, Land Acquisition, SCT

Item	Current Situation and Issue	Necessary Actions
PPP (Kenya)	<ul style="list-style-type: none"> - PPP project in Kenya is reasonably regulated by PPP Act No.15 2013 together with referenced laws. Indispensable Project Facilitation Fund Regulations have been issued. PPP Unit was established in 2013. - The concerns of private sector are: i) demand focus, ii) construction schedule, iii) project cost, iv) level of tariffs. In addition, it is also important how to collect 	<ul style="list-style-type: none"> - Arrangement of technical and financial supports during formulation of PPP project considering concerns of private sector, toll collection mechanism, establishment of bankability, etc. - Formulation and issue of specific guidelines on where the jurisdiction of county

Item	Current Situation and Issue	Necessary Actions
	<p>the tariff without causing any inconvenience to the users.</p> <ul style="list-style-type: none"> - The affordability of the users and society to utilize the projects may become the breaking point for the PPP scheme. Therefore, there is an urgent need for specific guidelines on where the jurisdiction of county government ends and that of the central government begins. Subsequently, financial support by the Public shall become essential for the sustainable PPP scheme. - There is a strong necessity for a joint agreement among the countries for cross border infrastructure project. 	<p>government ends and that of the central government begins in PPP schemes.</p> <ul style="list-style-type: none"> - Formulation and issue of guideline for joint agreement among the countries for cross border infrastructure project.
PPP (Uganda)	<ul style="list-style-type: none"> - Public Private Partnerships Act 2015 was promulgated in Uganda. However, a framework of PPP Act 2015 is not over-prescriptive on focus on implementing successful PPP projects. The following points should be considered: i) Implementation Rules and Regulation or PPP Manual, ii) PPP pipeline projects list including guidance documents, iii) the public relations and education of PPP, iv) governmental organization among the implementing ministries for the alignment of PPP project implementation, v) supporting laws and regulations, vi) restrictions on assignment or transfer of share. - Following tools of public sector may be considered to regulate; i) availability payment system, ii) viability gap fund, iii) annuity payment, iv) and transportation tax and/or levy - There is a strong necessity for the joint agreement among the countries for cross border infrastructure project. 	<ul style="list-style-type: none"> - Formulation and issue of s Implementation Rules and Regulation or PPP Manual. - Formulation of PPP pipeline projects list. - Arrangement of technical and financial supports during formulation of PPP project considering concerns of private sector, toll collection mechanism, establishment of bankability, etc. - Formulation and issues of regulations on i) availability payment system, ii) viability gap fund, iii) annuity payment, or iv) and transportation tax and/or levy - Formulation and issue of guideline for joint agreement among the countries for cross border infrastructure project.
Land Acquisition and Resettlement	<ul style="list-style-type: none"> - In many infrastructure development projects land acquisition issues have been pointed out. The major reasons are: i) price of land (amount of compensation), ii) availability of alternative land, and iii) identification of right recipient (including issues within family). - In addition, the land acquisition means the loss of jobs for people and therefore alternative job opportunities for getting income shall be considered. - These issues cause delay of project progress, or sometime cause opposition movement to the project itself. 	<ul style="list-style-type: none"> - Formulation and implementation of land title management project to establish land title database with information of Cadastral map - Arrangement of technical assistance for land acquisition and resettlement program including alternation income source prior to implementation of project
Single Custom Territory (SCT)	<ul style="list-style-type: none"> - The procedure has already determined “Single Customs Territory Procedures Manual” issue by EAC Secretariat. However, SCT is not applied for most of general cargo and bonded procedure is still required. - The IT system for customs procedure is different between Kenya and Uganda. Transforming data or information is necessary from one country to another and this should be within requisite limited time. However, the customs systems frequently break down and are very slow. Therefore, the SCT requires development of regional IT connectivity with enough transforming capacity. 	<ul style="list-style-type: none"> - Expansion of goods to be adapted the SCT. - Increase of trained staff and equipment for custom in the Mombasa port for SCT - Installation and expansion of ICT through cross boarder ICT project along SGR, Transmission line, oil pipelines.

Source: JICA Study Team

7.1.5 Communication Strategy

For communication strategy to public, meeting, advertisement, publicity, promotion of investments, human exchange shall be raised as a communication tool. It is also important to consider information from stakeholders and realize an interactive form of communication.

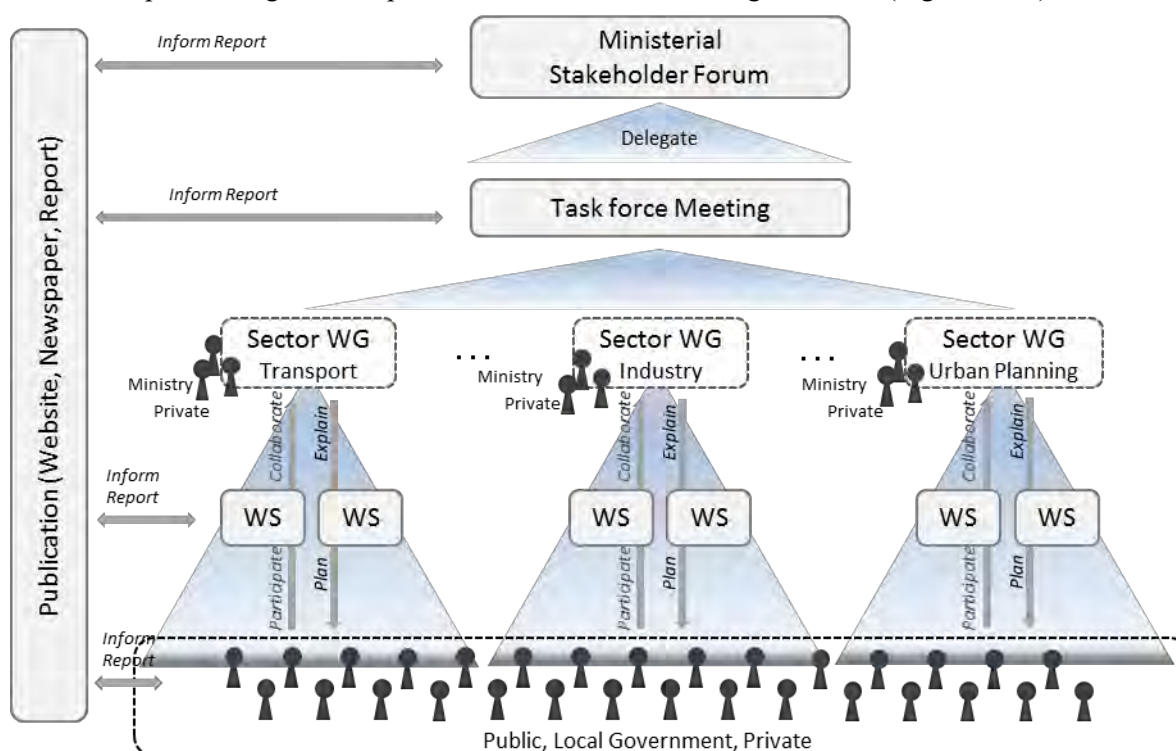
For public sector, workshop shall be the main opportunity to involve them including local government into implementation of MP, explain the projects and receive their opinion/feedback. Three lessons were drawn regarding the public involvement through the experience of Stakeholders Meetings for SEA conducted during this Project:

- 1) Strong ownership of Ministry/County is necessary to hold the meeting and encourage the participation.
- 2) Sufficient budget is necessary to be secured for announcement at local level (poster, press advertising, etc).
- 3) Allowance for participants contribute to the number of attendance and increase their motivation.

Based on above lessons, it is necessary to give to the local government (1) the initiative as well as (2) enough budget for a sufficient arrangement of meetings. As for the allowance payment for participants, it should be set as a clear rule according to the budget.

Constant publication is also important to share the progress and attract the attention of stakeholders. Publication through SNS, newspaper shall be easy to spread and efficient for public.

Proposed integration of public sector is shown in the figure below (Figure 7.1.7).



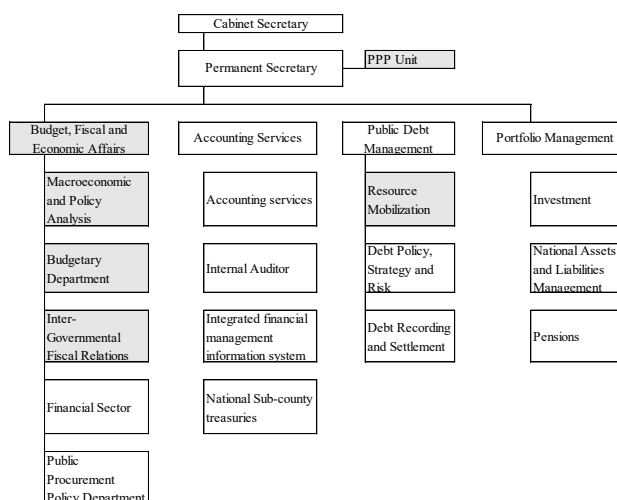
Source: JICA Study Team

Figure 7.1.7 Proposed Integration Opportunities of Public Sectors into MP Implementation

7.2 Financial Capacity in Kenya

7.2.1 Legal Framework and Organization

The legal framework governing the budget and expenditure of the government in Kenya is stipulated in the Financial Management Act 2013. The Cabinet Secretary for Finance is responsible for managing the consolidated fund and all matters relating to public financial affairs. The budget process begins with a *Budget Outlook Paper*, which determines indicative ministerial ceiling for the proposed budget year and the medium term. The line Ministries then prepare the detailed budget with the technical guidance from the National Treasury. The departments responsible for budget preparation within the National Treasury are the Budgetary Department, and Inter-Government of Fiscal Relations under the Directory of Budget, Fiscal and Economic Affairs, which are highlighted in Figure 7.2.1. The Department of Inter-government of Fiscal Relations liaises with line ministries on the preparation of sectoral budgets. The Department of Resource Mobilization under the Directory of Public Debt Management is responsible for mobilizing and managing external resources. The PPP Unit was established in 2013 under the National Treasury, whose mandate is to serve as a secretariat and technical arm of the PPP Committee, which is authorized to assess and approve PPP projects in Kenya.



Source: JICA Study Team based on the website and interview with National Treasury

Figure 7.2.1: Organizational Structure in the National Treasury

The proposed budget is submitted to the Parliament by a budget speech of the Cabinet Secretary for Finance and by the Budget Policy Statement (BPS). The BPS applies a policy based budgeting, which sets out broad based strategic priorities and policy goals that guide the preparation of their budget for the following year and over the medium term.

7.2.2 Reviews of Budget and Expenditure in Kenya

The budget and expenditure for the medium term are presented as follows:

Table 7.2.1: Budget and Expenditure for the Medium Term in Kenya (Ksh billion)

Item	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18
	Act	Proj	Proj	Proj	Proj	Proj
Revenue	812.5	991.9	1,176.2	1,347.7	1,594.6	1,845.3
% of GDP	19.1%	21.0%	22.0%	20.7%	21.5%	21.8%
Expenditure	1,107.3	1,300.6	1,669.0	1,880.8	2,052.6	2,251.4
% of GDP	21.8%	24.8%	25.9%	28.8%	27.6%	26.6%
Recurrent expenditure	808.3	787.9	900.2	987.0	1,194.4	1,244.3
Development and Net Lending	298.9	319.3	534.6	627.1	654.5	683.4
Public Debt (% of GDP)	42.0%	48.0%	47.3%	46.6%	45.2%	43.6%

Source: Data from Economic Survey 2015, Budget Policy Statement 2015

The revenue in Kenya rose to over 1 trillion in 2014/15, and is expected to increase to 1,348 billion in 2015/16, which accounts for around 20% of GDP. The Kenyan government has a fiscal policy to maintain the revenue at the level of 21.8% of GDP over the medium term and containing growth of expenditure. However, the expenditure has been increasing and is projected to expand from 26.0% of GDP in 2012/13 to 28.8% of GDP in 2015/16, which will then slightly decline to 26.6% by 2017/18. The government committed a policy of reducing the recurrent expenditure and allocating a minimum of 30% of the national budget to development expenditure. The development expenditure is expected to attain more than 30% of the total expenditure by 2014/15, while the recurrent expenditure will be increasing by the average growth of 9.3% for the medium term. This expansionary expenditure is driven by increased development expenditure for infrastructure, energy, and ICT projects, as well as budget allocation to county governments.

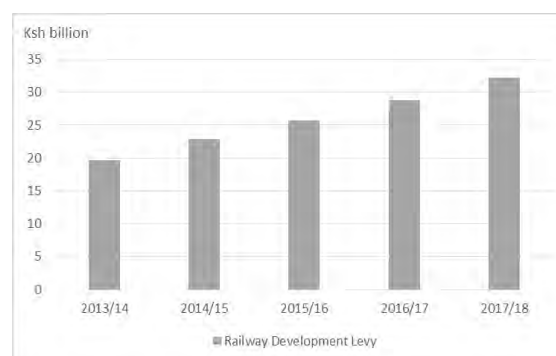
The Kenya Economic Update (June 2015, the World Bank) warned the increasing fiscal deficit driven by development projects in priority areas of infrastructure, energy, and ICT, and evaluated that Kenya's fiscal position is not sustainable in the medium term. Although the government's policy of increasing the share of development expenditure and containing recurrent expenditure would contribute to economic development and reduce the dependence on external financing for development projects, more prudent fiscal policy such the phased implementation of development projects and streamlining the national government's expenditure for non-prioritized area could be considered in order to reduce a fiscal deficit.

7.2.3 Financing for the Transport and Logistic Sector

As for self-generated revenues, there are currently several funding mechanisms in the transport sector as follows:

- (1) Taxes and levies on fuel such as Road Maintenance Fuel Levy
- (2) Taxes and levies on vehicle and parts such as import duties, excise duties and VAT
- (3) Railway Development Levy
- (4) Revenues from port operation such as cargo handling charge (KPA)
- (5) Passenger Service Charge for airport operation (KAA)
- (6) Revenue from pipeline operation (KPC)

The above first three revenues are transferred to the Treasury Account, which are then allocated to Ministry of Transport and Infrastructure for road maintenance and railway development projects. The Railway Development Levy (RDL) is to be used solely for financing the Standard Gauge Railway. The government established a Railway Development Fund, which collects 1.5% of RDL on all import. It is projected that the RDL will increase from Ksh 19.7 billion in 2013/14 to Ksh 32.3 billion in 2017/18, as shown in Figure 7.2.2.



Source: Data from BPS 2015

Figure 7.2.2: Projection for Railway Development Levy (2013/14-2017/18)

The Semi-Autonomous Government Agencies (SAGAs) are the parastatal government organizations that receive transfers from their parent ministries and/or collect and spend some earmarked tax and non-tax revenues. There are four SAGAs in the road sectors, namely, (1) Kenya National Highway Authority (KeNHA), (2) Kenya Rural Roads Authority (KeRRA), (3) Kenya Urban Road Authority (KURA), and (4) Kenya Road Board, which implement and maintain the road projects in Kenya. In the transport sector, there are seven SAGAs, which are, 1) Kenya Civil Aviation Authority (KCAA), 2) Kenya Airport Authority, 3) Kenya Port Authority (KPA), 4) Kenya Ferry Services (KFS), 5) Kenya National Shipping Line (KNSL), 6) Kenya Railway Corporation, and 7) Kenya Maritime Authority (KMA). Each SAGA submits a proposed budget and expenditure each year.

The medium term ceiling for transport and industrial expenditure are shown in Table 7.2.2 and Figure 7.2.3. The transport sector stands at 26% of the total capital expenditure, which will be increased to 41% in 2015/16 mainly due to the increased expenditure for the railway sub-sector. The construction of Standard Gauge Railway has been prioritized in the transport and logistics sector over the medium term, and the SGR section between Nairobi and Mombasa is expected to be complete by 2017. The expenditure for the railway sub-sector will increase rapidly by more than five times, from Ksh26.2 billion in 2014/15 to Ksh144.4 billion in 2015/16. The road sector is also expected to increase steadily by the annual average growth of 15%. The government undertook a policy of devolution of rural road development to country governments, and the expenditure pressure for the road sector remains strong, despite the recent emphasis on a shift from truck to railway for freight cargo. The expenditure for marine transport and air transport are allocated for Ksh 5.7 billion and Ksh 8.8 billion in 2015/16 respectively. This accounts for 2.2% and 3.4% of the total transport expenditure. The modernization of Mombasa

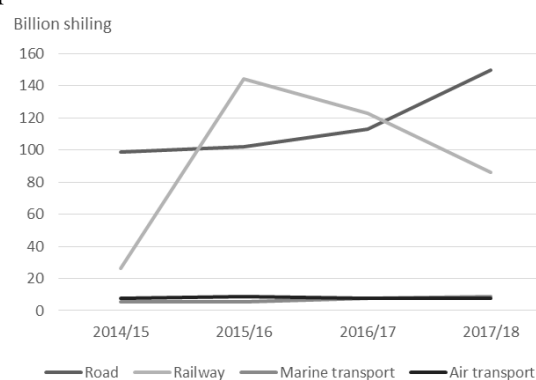
Port plans to mobilize private investment and revenues from port operation, which may be the reason for the small allocation for the marine transport.

Table 7.2.2: Medium Term Ceiling for the Transport Sector

(Capital Expenditure, Ksh billion shilling)

	2014/15 (Proj)	2015/16 (Proj)	2016/17 (Proj)	2017/18 (Proj)
Total Transport	138.8	261.5	251.9	252.8
State Department of Infrastructure (Road)	99.0	102.2	112.8	150.0
State Department of Transport	39.8	159.3	139.1	102.8
Rail transport	26.2	144.4	123.2	86.1
Marine transport	5.6	5.7	7.7	8.7
Air transport	7.6	8.8	7.9	7.9
Industrial development and investment	7.4	5.4	5.5	5.5

Source: Data from Budget Policy Statement 2015



Source: Data from Budget Policy Statement 2015

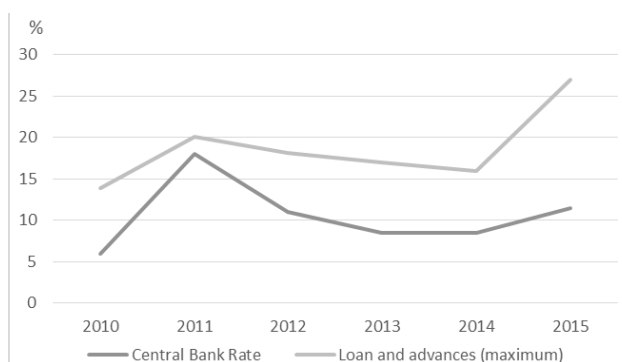
Figure 7.2.3: Ceiling for the Transport Sector (Billion Shilling)

7.2.4 Private Sector Financing in Kenya

In the transport and logistics sector, the private sector's financing is limited to the railway sector and the issue of infrastructure bond in 2014. All railway operations for freight in Kenya and Uganda were conceded to a private operator, that is, Rift Valley Railways (RVR) in 2006 for the concession period of 25 years. In 2014, the Kenyan government issued its first sovereign Eurobond, which attracted USD 2 billion and improved the foreign reserve and current account in Kenya. The proceeds of Eurobond were used to repay a USD600 million syndicated loan and to finance energy and infrastructure project. In addition, the PPP Unit was established in 2014 under the National Treasury, and 71 PPP projects were approved as pipeline projects, of which 18 projects were identified in the transport sector.

Under the industrialization and Enterprise Development sector, Special Economic Zone (SEZ) was identified as a pipeline PPP. Commercial financial banks play a key role in promoting industrial development through the provision of loans and credit. The total value of manufacturing projects approved by industrial financial institutions increased from Ksh 182.6 billion in 2013 to Ksh237.9 billion in 2014. Industrial Development Bank (IDB) Capital Limited financed three manufacturing projects worth Ksh 74.2 million 2014, while Development Bank of Kenya (DBK) approved two projects worth Ksh 66.6 million in 2014. Kenya Industrial Estates (KIE) supports indigenous entrepreneurship by financing small scale and micro enterprises in Kenya, and approved 543 projects worth Ksh 194.3 million in 2014, of which a third of the total disbursement was destined to the food processing manufacturing. Industrial and Commercial Development Corporation (ICDC) supported one project for mango processing in 2014, which amounted to Ksh 230 million.

One of the major challenges of private sector financing for infrastructure is the relative high borrowing costs from commercial banks. A typical project life of infrastructure projects is the long term ranging from 20 years to 30 years, which normally requires a concessional loan to pay back to the investors. In Kenya, Central Bank Rate has been stabilized to less than 10% during the past few years, but due to the deterioration of Kenyan Shilling, CBR was raised to 11.5% in 2015. Subsequently, the borrowing cost from commercial banks soured significantly to a maximum of 27% as of October 2015. With the interest rate of more than 10%, financing costs in infrastructure projects would diminish the financial benefits and financial viability of the project.



Source: Economic Survey 2015, East African Newspaper

Figure 7.2.4: Central Bank Rate and Interest Rate from Commercial Bank in Kenya (2010-2015)

7.2.5 Required Cost and Available Resources

The total required investment costs for this Master Plan are estimated at USD 30.5 billion and summarized in the following table.

Table 7.2.3: Required Costs for the Master Plan by Sub-Sector (2016/17 – 2030/31, USD million)

Sub-Sector	Total Required Cost for M/P	Estimated Secured External Financing	PPP Financing	Government financing
Road	4,406.9	1,766.0	1,054.9	1,585.7
Border Post	55.5	21.0	-	34.5
Port	2,020.7	-	2,020.7	-
Airport	485.3	412.5	-	72.8
Inland Water	353.6	300.6	-	53.0
Railway	21,300.0	4,255.0	405.0	16,640.0
Pipeline	1,580.0	-	964.0	616.0
Logistic Hub	271.8	-	244.6	27.2
Total	30,473.8	6,755.1	4,689.3	19,029.2

Source: JICA Study Team

The railway sub-sector requires the largest investment, which stands at USD 21.3 billion, followed by the road sub-sector (USD 4.4 billion) and the port sub-sector (USD 2.0 billion). Of the total investment costs, around 22 percent are secured by external financing while 15 percent are planned to be financed by the PPP framework.

Based on the Policy Statement on Transport Infrastructure Funding of the Kenyan government, the projects related to the Port of Mombasa will be self-financing through charges levied on port users, PPP concession fees and KPA reserves. The rest of the investment costs are categorized into the government financing, of which USD 8.9 billion is required for the government grant in Kenya. As shown in Table 7.2.3, the investment for the railway sector consists of more than 83

percent of the required costs in the Kenyan government, all of which are planned to be implemented in the short term.

Table 7.2.4: Required Costs by Timeframe in Kenya (2016/17 – 2030/31, USD million)

Sub-Sector	Short Term	Medium Term	Long Term	Total
Road	177.0	408.4	321.0	906.4
OSBP	0.8	-	2.0	2.8
Port	-	-	-	-
Airport	8.3	-	-	8.3
Inland Water	13.3	26.4	-	39.7
Railway	7,460.0	-	-	7,460.0
Pipeline & Mineral	261.6	250.0	-	511.6
Logistic Hub	12.1	5.5	-	17.6
Total	7,933.1	690.4	323.0	8,946.4

Source: JICA Study Team

Next, the available development expenditure for the transport sector in Kenya is calculated based on the following assumptions:

- The development expenditure in the transport sector is projected to increase in proportion to the real GDP growth rate. A constant price in 2015 is used for this analysis.
- The financial analysis is based on the government's fiscal policy, the current expenditure allocation and the medium term expenditure plan. Currently, the RDL consists of 1.8% of the total revenue, and the total railway expenditure is allocated between 4.6% and 5.5% of the total expenditure in the medium expenditure framework, while the road sector comprises around 5.3% to 6.0% of the total expenditure during the medium term. Due to the large investments required in the railway sub-sector, the share of the railway sub-sector is projected to maintain at 4.8% of the total expenditure that includes the revenue from RDL, while maintaining at least the same amount of expenditure for the road sector.
- The expenditure share of the Northern Economic Corridor is assumed as follows: the required investment costs in the road sub-sector consists of 10 percent of the total road expenditure, while the required costs in the railway, airport, and marine sub-sectors are 50 percent, 30 percent, and 20 percent of the total expenditure respectively. This assumption is rather conservative, but not under-estimated, to project the future available financial resources.
- The share of the transport expenditure in the total expenditure was allocated between 8.4% in 2014/15 and 13.7% in 2015/16 of the total expenditure, and is projected to be between 10.6% and 11.7% according to the medium term expenditure plan in BPS 2016. The transport expenditure will be maintained by 10.3% of the total expenditure for the rest of the period.

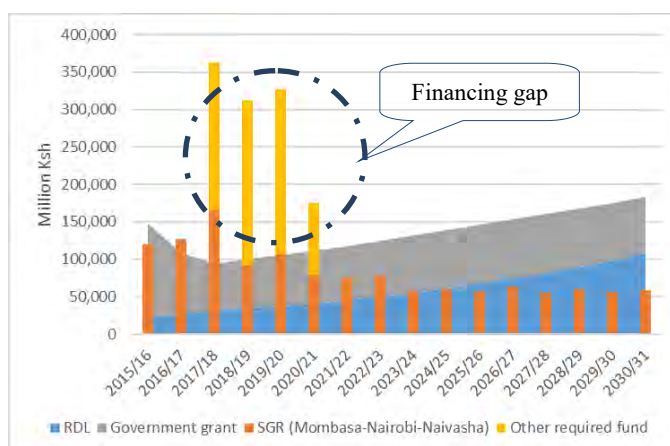
Based on the above assumptions and available financial data from the website, the available resources for NEC in Kenya are calculated in the following table. The comparison between the required investment costs (Table 7.2.3) and the estimated available resources are shown in Coverage column.

Table 7.2.5 Available Resources for NEC in Kenya by Timeframe (2016/17 – 2030/31, USD million)

Sub-Sector	Short Term (2016-2020)		Medium Term (2021-2025)		Long Term (2026-2030)		Total	
	Available	Coverage	Available	Coverage	Available	Coverage	Available	Coverage
Road	565.1	298%	672.8	163%	857.5	265%	2,095.5	226%
Railway	2,547.7	34%	3,229.4	-	4,116.0	-	9,893.2	133%
Marine Transport	48.7	367%	74.9	284%	95.5	-	219.2	552%
Airport	60.8	728%	80.7	-	102.9	-	244.4	2,930%
Pipeline & Mineral	20.8	8%	26.9	11%	34.3	-	82.1	16%
Total	3,243.2	41%	4,084.8	592%	5,206.3	1,612%	12,534.3	140%

Source: JICA Study Team

As shown in the above tables, the projected government expenditure in the road, marine transport, and airport sub-sectors are expected to cover the proposed investment costs throughout all the periods. In the railway sub-sector, a financing gap is expected in the short term, but in the medium and long term, there are sufficient resources to cover the investment costs. Figure 7.2.5 shows the required costs and available resources in the railway



Source: JICA Study Team

Figure 7.2.5: Estimated Required Costs and Available Resources in the Railway Sub-Sector in Kenya (2016/17-2030/31)

sub-sector, which are based on the data from Ministry of Transport and Infrastructure on Mombasa-Nairobi SGR project, the estimated cash flow for Nairobi-Naivasha SGR project to be financed by Chinese Exim Bank, and other required government financing such as Naivasha-Malaba SGR project. As indicated in this figure, the financing gap in the railway sub-sector could be narrowed by rescheduling the implementation to the medium and long terms, in which available resources are expected to cover the required costs.

Other measures to reduce the financing gap could be made through shifting more financial resources from truck to railway, increasing the user charge through the RDL, and seeking private financing such as a PPP for financially viable projects that are indicated in Chapter 9. As shown in Figure 7.4.5, the current level of RDL seems to cover the SGR investment costs for Mombasa-Nairobi and Nairobi-Naivasha in the medium-long term, but it does not cover the rest of required costs such as Naivasha-Malaba SGR and ICD in Embakasi. To cover the required cost, it is necessary either to increase the RDL to 3.0% of all imports from 2019/20, or to maintain the current level of RDL and provide a government grant to the railway sector by at least 1.6% of the total expenditure. External and domestic debts and infrastructure bond are among other options to narrow the gap, but there is a risk of rise in the public debt to exceed the threshold due to the large amount of required investment costs and other investment needs in

Kenya in the short term. Commercial loan would deteriorate the sustainability of debt repayment in Kenya, and it is recommended to use a concessional loan only.

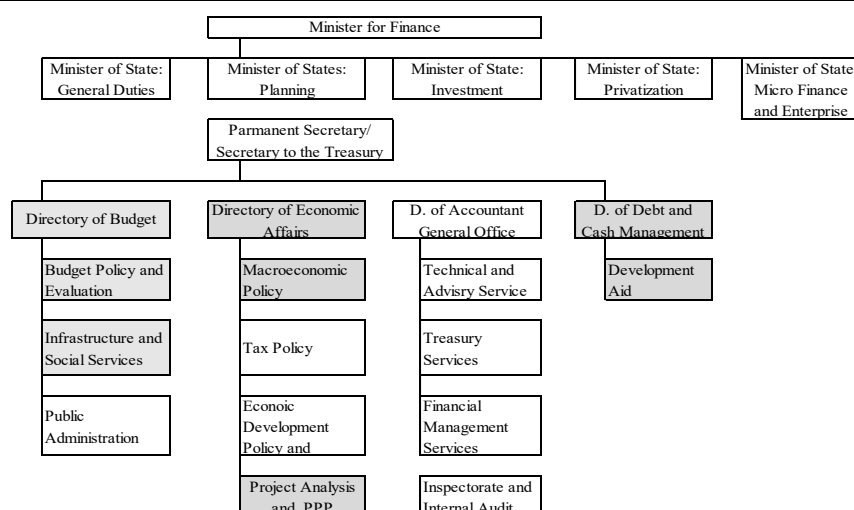
The pipeline sub-sector is expected to be self-financing based on charges on pipeline users and existing KPC reserves, according to the Policy Statement on Transport Infrastructure Funding¹. The investment costs for transporting coal by railway is expected to be financed by external resources and government grant, but the government has insufficient resources to cover this investment.

7.3 Financial Capacity in Uganda

7.3.1 Legal Framework and Organization

The Public Finance Management Act (PFMA) 2015 was enacted by Parliament, which provides the framework for the annual and medium-term budget and expenditure as well as the management of petroleum revenues. The PFMA 2015 mandates the Minister for Finance to prepare a Budget Framework Paper (BFP), which includes the medium term macroeconomic framework, medium term fiscal framework including non-petroleum and petroleum revenues, and the statement for the annual budget for the next financial year. The PFMA 2015 applies a policy-based budgeting in which the annual budget shall be prepared consistent with the National Development Plan and the BFP. The Department of Macroeconomic Policy under the Directorate of Economic Affairs in Ministry of Finance, Planning and Economic Development (MFPED) is responsible for the preparation of macroeconomic framework, and the Department of Budget Policy and Evaluation under the Directorate of Budget is in charge of formulating the annual and medium term fiscal framework. The Department of Infrastructure and Social Services under the Directorate of Budget work together for the preparation of the fiscal framework in the transport sector. In terms of external sources, a newly established Directorate of Debt and Cash Management are responsible for the management of external sources and public debt.

¹ Policy Statement on Transport Infrastructure Funding (2016-25), Ministry of Transport and Infrastructure, January 2016



Source: JICA Study Team based on the website and interview with MFPED

Figure 7.3.1: Organizational Structure of Ministry of Finance, Planning and Economic Development in Uganda

7.3.2 Reviews of Budget and Expenditure in Uganda

The government of Uganda has a policy to ensure the continued stability of tax system and increase revenue through the improved measures for tax collection such as the establishment of business registration database in URA. The projected revenue in 2015/16 is Ush 111,227 billion, which is around 13.4% of GDP. The percentage of revenue to GDP is expected to increase to 15.5% by 2019/20. The projected revenue over the medium term does not include petroleum revenues, since the required infrastructure for oil production has not been in place.

Table 7.3.1: Budget and Expenditure for the Medium Term in Uganda (Ush billion)

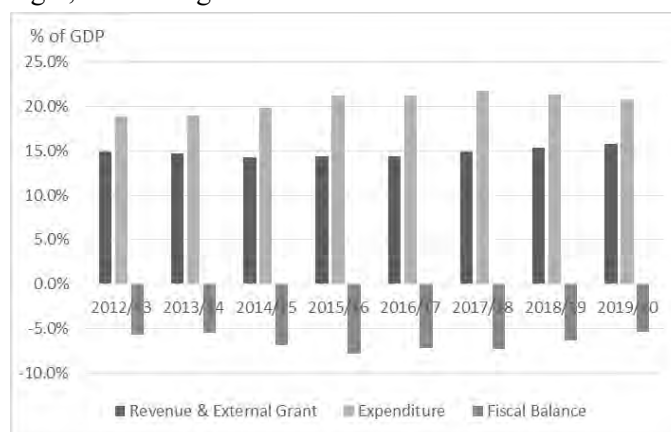
Item	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
	Act	Act	Proj	Proj	Proj	Proj	Proj	Proj
Revenue	7,352	8,168	9,766	11,227	12,846	14,735	16,872	19,355
% of GDP	13.2%	13.5%	13.0%	13.4%	13.9%	14.5%	15.0%	15.5%
External Grant	936	703	934	839	456	452	432	440
Expenditure and Lending	10,522	11,513	14,919	17,766	19,536	22,191	24,037	26,106
% of GDP	18.9%	19.0%	19.9%	21.2%	21.2%	21.8%	20.9%	20.9%
Recurrent Expenditure	5,812	6,706	7,426	8,572	8,600	9,715	11,147	13,121
Development Expenditure	4,237	4,768	5,098	6,559	8,637	11,133	12,169	12,298
Net Lending & Investment	409	19	2,290	2,455	1,999	913	320	0
Overall balance (exc, grants)	-3,170	-3,346	-5,153	-6,539	-6,689	-7,457	-7,165	-6,751
Public Debt (% of GDP)	26.2%	28.9%	31.9%	36.0%	39.7%	43.0%	45.5%	46.0%

Source: Data from 2nd National Development Plan, BPF 2015, IMF Article IV Consultation 2015

External grants accounts for around 7% of the total revenue in 2015/16, which is projected to reduce to 2.2% of the total revenue by 2019/20. Due to the difficulty of projecting external resources for more than 3 years, the estimated amount is provisional and likely to change in future. External loans mobilized in 2014/15 was increased significantly from USD 689.1 million in 2013/14 to USD 2,714.9 million in 2014/15, most of which will be the funding for flagship projects in Karuma Hydro Power Project and Isimba Hydropower Project.

The overall expenditure and net lending is projected to rise to Ush 17,766 billion in 2015/2016. The percentage of expenditure to GDP is 21.2% in 2015/16, which is well above the government revenue (13.4%), and widening a fiscal deficit to Ush 6,539 billion or 7.8% of GDP. The Government of Uganda, however, plans to consolidate the spending by the end of the 2nd National Plan, to the total deficit of 5.4% of GDP in 2019/2020. Compared to Kenya, development expenditure is relatively larger, accounting for around

37% of the total expenditure. The percentage of net lending and investment is projected to rise to 10% to 15% of the total expenditure between 2014/15 and 2016/17. The net lending in 2015/16 is projected to be Ush 2,455 billion, which will be spent mostly on infrastructure development. The fiscal deficit will be financed by domestic and external sources, and public debt to



Source: National Budget Framework Paper 2015/16, Uganda

Figure 7.3.2: Revenue, Expenditure and Fiscal Balance in Uganda (FY2012/13 – 2019/20)

GDP in Uganda is projected to increase to 46% by 2019/2020. With the increase of revenue from petroleum production, the fiscal balance and public debt are expected to improve for the long term. The Economic Update (September 2015) predicts a dramatic change of fiscal balance by oil production, which would double the value of country's current fiscal revenue. The PFMA 2015 established the Petroleum Fund, into which the petroleum revenues accrued to the government will be paid. The Petroleum Revenue maintained in the Petroleum Fund shall be appropriated to the Petroleum Revenue Investment Reserve, which will be invested in accordance with the petroleum revenue investment policy issued by the Minister for Finance and managed by the Bank of Uganda.

7.3.3 Reviews of Budget and Expenditure in the Transport and Logistic Sector

The self-funding and direct user charges in the transport sector are mainly limited to the operation and maintenance of roads in Uganda, and most of development costs are procured by either government grant or external sources.

In terms of the revenues directly collected from users, there are currently several funding mechanisms in the transport sector as follows:

- (1) Taxes and levies on Road User Charges appropriated by the Uganda Road Fund (URF):
Sources of RUC includes fuel levy, transit fees, road license, axle load fines, tolls,

weight/distance charges, and traffic and road safety charge, which are to finance routine and periodic maintenance of public roads in Uganda

- (2) Revenues from railway and port operation such as cargo handling charge (RVR)
- (3) Passenger Service Charge and other airport handling charges for airport operation (UCAA)

The budget for URF in 2014/15 amounted to Ush 428.1 billion, of which 274.4 billion or 64.1% of URF was allocated to the National Road Maintenance Program and Ush 146.4 billion was allocated to the road network in District, Urban and Community Access Road (DUCAR) and Kampala Capital City Authority (KCCA). The Railway in Uganda has been operated by a private company, Rift Valley Railway (RVR), and as of June 2013, RVR invested USD 6.7 million in conceded assets, but it can be said that rehabilitation and maintenance for the railway network has not been sufficient for efficient operation.

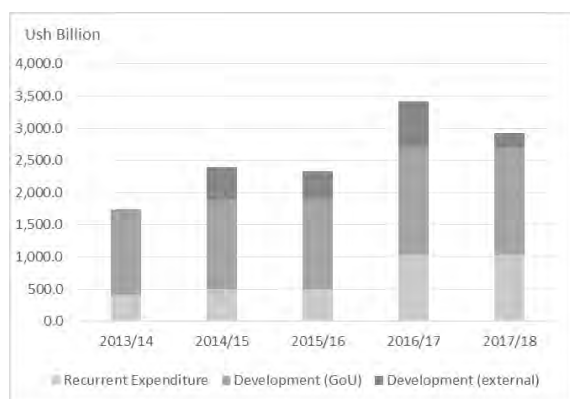
The 2nd National Development Plan 2015/16-2019/20 adopted an expenditure strategy to focus on infrastructure development and human capital development. The Works and Transport Sector received the largest share in the Ugandan budget from 18.2% to 23.4% of the budget between 2015/16 and 2018/19. The major infrastructure projects in the 2nd NDP are the Standard Gauge Railway (USD 1,926 million), Hoima Oil Refinery (USD536 million), and Kampala-Jinja Highway (USD300 million) as shown in Table 7.3.2. The total costs in the Work and Transport sector is estimated at Ush 42,557.6 billion during the 2015/16- 2019/20 period, of which 50% of total costs is planned to be financed by the private sector.

Table 7.3.2: Key Infrastructure Projects in the 2nd National Development Plan (USD million)

Infrastructure Projects	2015/16	2016/17	2017/18	2019/20	2020/21	Total
Entebbe Airport Rehabilitation	81	31	40	40	10	203
Standard Gauge Railway		570	454	452	450	1,926
Kampala - Jinja Highway		90	179	31		300
Kampala – Mpigi Expressway		33	66	99	99	297
Other road projects	130	47	55	113	121	466
Hoima Oil Refinery			202	167	167	536
Other oil related infrastructure	100	100	121	230	137	688
Markets and Farm Income Enhancement		9	26	43	51	129

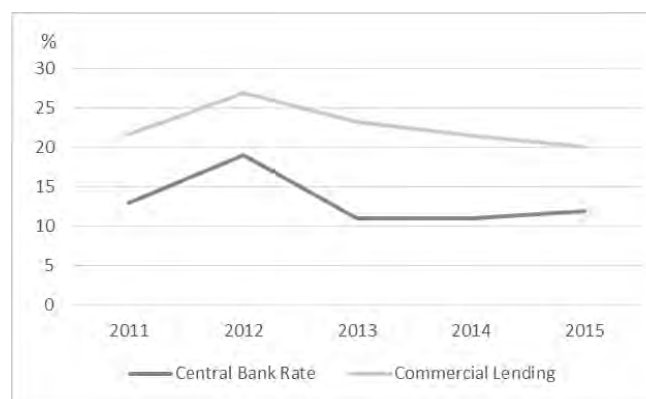
Source: 2nd National Development Plan 2015/16-2019/20, Uganda

According to the BFP 2015/16, Ush1,836 billion was approved for development expenditure in the Works and Transport sector in 2015/16, which is around 74% of the total expenditure in the Sector. As shown in Figure 7.3.3, the projected expenditure in the transport sector is expected to have a peak in FY 2016/17, in which a total of Ush3,419 billion will be spent on recurrent and development expenditures. A big share of the budget will be allocated to the road sector, and the Uganda National Road Authority is expected to receive the largest share, around 70% of the sector's budget, which is followed by Uganda Road Fund (Ush 428.1 billion) and Kampala Capital City Authority (Ush 170 billion) in 2015/16.



Source: National Budget Framework Paper 2015/16, Uganda

Figure 7.3.3: Expenditure in the Transport Sector in Uganda (FY2013/14 – 2017/18)



Source: Article IV Consultation, 2015, IMF

Figure 7.3.4: Central Bank Rate and Interest Rate from Commercial Banks (2011 – 2015)

The BFP 2015/16 does not include the construction cost for SGR over the medium term, and the total expenditure for the railway sub-sector remains to be very low, Ush 4.5 billion in 2015/16 for engineering design of SGR. In terms of the inland water sub-sector, around Ush 4.9 billion will be spent on the purchase of new ferry in Port Bell and Jinja, and other development of inland water transport in 2015/16. The rehabilitation of Entebbe Airport will be financed by Chinese fund for 252.9 billion in 2015/16. The construction and rehabilitation of inland container depot is allocated Ush 0.45 billion in 2015/16, and border post rehabilitation and construction of OSBP facilities is allocated Ush 8 billion in 2015/16. It can be said that a transport policy of shifting from truck to railway and inland waterway has not been materialized yet in the BFP 2015/16.

7.3.4 Private Sector Financing in Uganda

Except for the railway sector, there has been no private sector financing for infrastructure in Uganda. As of June 2013, RVR had invested USD 6.7 million for the conceded assets. The amount of capital investment, however, is not sufficient to improve the railway operation. The PPP Unit was established under the Ministry of Finance, Planning and Economic Cooperation in 2015 and several transport projects such as Kampala-Jinja Expressway were proposed to be financed by the PPP framework.

Similar to Kenya, the relative high cost of lending is one of the major impediment for the private sector financing for infrastructure. Compared to Kenya, the lending rate from commercial banks in Uganda is higher, with the average interest rate of 22.7% during the past 5 years, as shown in Figure 7.3.4.

The headquarter of East African Development Bank (EADB) is located in Kampala, with a branch in each member country (Kenya, Rwanda, and Tanzania). EADB financed in commercial projects and the investment of railway wagon in Tanzania, and plans to raise the amount to over USD 520 million to improve the financing capacity. The maturity of investment

projects by EADB are normally for 10 years with a grace period of 2 years, and seek tax exemption to enable the bank to provide more concessional loans.

7.3.5 Required Costs and Available Resources

As shown in Table 7.2.3, the total required investment costs for the Master Plan are estimated at USD 30.5 billion, of which USD 6.8 billion are secured by external sources and USD 4.7 billion are planned to be financed by the PPP arrangement. The rest of the investment costs are considered to be financed by the government grant, of which USD10.0 billion is required for the Ugandan government. Table 7.3.3 shows the required costs for the government in Uganda by each timeframe. The largest investment costs are required in the railway sub-sector, followed by the road sub-sector.

**Table 7.3.3: Required Costs by Timeframe for the Government in Uganda
(2016/17 – 2030/31, USD million)**

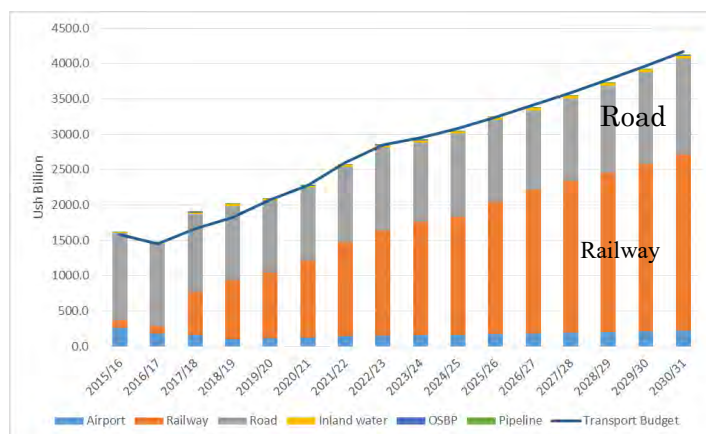
Sub-Sector	Short Term	Medium Term	Long Term	Total
Road	15.0	392.3	272.0	679.3
OSBP	0.3	13.9	2.0	16.8
Port	-	-	-	-
Airport	30.2	10.1	24.1	64.5
Inland Water	6.7	0.0	0.0	6.7
Railway	3,305.0	1,375.0	4,500.0	9,180.0
Pipeline & Mineral	92.8	0.0	0.0	92.8
Logistic Hub	2.3	2.3	4.9	4.9
Total	3,452.4	1,793.7	4,803.0	10,049.6

Source: JICA Study Team

The available development expenditure for the transport sector in Uganda is then calculated based on the following assumptions:

- The development expenditure in the transport sector is projected to increase in proportion to the real GDP growth rate. A constant price in 2015 is used for this analysis.
- The financial analysis is based on the government's fiscal policy, the current expenditure allocation and the medium term expenditure plan, but due to the large investments required in the railway sub-sector, the share of the railway sub-sector is projected to increase from 0.6% in 2015/16 to 3.0% in 2017/18 and 4.0~5.5% of the total expenditure in the medium-long term. This budget allocation includes the revenue from Infrastructure Levy, while maintaining at least the same amount of expenditure for the road sector. Infrastructure Levy currently consists of 0.6% of the total budget.

- The expenditure share of the Northern Economic Corridor is assumed as follows: the required investment costs in the road sub-sector is assumed to be 20 percent of the total road expenditure, while the required costs in the railway, airport, inland water, logistics, and OSBP sub-sectors are assumed to be at 70 percent, 50 percent, 50 percent, 100 percent, and 100 percent of the total expenditure respectively. This assumption is rather conservative, but not over-estimated, to project the future available financial resources.



Source: JICA Study Team

Figure 7.3.5: Transport Budget and Proposed Expenditure in the Transport Sub-Sectors in Uganda (2016/17-2030/31)

- The share of the transport capital expenditure are set at 9.3% of the total expenditure between 2017/18 and 2030/31, which is based on the current expenditure allocation (9.1% in 2016/17) and the medium term expenditure plan in BPS 2016, and within the total budget for the transport sector.

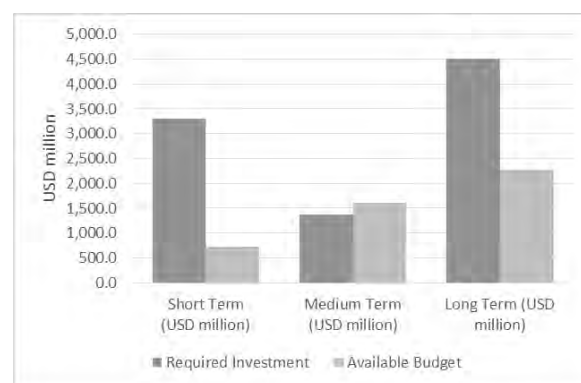
Based on the above assumptions and available financial data from the Ministry of Work and Transport, the available resources for NEC in Uganda are calculated in the following table. The comparison between the required investment costs (Table 7.3.3) and the estimated available resources are shown in Coverage column.

Table 7.3.4: Available Resources for NEC in Uganda by Timeframe (2016/17 – 2030/31, USD million)

Sub-Sector	Short Term (2016-2020)		Medium Term (2021-2025)		Long Term (2026-2030)		Total	
	Available	Coverage	Available	Coverage	Available	Coverage	Available	Coverage
Road	309.6	2,064%	327.8	84%	353.9	130%	991.3	146%
OSBP	10.0	2,887%	5.4	39%	5.9	295%	21.3	127%
Airport	98.5	326%	114.9	1,135%	147.5	612%	360.9	560%
Inland Water	14.9	224%	23.0	-	29.5	-	67.4	1,009%
Railway	717.4	22%	1,599.9	116%	2,270.9	50%	4,588.2	50%
Pipeline	111.7	120%	64.3	-	-	-	176.0	190%
Logistic Hub	2.7	114%	3.7	157%	4.7	96%	11.1	115%
Total	1,264.9	37%	2,138.9	119%	2,812.3	59%	6,216.1	62%

Source: JICA Study Team

As shown in the above table, the projected government expenditure in the road, One Stop Border Post (OSBP), airport, inland water, pipeline, logistic hub are expected to cover the proposed investment costs in the total amount. However, although the share of the railway sub-sector is increased, a financing gap is expected in the short term and medium term, as well as in terms of the total available resources. Some options are considered to narrow the financing gap in the railway sub-sector such as; (1) reduce the number of SGR projects to more prioritized and highly demanded projects, (2) reschedule the short term's SGR projects to the medium- long terms and commence the only prioritized railway projects in the short term, (3) increase user charge for railway users and through infrastructure levy, (4) seek the PPP arrangement and infrastructure bonds for financially viable projects that are considered in Chapter 9, (5) apply a concessional loan to reduce the short-term financing requirement, and (6) more shift from truck to rail in transport expenditure.



Source: JICA Study Team

Figure 7.3.6: Required Costs and Available Resources in the Railway Sub-Sector in Uganda by Timeframe

7.4 Regional Financing Mechanism

Some of the proposed transport projects require cross-border coordination and regional strategic approach. For instance, the construction of OSBP needs to be prepared and coordinated by two countries and the development of regional port such as Mombasa would benefit not only coastal state but also landlocked countries. It is therefore increasingly recognized that regional transport projects shall be better prepared and designed on a regional basis and the regional financing mechanism for the preparation and implementation of regional infrastructure projects have been considered in EAC. The establishment of EAC Development Fund under the EADB has been proposed, which is to provide finance for the preparation of regional projects.

One of the advantages of regional financing mechanism in EAC is the reduction of transaction costs; representatives from the member countries in EAC will prepare, coordinate, design, and procure regional projects, which would reduce the time and costs of coordination and preparation significantly. In addition to financing the preparatory stage, financing the implementation of small regional projects such as OSBP could be considered through the regional financing mechanism. For instance, in case of the construction of OSBP through the framework of EAC, EAC will prepare the design, coordinate with external donors and procure one tender, which would reduce the time and cost that currently both governments spent for the preparation, coordination and procurement of OSBP separately. The sources of financing can be loans, grant and other finance from the member countries and development partners.

In addition to the contribution from the member countries and external loans, a principle of user charge can be considered for financing regional projects. For instance, the Council of EAC approved a 1.5% levy on dutiable imports into the region, which can be used to improve cross-border trade and facilities such as OSBP and Malaba marshal yard.

Based on the above, the proposed financing plans for this Master Plan are summarized in the following table.

Table 7.4.1: Proposed Financing Plan for the Master Plan

Sub-Sector	Kenya	Uganda
Road	- Government grant is required for the proposed road projects, though gradual reduction in government subsidies and the increase of private sector participation and user charges such as tolling are considered.	- More shift from truck to railway in financing transport infrastructure is necessary while maintaining similar amount of investment costs for the road sub-sector - More private sector participation and infrastructure bond are considered for financially viable projects and the increase of user charges to be considered
OSBP	- More regional financing mechanism for the preparation and implementation of OSBP are considered	
Airport/Port	- Financing in this sub-sector can be gradually moved from government subsidies to private sector financing, especially for financially viable projects. Cost recovery through direct user charges can be considered to finance investment costs	
Inland water	- Government grant is required for the proposed projects and more regional financing mechanism for strategic planning and implementation to be considered.	
Railway	- Financing gap in the railway sub-sector can be narrowed by rescheduling the railway investments to the medium-long term, shifting more financial resources from truck to railway, increasing cost recovery through user charge, and seeking the private financing such as a PPP and infrastructure bond for financially viable projects. Concessional loans are among other options to narrow the gap, but there is a risk of raising the public debt to exceed the threshold due to the large amount of required investment costs.	- More modal shift from truck to railway in the transport expenditure is required to cover the proposed investments. Rescheduling some railway projects from the short term to the medium-long term and reducing the number of projects to more prioritized and highly demanded projects are necessary to narrow the financing gap. More cost recovery through user charge and private sector financing and infrastructure bond for financially viable projects can be considered. A concessional loan to cover the short-term financing requirement can be another option.
Logistic Hub	- All required costs can be financed by the PPP framework and user cost recovery.	
Pipeline	- The proposed pipeline projects will be financed by cost recovery from user charge and KPC reserve. More government grant is required for railway investment to transport coal.	- The PPP arrangement and cost recovery from user charge are considered for financially viable pipeline projects. The proposed Petroleum Fund can be used to repay the loan required for the initial investments. The regional financing mechanism for the preparatory stage can be sought after.

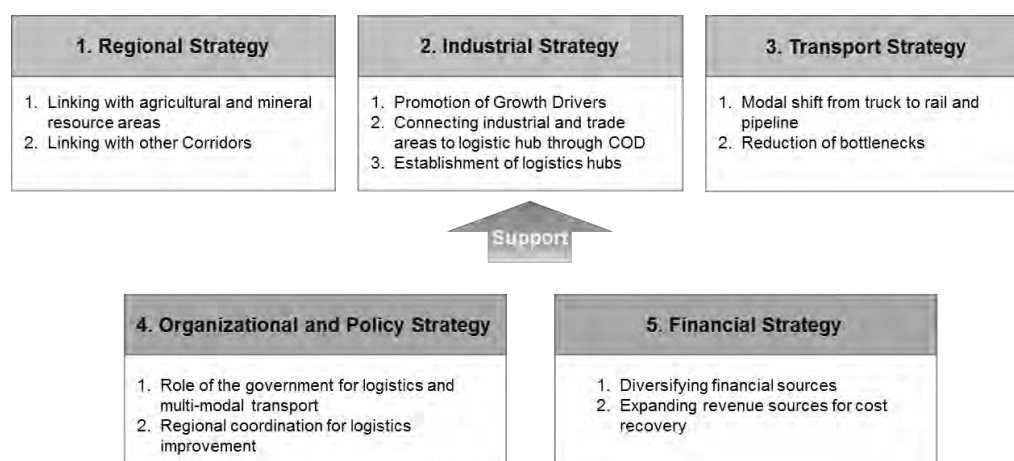
Source: JICA Study Team

CHAPTER 8 PROPOSED DEVELOPMENT STRATEGIES

8.1 Overview

The Development Vision for NEC has been formulated through discussions with TWG meetings both in Uganda and Kenya. The proposed Development Vision is “To be the Leading Economic Corridor with Integrated Transport and Logistics Systems in Africa”. Four key words for the Development Vision has four key words which makes the NEC distinct from other corridors, these are, i) leading, to be the leading, most efficient and reliable in Africa and the success can be applied to other corridors, ii) integrated transportation system, which offers diversified and multi-modal options (road, rail, waterway, and pipeline) and facilitates regional integration in East Africa, iii) integrated logistic hub, in which multi-modal options are available, and industrial areas connected and promoted by transport and logistic infrastructure, and iv) economic corridor, stimulate regional economic development in the area surrounding the corridor through development of transport infrastructure, logistic facilities and creating industries.

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



Source: JICA Study Team

Figure 8.1.1: Proposed Five Strategies for NEC

The relationship between the above key words of the Vision and strategies are shown below.

Table 8.1.1: Relationship between Vision and Strategies

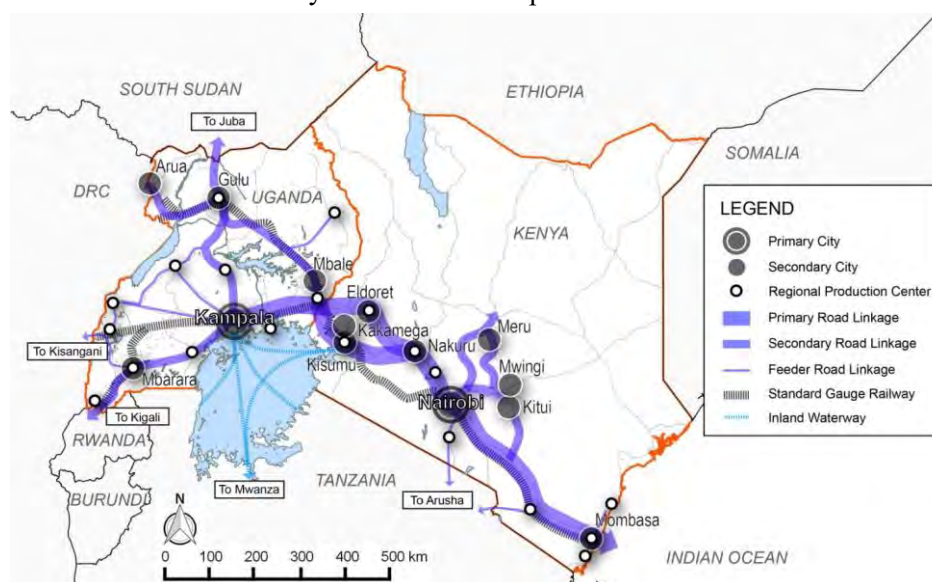
Strategy	Leading	Integrated Transport System	Integrated Logistic Hub	Economic Corridor
Regional Strategy	X	-	-	X
Industrial Strategy	-	-	X	X
Transport Strategy	X	X	-	-
Strengthened by				
Organizational and Policy Strategy				
Financial Strategy				

Source: JICA Study Team

8.2 Regional Strategy: Linking Production Center and Corridors

(1) Linking agricultural productive areas and mineral resources through development of secondary cities

Major cities and economic activities are concentrated along the NEC, and it is essential to link potential agricultural productive and mineral resources areas through feeder roads. It is therefore important to link potential agricultural zones and mineral resources areas to the NEC. In this regard, JICA Study team proposes, as a spatial structure of the NEC, development of multi-center with regional development (Distributing urban function with regional industries system) considering distribution of growth drivers. The proposed spatial structure plan has the following characteristics: i) balanced growth and efficient logistics in the NEC region through promotion of urban functions of “12 Secondary Cities”, and ii) Secondary Cities that serve as regional urban center supplying urban services and logistic hub which connects Regional Production Center and Primary Cities as consumption areas.



Source: JICA Study Team

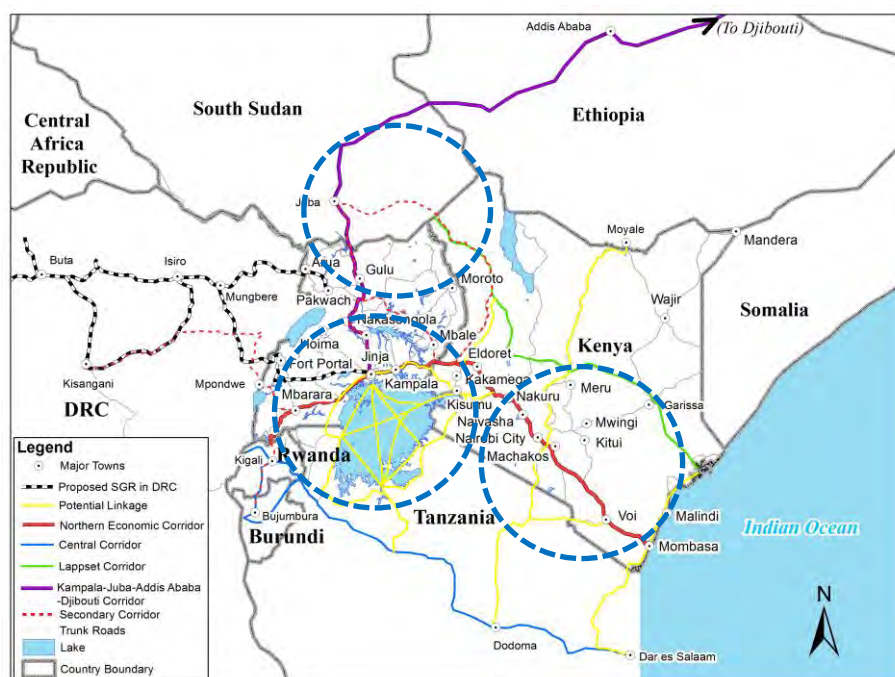
Figure 8.2.1: Proposed Spatial Structure Plan for NEC

The expected impact is to realize smooth movement of products and balanced development of NEC region. Please note that the report proposed 3 alternative spatial structure plans including above. The spatial structure plan will be settled on through discussion with technical working group, steering committee, and stakeholder meetings.

(2) Linking with LAPSSET, Central Corridor, and Kampala-Juba-Addis Ababa-Djibouti Corridor

With the introduction of common market and custom union, trade with East African countries has become more important for both Kenya and Uganda. In East Africa, the Central Corridor and LAPSSET are closely related to the NEC, in the sense that inter-regional trade between strategic locations will be promoted. For instance, Voi (Northern Corridor) can be connected to the Central Corridor through Taveta/Holili –Arusha –Dodoma, which would promote regional trade between Kenya and Tanzania and is important for economic and industrial activities in the Northern Tanzania. Inland waterway on the Lake Victoria would be a center of regional trade due to its location, and the Ring Road around Lake Victoria would serve as an alternative option for lake transport and facilitate regional trade within East Africa. Linking to LAPSSET from Eldoret, which is one of our target routes, would serve as an alternative for the route to South Sudan. For landlocked countries, it is important to have multiple options to the ocean since only one option is a risky and the congestion is accelerated. The coastal corridor to connect Mombasa to Lamu would be important to reduce the risk of congestion. The following figure illustrates potential linkage with the Central Corridor and LAPSSET. On the other hand, the Kampala – Juba (South Sudan) – Addis Ababa (Ethiopia) - Djibouti Corridor will be upgraded and connected to NEC in Kenya and Uganda.

The expected impact is to provide wider market for and close linkages with the East Africa region. As shown by following figure, the linkage with Central Corridor (blue line), LAPSSET (green line) and Kampala-Juba-Addis Ababa-Djibouti Corridor (purple line) would accelerate regional trade and integration in East Africa.



Source: JICA Study Team

Figure 8.2.2: Potential Linkage with Central Corridor, LAPSSET, and Kampala-Juba-Addis Ababa-Djibouti Corridor

(3) Major Suggested Projects for Regional Strategies

Urban and Regional Development Projects in Kenya:

The following projects are identified in Kenya for urban & regional development, land use management and land title management.

Table 8.2.1: Suggested Urban and Regional Development Projects in Kenya

No.	Name of Project	Outline
1	Preparation of strategic urban development plans for metropolitan regions	Strategic urban development plans for metropolitan regions (Kisumu-Kakamega, Nakuru-Eldoret, and Kitui-Mwingi-Meru) which are in close proximity to NEC with capacity development for County Governments
2	National Land Information Management	Development and implementation of a GIS based National Land Information Management System (NLIMS), finalizing digitization of land paper records, deployment of electronic land records management system, development and implementation of a cadastral database system
3	Preparation and implementation of integrated land use framework and plan	Integrated land use framework and plan and management structure at national and county level

Source: JICA Study Team

Urban and Regional Development Projects in Uganda:

The following projects are identified in Uganda for urban & regional development, land use management and land title management.

Table 8.2.2: Suggested Urban and Regional Development Projects in Uganda

No.	Name of Project	Outline
1	Preparation of strategic urban development plans for regional cities	Strategic urban development plans for regional cities (Gulu, Mbale, Mbarara and Arua) with capacity development for local government (District Councils and Municipal Councils)
2	Preparation of strategic physical development plans for strategic cities	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)
3	National Land Information Management	Development and implementation of a GIS based National Land Information Management System (NLIMS), finalizing digitization of land paper records, deployment of the electronic land records management system, development and implementation of a cadastral database system
4	Preparation and implementation of integrated land use framework and plan	Integrated land use framework and plan and management structure at national, and district level

Source: JICA Study Team

Corridor Linking Project:

To build a more effective logistics road network in the East African Countries, the Northern Economic Corridor should be effectively connected with the Central Corridor through improvement of Lake Victoria Circular Road and Mt. Kilimanjaro foothill road. In addition, LAPSSSET (The Lamu Port Southern Sudan-Ethiopia Transport) Corridor and the Kampala – Juba (South Sudan) – Addis Ababa (Ethiopia) - Djibouti Corridor should be upgraded and connected to NEC in both Kenya and Uganda.

8.3 Industrial Strategy: Effective and Efficient Logistical System for Industry and Trade

(1) Promotion of growth drivers to increase export, reduce import, and economic development

From an industrial development in NEC region viewpoint, 35 growth drivers consisting of manufactured, agricultural and livestock, and energy and mining products etc. are nominated. 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 will be categorized as shown in the table below.

Table 8.3.1: 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)
Strategic products or industries which provide significant solutions for industrial structure upgrading	Crude Oil, Coal, Natural Gas	Crude Oil, Petroleum, Phosphate
Industries with strong forward and backward linkages	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

The above 35 growth drivers have large potentials for: i) increasing the export to East Africa region or international market, ii) decreasing the import through expansion of domestic production, and iii) large contribution to add value the local economy, as summarized in the below.

Table 8.3.2: Candidates of Growth Driver in Kenya and Uganda

Category	Kenya	Uganda
Expansion of Export	Tea, Coffee, Cut Flower, Processed Fruits and Vegetable, Crude Oil, Soda Ash, Niobium and Rare Earth Elements, Construction Materials (e.g., cement, iron and steel,), Consumer Goods (e.g., soaps, cosmetics and detergents), Apparel Industry, Leather Industry, Soda Ash	Coffee, Oil Seeds, Crude Oil, Phosphate, Other Minerals (e.g., gold, iron ore, wolfram, tin, tantalite, copper etc), Leather Products, Construction Materials (e.g., iron and steel), Consumer Goods (e.g., soaps and detergents),
Reduction of Import	Rice	Palm Oil, Rice, Petroleum
Value Addition to Local Economy	Meat Products, Plastics, Packaging, Coal, Natural Gas, Tourism, Logistic Service	Meat Production, Dairy Products, Tourism, Logistic Service
Total	20 Drivers	15 Drivers

Source: JICA Study Team

The expected impact is to improve the export (85% of increased export cargo between 2014 and 2030 will be created by growth drivers) and to reduce import (10% increase of import in 2030 at Mombasa port will be expected without contribution of growth drivers). The above growth drivers will have more competitive advantage through effective and efficient logistical system

including improved border post, logistic hubs etc. It is also noted that industrial infrastructure in terms of power supply, water supply and ICT should be developed as scheduled to support the growth drivers.

(2) Connecting industrial areas to logistic hubs through Cargo Oriented Development (COD)

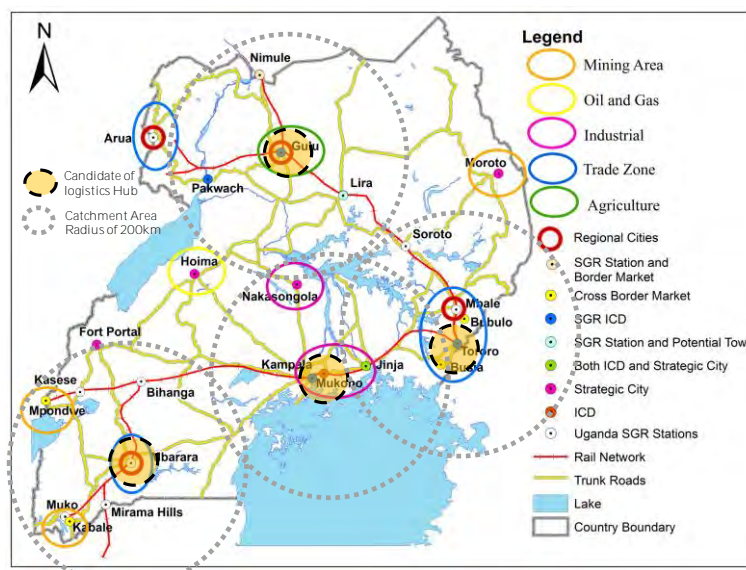
Logistic hubs can be constructed at strategic locations such as SGR stations, strategic cities, key industrial areas, and so on. Harmonization with industrial plan, mineral resource development, and agricultural development can be key for transport and logistics planning. Such developments can be referred to as Cargo-Oriented Development (COD). The expected impact is to realize efficient and reliable logistic network for industry.

SEZs (Mombasa, Naivasha, Eldoret, and Kisumu), industrial parks (Voi, Athi River) and ICT city (Konza City) are projects planned for developed along the NEC in Kenya. Currently, ICDs are located operational in Embakasi (Nairobi), Kisumu, and Eldoret. SGR stations are planned to in Mombasa, Mariakani, Voi, Mtito Andei, Sultan Hamud, Athi River, Nairobi, Longonot, Narok, Bomet, Sondu, Ahero, Kisumu, Yala, Mumias and Malaba and will be significant for transport and logistic activities in future. The location of logistic hubs will be duly analyzed at a later stage together with traffic demand forecast and transport network analysis, but nevertheless, if the catchment area of logistic hubs is assumed to be 200km, which requires around 3 hours meaning a day trip can be done, it becomes inevitable to install logistic hubs in at least 3 locations (Nairobi, Kisumu and Voi/Mombasa) in Kenya.



Source: JICA Study Team

Figure 8.3.1: Image and Candidates of Logistic Hub in Kenya



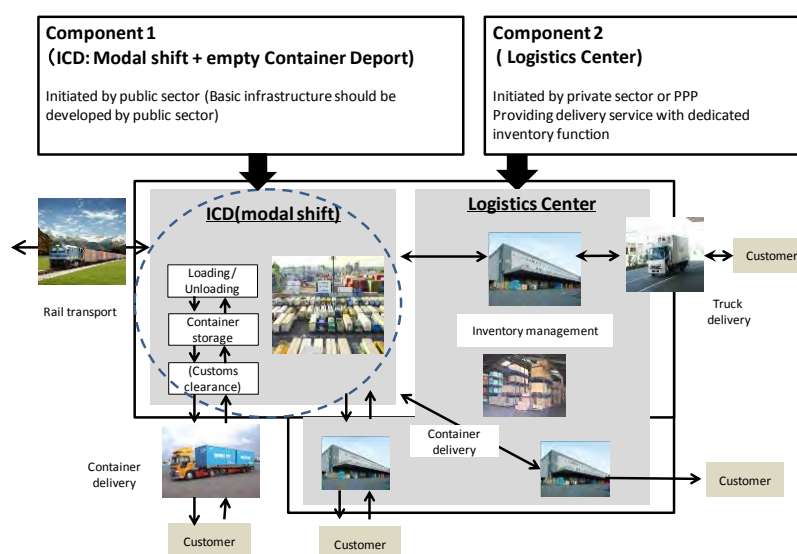
Source: JICA Study Team

Figure 8.3.2: Image and Candidates of Logistic Hub in Uganda

In Uganda, 7 economic areas (Gulu, Moroto, Kabale, Mohondwe, Kampala, Nakasongolaa, Hoima) and 3 trade zones are proposed in the Vision 2040. In addition, 4 regional cities (Gulu, Arua, Mbale, and Mbarara) and 5 strategic cities (Jinja, Moroto, Fort Portal, Hoima, and Nakasongola) have also been identified by the vision. Cross border markets are proposed in 5 border cities (Nimule, Mpondwe, Kabale, Busia, Bubulo) and ICDs are located in Mukono, Jinja, and Tororo. Gulu will be a strategic and regional location for transportation to South Sudan and Northern Uganda, and Mbarara can serve as a strategic location to link mining area and border trade with both Rwanda and DRC. Pakwach can be a strategic and regional location to link DRC and inland waterway and connecting to oil and gas area in Lake Albert while Soroto or Tororo/Mbale can be a strategic location for mineral resource transport from Moroto. If the catchment areas for the logistic hub is 200km requiring around 3 hours and a day trip can be done, it is inevitable to install a logistic hub in at least 4 locations (Kampala (Mukono), Tororo, Gulu, and Mbarara) in Uganda.

(3) Establishment of logistic hubs with ICD and Logistic Center

A logistic hub can be defined as a center or specific area designated to deal with activities related to transportation, collection, distribution, and storage of goods for national and international transit where traffic is exchanged across several modes of transport. A potential logistic hub could have multi-modal facilities such as ICD that connect railway and road, inland water, and airport. In addition to multi-modal facilities, a logistic hub provides logistics center with facilities and services such as warehouse, distribution center, and one stop shop. Therefore, Logistics Hub connects international through ICD to domestic “door” delivery through logistics center. Logistic hubs with ICDs and logistics center are designed to connect with industrial parks, mineral resource areas, and agricultural zones to facilitate economic activities and investment opportunities.



Source: JICA Study Team

Figure 8.3.3: Image of Logistic Hub with ICD and Logistics Center

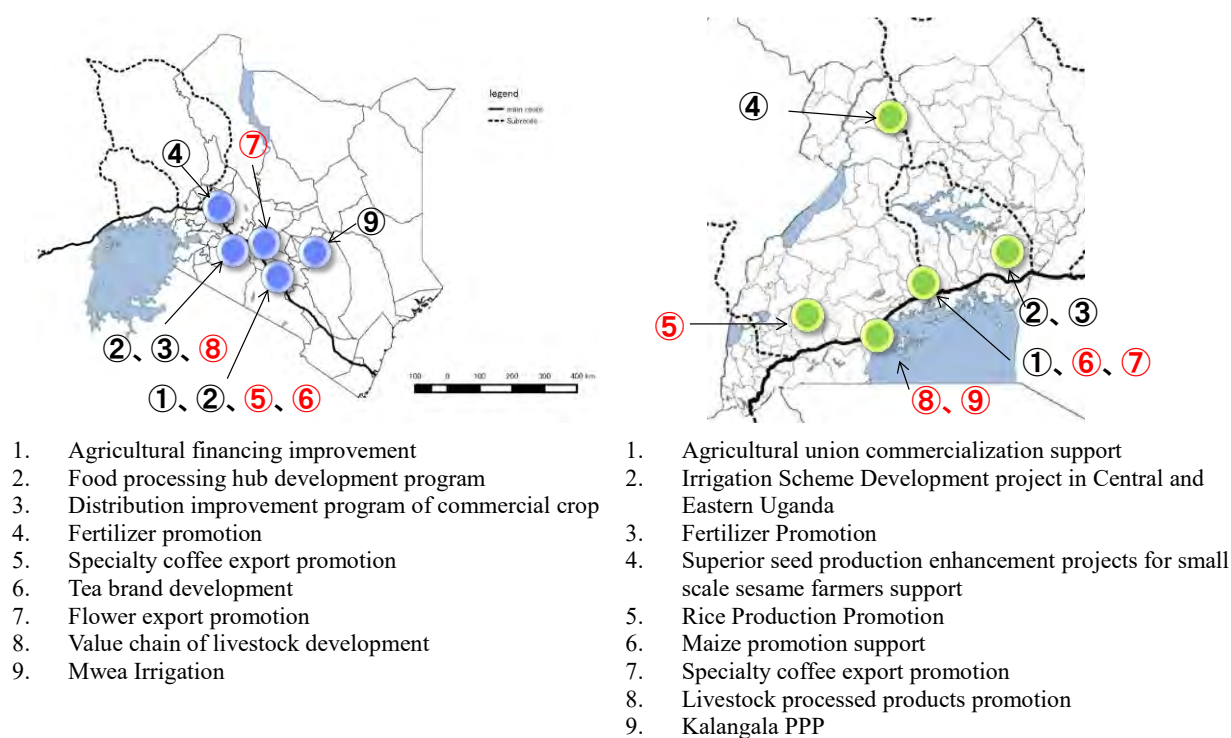
Logistic centers should provide accurate and cost-effective inventory operation for handling large variety/small lot commodities while achieving cost reduction. On the other hand, customers (especially manufactures) will focus more on their core business as logistics services will be outsourced. In this regard, logistics service providers carry out inventory and processing operation on behalf of the costumers. In future, Logistics centers can lead to providing “Just In Time (JIT)” delivery by small-medium sized trucks, since the capacity of access road to customers will be insufficient for large trucks except for primary road like NEC.

The expected impact is to: i) establish effective linkage between rail and truck modes, ii) reduce empty container movement (by 7% in Mombasa), and iii) expand local business of logistics based on needs of clients.

(4) Major Suggested Projects for Industrial Strategies

Agricultural Development Projects in Kenya and Uganda:

The following projects are identified in both Kenya and Uganda for agricultural and fishery development, and agribusiness development.



Source: JICA Study Team

Figure 8.3.4: Location Map of Suggested Projects for Agriculture Development

Industrial Development Projects in Kenya:

The following projects are identified in Kenya for Industrial Development.

Table 8.3.3: Suggested Industrial Development Projects in Kenya

No.	Name of Project	Outline
1	Special Economic Zone Development	The concept of special economic zone (SEZ) is to provide quality infrastructure as well as good business environment together with fiscal incentives within designated areas. The locations include Dongo Kundu SEZ, Naivasha Industrial Park, Athi River Industrial Park, Machacos-Kajiado Leather Industrial Park, and Konza Tech City.
2	Packaging industry development for food-processing	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 project can comprise trainings for packing industries, research and development institutions, and agro-processing operators.

Source: JICA Study Team

Industrial Development Projects in Uganda:

The following projects are identified in Uganda for Industrial Development.

Table 8.3.4: Suggested Industrial Development Projects in Uganda

No.	Name of Project	Outline
1	Industrial Park Development	The project concept is to ease access to land with good infrastructure and business environment. The locations include Bweyogerere Industrial Park in the suburbs of Kampala, Mbarara, Masaka, Mbare, Soroti, Gulu, and Kasese.
2	Building capacity of Standard, Metrology, Quality Infrastructure	The project is to establish standard, quality and metrology infrastructure. In addition, the institutional capacities with involvement of private sector in the area of standard, quality and metrology should be developed.
3	Leather Industry Infrastructure Upgrading	The project is to upgrade the leather industry 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.
4	Marketing hubs for DRC and South Sudan	While frontier markets such as DRC and South Sudan are with potential, the conditions of infrastructure and business environment should be improved through the project to extensively explore the market with actual physical presence in such countries.

Source: JICA Study Team

Industrial Development Projects for Kenya and Uganda:

The following projects are identified in Kenya and Uganda for Industrial Development.

Table 8.3.5: Suggested Industrial Development Projects in Kenya and Uganda

No.	Name of Project	Outline
1	SME Financing for Processing, Manufacturing and Logistics Sector Development	Despite various efforts including private and public dialogues, the business environment in Kenya and Uganda still requires improvement. The gradual financial market development and outstanding development of mobile money transaction system will improve access to financial services.
2	Building up Competitiveness of Construction Materials and Machinery Industry	Planned and on-going infrastructure development projects and growing demand for housing means high potential demand for construction materials. 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.

Source: JICA Study Team

Mining and Oil Development Projects in Kenya:

The following projects are identified in Kenya for Mining and Oil Development.

Table 8.3.6: Suggested Industrial Development Projects in Kenya

No.	Name of Project	Outline
1	Coal Transportation Infrastructure	Construction of a railway branch line from the main rail line to the coal mines in Kitui is a priority infrastructure project. The feasibility study on the coal transportation system including coal terminals should be carried out.
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. Due to rapid growth of imported oil product, the replacement and expansion as well as additional pipelines should be carried out.

Source: JICA Study Team

Mining and Oil Development Projects in Uganda:

The following projects were identified in Uganda for Mining and Oil Development.

Table 8.3.7: Suggested Industrial Development Projects in Uganda

No.	Name of Project	Outline
1	Refinery and Oil Product Tailing Pipeline Construction	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 through a PPP scheme.
2	Cross Border Product Oil Pipeline	With the economic development of these land locked countries, demand of product oils has increased significantly and road traffic is started to be over loaded. To mitigate the road traffic situation, and to enhance the traffic safety, extension of the pipeline to Kampala, and to Kigali will be constructed.
3	Mining Master Plan	The Project objective is to maximize the value of mineral resources and boost initial part of the economic development of the country. The master plan includes: i) Mineral Strategy, ii) List of Strategic Minerals and Target area, iii) Development of Strategic Mineral Mapping and Database, vi) Mineral Identification Capability, etc.

Source: JICA Study Team

Logistic Hub Project:

Logistic Hub should be constructed at Mombasa, Nairobi, Kisumu, Tororo, Kampala, Gulu, and Mbarara. Most of logistics hubs have two common functions; i) Inland Container Depot (ICD) function for modal shift and empty container depot service as far as SGR extension is expected, and ii) logistics center function which focuses on inventory and delivery service whose catchment area is set up approximately 200km in order to achieve one-day delivery.

8.4 Transport Strategy: Efficient and Integrated Multimodal Transportation System

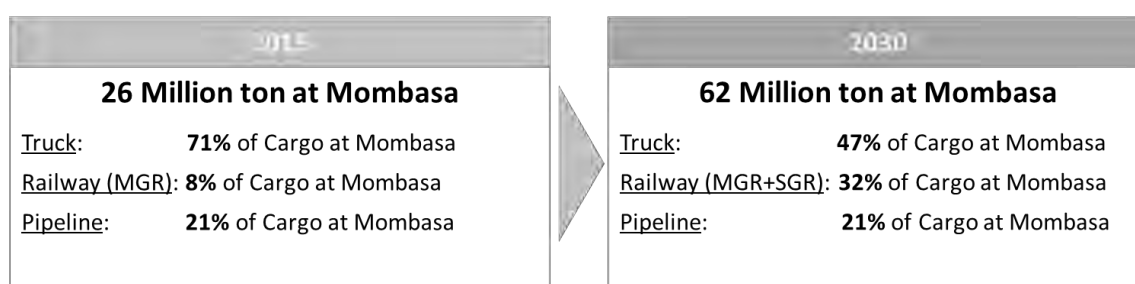
(1) Modal shift from truck to rail and pipeline

In Kenya and Uganda, around 76% of cargo freight are transported by truck, while other transport modes such as railway and inland waterway use is at less than 4% of total freight. In addition, 20 % of total import and export in tonnage for Cargo is oil products which are transported through oil pipeline. Currently, trucks carry all types of goods from bulk cargo to mineral resources and liquid fuels. However, it is more efficient to transport large amounts of heavy freight such as coal, cement, and construction material over long distances by railway. Both Kenya and Uganda governments plan to construct Standard Gauge Railway (SGR) to encourage modal shift from truck to railway, as envisaged in their Visions. It is planned that Kampala and Malaba will be connected by SGR by 2020, which will be extended to Gulu-Nimule route for South Sudan and to Gulu-Pakwach route for DRC, Kampala- Kasese

route to DRC, and Bihanga-Mirama Hills route to Rwanda. As such therefore, railway should be used more for cargo transport upon completion of the SGR project. According to result of preliminary freight traffic demand forecasting, the transit cost of SGR is almost 50% of truck's transit cost and total railway demand for both MGR and SGR can be approximately 33% of all freight tonnage via Mombasa port. It therefore means that the service level of SGR including cargo transport charge will be a key success factor to realize modal the shift from truck to rail.

In Kenya, 5.2million m2 of oil products are transported by pipeline from Mombasa to Eldoret, while the rest of 1.5million m2 are transported by truck. In Uganda however, all oil products are transported by trucks. The government of Kenya planned replacement of old pipelines and establishment of new ones with expanded capacity to meet increasing demand of petroleum products in future. It is, therefore, important that the pipeline should be constructed and operated as planned.

The expected impact is to realize multimodal transport system including railway, truck, and pipeline for NEC. The current and future (2030) share of cargo from and to Mombasa by road, railway, and pipeline are illustrated below.



Source: JICA Study Team

Figure 8.4.1: Possible Institutional Framework for Logistic Promotion and Multimodal Transport

(2) Reduction of bottlenecks of freight traffic and logistics

Based on Origin and Destination (OD) survey and traffic survey for cross border traffic on the roads, bottlenecks caused by cargo traffic are identified in sections around Mombasa and Malaba border. In Kampala and Nairobi, it is necessary to expand road network capacity road widening, construction of bypasss, ring roads, over/under passes etc. The Development Vision aims at providing efficient transportation system in terms of time, cost, and reliability in comparison with other corridors. Considering the development vision and the current bottlenecks, six targets are set in this study, as shown below.

Table 8.4.1: Future Target for Reduction of Bottlenecks

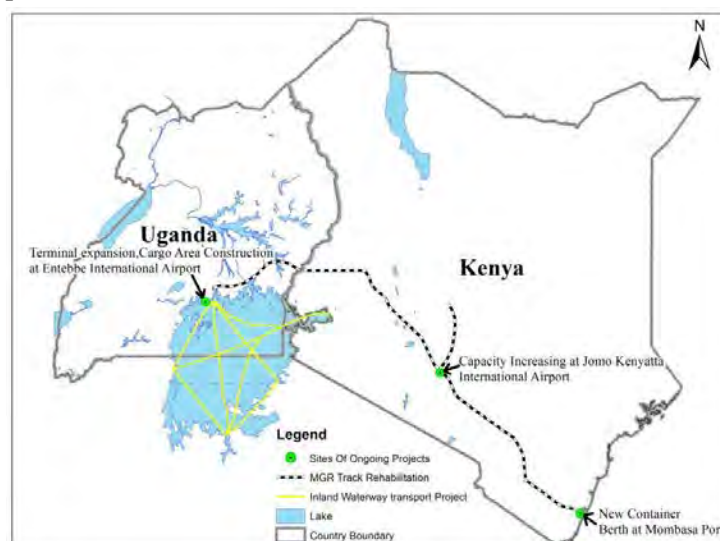
Bottlenecks	Current situation	Future target
Custom clearance in Mombasa	Currently it requires around 4.0-6.0 days for port discharge and custom clearance in Mombasa for transit.	Within 1.0-2.0 day for transit or 1.0 day at CFS in addition to less than 2.0 days for port discharge.
Access road to Mombasa (8km)	It takes around 12 hours to access Mombasa Port due to congestion	Shorten the time through infrastructure development
One Stop Border Post in Malaba	It requires 1.0 day for border crossing	Shorten to within 12 hours including driver's rest time by multi-lane border for petro cargo, etc. under full implementation of SCT scheme
Inland Container Depot (ICD)	Services in ICD are limited and no empty container depot is functioning	Develop modal shift function, empty container depot, etc.
Export of goods at port	It takes 2 days waiting for scanning	1.0 days by proper operation at CY and reduced time of scanning, etc.
Road danger spots	Many truck accidents on the road network	Improved road traffic safety and reduction of traffic jam caused by the accident.

Source: JICA Study Team

The expected impact is to reduce transit time of freight (1.5 days reduction from Mombasa to Nairobi/Kampala, and, 1.5 – 2.0 days reduction from Nairobi/Kampala to Mombasa).

(3) Enhancement of existing transport infrastructures

In addition to roads and new SGR, existing transport structures such as MGR, Mombasa port, waterway in Victoria Lake, international airports should be reactivated or enhanced. Promotion of these modes can contribute to improvement of logistics along NEC. The location of the existing transport structures to be enhanced is illustrated below.



Source: JICA Study Team

Figure 8.4.2: Location of Existing Transport Structures to be Enhanced

The meter gauge system operated by Rift Valley Railways (RVR) spans the entire NEC from Mombasa to Kampala. RVR operates the system under a Concession awarded by Kenya and Uganda in 2006. RVR has invested in infrastructure and equipment but overall, it appears to have lost its share of cargo transport. RVR should consider strengthening of track and infrastructure and additional rolling stock.

Both airports of Nairobi and Entebbe have plans to expand their handling capacity for both passengers and cargo, and strengthen the hub function for the region. Mombasa port is expected to be one of the hub ports in the world in the long term. If Mombasa port has a capacity to handle more than 3million TEUS per year, new Container Berth project at Mombasa Port should be completed in the short or medium term.

SGR has a possibility to activate railway network as a whole for cargo transport and passenger transport in East African countries. Lake Victoria Transport revival should be examined as a railway link. From both cargo and tourist transport, several alternative strategies should be examined. Currently Rehabilitation of Port Bell is supported by both World Bank and EU while development of Mwambani port in Tanga, Musoma Port and New Kampala Port at Bukasa are said to be next in line. Bukasa Port development and the new Port Bell Projects were initially proposed by MOWT. The projects aimed to realize better port functions, expand port-area, and add not only wagon ferries but also boats. In addition, a new industrial park is planned to be constructed near the port.

The expected impact is to realize mufti modal system covering air and waterway for NEC in addition to truck, rail and pipelines.

(4) Major Suggested Projects for Transport Strategies

1) Road

Logistics Highway Project

The main route of the Northern Economic Corridor from Mombasa, Nairobi, Kampala, Kigali and Bujumbura should have at least a dual carriageway. This is because most sections will require four lane capacity, at least up to 2030. Double carriageway with median strip is much safer than single carriageway without median strip.

Truck Service Stations Project:

Truck Service Station is to have enough large sized parking lots of more than 100 because more than 100 heavy goods vehicles heading in one direction is currently witnessed during daytime on many sections of the Northern Economic Corridor. In addition, sufficient accommodation open 24 hours should be provided for long distance drivers. In addition, traffic restriction information should also be provided to drivers before selecting a border to pass. These three functions are focused on in the Truck Service Station project.

2) Railway

The Base case railway development strategy has several elements:

Short term:

- Determine an operating format for the Mombasa-Nairobi SGR.
- Implement SGR from Nairobi to Malaba and Malaba to Kampala.

- Involve the private sector in railway investments such as ICD or terminal or smaller initiatives like leasing rail wagons and locomotives to the railways and shippers.

Medium term:

- Implement SGR to Gulu, Pakwach and Nimule
- Implement ICDs and railway yards and obtain operators.
- Develop a plan for meter gauge and standard gauge side-by-side operations.
- Use policies and regulations to support the shift of cargo from road to rail.

Long term:

- Invest in and maintain the standard gauge railway.

It is expected that Kenya and Uganda will retain ownership of the SGR infrastructure and contract operations to a private company. The two countries should closely monitor the condition of the railway and ensure that sufficient time and expenditure is devoted to maintenance. The national governments of the two countries should make efforts to provide a stable source of funding for railway maintenance that is insulated to the greatest extent possible from politics affecting annual government budget preparations.

3) Port

Mombasa port is expected to be one of the hub ports in the world in the long term and has to handle more than 3million TEUS per year. The following projects should be completed in short to medium term.

- Construction of Second Container Terminal (depth: 15m and 11m; berth ×.2)
- Construction of an access road (approx. 1.6km)
- Dredging works (dredging volume: approx. 3 million cubic meters)
- Construction of a new standard gauge railway linking Mombasa with Nairobi, Kampala and other hinterland destinations
- Construction of a southern by-pass for Mombasa linking the south to north coasts

4) Airport

Jomo Kenyatta International Airport (JKIA) is improving capacity to deal with increasing passenger and cargo demand through an on-going project. JKIA already has 5 cargo terminals which are privatized. Air carriers can choose cargo terminals depending on the service standard and cost performance. The service improvement will be a key factor to becoming an Air-Air Cargo Hub in the region.

Entebbe International Airport will improve air cargo facility. Considering current JKIA performance, Entebbe International Airport should have another strategy and Air & Truck service will be one of the options. The border facilitation should have advantage and can realize Air & Truck service to DRC.

5) Waterway

From a cargo and tourist transport point of view, several alternatives for Lake Victoria waterway should be examined. Currently, Rehabilitation of Port Bell supported by World Bank and EU is underway. Development of Mwambani port in Tanga, Musoma Port and New Kampala Port at Bukasa are next projects. Bukasa Port development project as the new port was proposed in the past to realize better port functions, expand port-area, and add not only wagon ferries but also ro-ro boats. Further review of the project should be considered.

6) Border Post

Malaba border is the main branch point for several countries and therefore its congestion is a serious bottleneck for the whole EAC region. In order to reduce the possibility of congestion, the following two interventions should be considered;

i) Establishing multiple lanes

It is a common practice in the world to set up multiple lanes at the border as they help in reducing congestion up to the time of full implementation of SCT.

ii) Designated lanes for specific commodities/transporters (Fast lanes)

Dedicated lane (Fast lane) will be an incentive for Authorized Economic Operators (AEO). A dedicated lane for petroleum will be beneficial for speeding up its border crossing and for other commodities.

8.5 Organizational and Policy Strategy: Appropriate Institutional Framework for Transport and Logistics

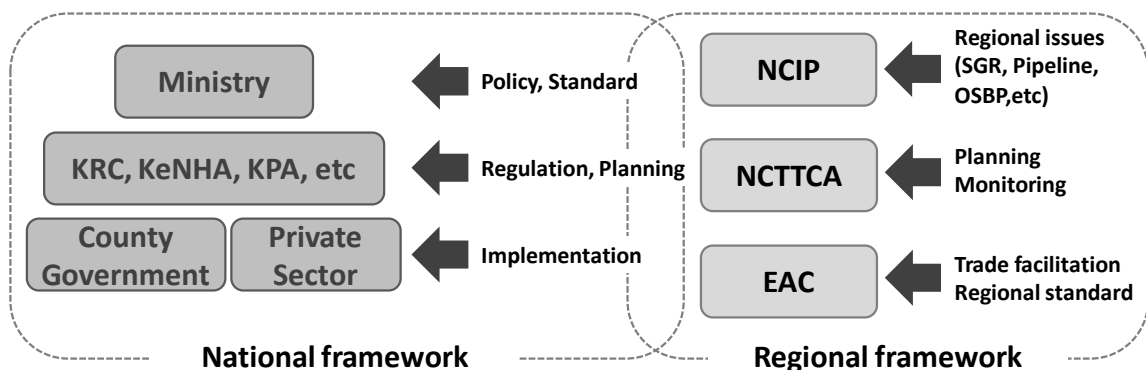
(1) Role of the government for logistics and multi-modal transport

Although the institutional framework for transportation system has been developed at both national and regional levels, those for logistic activities are under developed in the study area. It is therefore prudent to define the role of government as a regulator for logistic activities through SCT and PPP scheme.

(2) Regional coordination for logistic improvement

The organizational and regulatory framework for logistics and multi-modal transportation needs to be established at the regional level. Regional coordination for planning and monitoring for the NEC is so far being implemented by NCTTCA. NCTTCA's function with coordination of ministries concerned for both Kenya and Uganda should be maintained. On the other hand, regional coordination mechanism and private sector involvement are being developed through NCIP.

The following figure demonstrates a possible national and regional institutional framework for logistic promotion and multimodal transportation system.



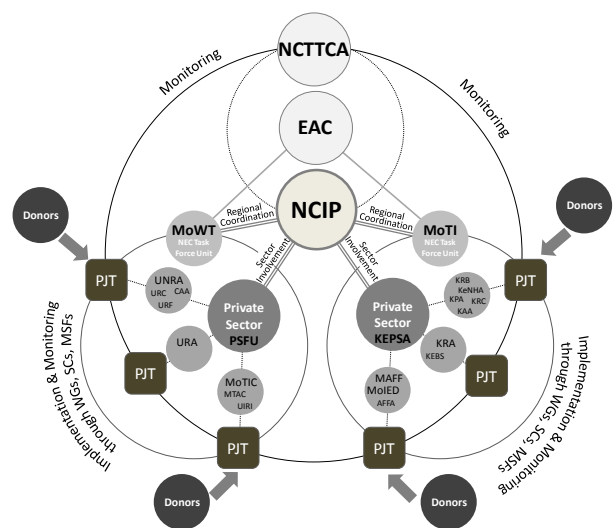
Source: JICA Study Team

Figure 8.5.1: Possible Institutional Framework for Logistic Promotion and Multimodal Transport

(3) Proposed Organizational Framework

Considering the current situation, some recommendations for organizational framework as well as organizational structure are proposed.

- Once the MP is approved and implementation commenced, there must be a monitoring and evaluation mechanism. It is essential therefore, under the initiative of MoTI / MoWT, to establish a taskforce covering various ministries/agencies in charge of transport, finance, trade, industry, agriculture, mining, energy, water etc as well as private sector organizations and NCTTCA. It is recommended that the working group and steering committee should be maintained after the JICA study as a further



Source: JICA Study Team

Figure 8.5.2: Proposed Organizational Structure

monitoring and implementation mechanism. In addition, the approval and adoption of MP through a cabinet memo in Uganda or vision 2030 in Kenya will be one of the important roles of the task force.

- Although the roles of the private sector should be independently identified, constant communication amongst them must be maintained through task force meetings as well as Ministerial Stakeholder Forums (MSFs). It should be noted that Freight Logistic Platform (FLP) will be a model type where private sectors are concerned not only with the implementation side but also the policy establishment side in effect.

(4) Capacity Development

Through the MP study, the following three items are identified as necessary for capacity development, namely: i) PPP, ii) Land Acquisition and Resettlement, and iii) Single Custom Territory (SCT). The following table shows current issues and necessity actions for capacity development.

Table 8.5.1: Necessity Actions for Capacity Development in terms of PPP, Land Acquisition, SCT

Item	Necessary Actions
PPP (Kenya)	<ul style="list-style-type: none"> - Arrangement of technical and financial supports during formulation of PPP project considering concerns of private sector, toll collection mechanism, establishment of bankability, etc. - Formulation and issue of specific guidelines on where the jurisdiction of county government ends and that of the central government begins in PPP schemes. - Formulation and issue of guideline for joint agreement among the countries for cross border infrastructure project.
PPP (Uganda)	<ul style="list-style-type: none"> - Formulation and issue of Implementation Rules and Regulation or PPP Manual. - Formulation of PPP pipeline projects list. - Arrangement of technical and financial supports during formulation of PPP project considering concerns of private sector, toll collection mechanism, establishment of bankability, etc. - Formulation and issues of regulations on i) availability payment system, ii) viability gap fund, iii) annuity payment, or iv) and transportation tax and/or levy - Formulation and issue of guideline for joint agreement among the countries for cross border infrastructure project.
Land Acquisition and Resettlement	<ul style="list-style-type: none"> - Formulation and implementation of land title management project to establish land title database with information of Cadastral map - Arrangement of technical assistance for land acquisition and resettlement program including alternation income source prior to implementation of project
Single Custom Territory (SCT)	<ul style="list-style-type: none"> - Expansion of goods to be adapted the SCT. - Increase of trained staff and equipment for custom in the Mombasa port for SCT - Installation and expansion of ICT through cross boarder ICT project along SGR, Transmission line, oil pipelines.

Source: JICA Study Team

8.6 Financial Strategy: Cost Recovery and Diversifying Financial Sources

(1) Diversifying the financial sources

Currently, financing for infrastructure is largely limited to government grants and external sources. Regional projects such as One Stop Border Post (OSBP) and regional infrastructure are all handled by each country, which increased the transaction costs in the preparation, implementation and monitoring of such projects.

It is therefore important to diversify the funding sources, especially from the private sector for more commercially oriented projects through PPP arrangement and by issuing infrastructure bonds. To minimize the transaction costs and duplication, regional financing mechanism can be sought after for regional projects. A draft law for the establishment of East African Development Fund (EADF) has been prepared, which could provide finance for implementation of regional infrastructure projects and funding for OSBPs. Regional banks such as East African Development Bank and AfDB could play a key role for regional projects and it can be analyzed

if the funding base for such regional banks could be enhanced. For logistic financing, the cost of borrowing from commercial banks is a heavy burden for private operators and investors in both Kenya and Uganda, and diversification of financing sources for logistics need to be looked into.

(2) Expanding the revenue sources of the governments for cost recovery

Related to the above, internally generated sources, or cost recovery from users, are currently limited to road maintenance and airport operations in the transport sector. Cost recovery from users should be expanded to the extent possible, in order to respond to the increasing financing needs and for financial sustainability.

The largest financing needs for the Northern Corridor is the SGR investment in the medium-long term, and therefore, a principle of cost recovery the SGR investment shall be analyzed to the extent possible for. A Railway Development Levy was introduced in Kenya in 2014, as one of the measures for cost recovery and will be reviewed in this study. Another potential means for cost recovery can be through mineral resource revenues, since SGR intends to transport mineral resources.

(3) Proposed Financing Plan

Considering current situation, the proposed financing plans for this Master Plan are summarized in the following table

Table 8.6.1: Proposed Financing Plan for the Master Plan

Sub-Sector	Kenya	Uganda
Road	Government grant is required for the proposed road projects, though gradual reduction in government subsidies and increase of private sector participation and user charges such as tolling are considered.	More shift from truck to railway in financing transport infrastructure is necessary while maintaining similar amount of investment costs for the road sub-sector More private sector participation and infrastructure bond are considered for financially viable projects and increase of user charges to be considered
OSBP	More regional financing mechanism for the preparation and implementation of OSBP are considered	
Airport/Port	Financing in this sub-sector can be gradually moved from government subsidies to private sector financing, especially for financially viable projects. Cost recovery through direct user charges can be considered to finance investment costs	
Inland water	Government grant is required for the proposed projects and more regional financing mechanism for strategic planning and implementation to be considered.	
Railway	Financing gap in the railway sub-sector can be narrowed by rescheduling the railway investments to the medium-long term, shifting more financial resources from truck to railway, increasing cost recovery through user charge, and seeking private financing such as a PPP and infrastructure bond for financially viable projects. Concessional loans are among other options to narrow the gap, but there is a risk of raising the public debt to exceed the threshold due to the large amount of required investment costs.	More modal shift from truck to railway in the transport expenditure is required to cover the proposed investments. Rescheduling some railway projects from the short term to the medium-long term and reducing the number of projects to more prioritized and highly demanded projects are necessary to narrow the financing gap. More cost recovery through user charge and private sector financing and infrastructure bond for financially viable projects can be considered. A concessional loan to cover the short-term financing requirement can be another option.
Logistic Hub	All of the required costs can be financed by PPP framework and user cost recovery.	
Pipeline	The proposed pipeline projects will be financed by cost recovery from user charge and KPC reserve.	The PPP arrangement and cost recovery from user charge are considered for financially viable pipeline

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Sub-Sector	Kenya	Uganda
	More government grant is required for railway investment to transport coal.	projects. The proposed Petroleum Fund can be used to repay the loan required for the initial investments. The regional financing mechanism for the preparatory stage can be sought after.

Source: JICA Study Team

CHAPTER 9 IMPLEMENTATION PLAN AND IMPACT OF MASTER PLAN

9.1 Overview

9.1.1 Overview of Kenya

(1) Overview

Projects developed under this Master Plan will be able to be implemented through various methodology including from the conventional public works (classic type) to public private partnership arrangement scheme. Apart from the classic type of implementation, since the objective of the study is to identify the possibility of the participation of private sectors into the field of infrastructures, an implementation scheme for Public Private Partnership (PPP) has been considered starting from the Kenyan Government policies. While local private financier shows strong intention to follow the government policy, an opinion from the organization of Japanese companies is rather reluctant to participate. Concerning the pipeline projects under PPP Act No.15 2013, PPP Unit has periodically revised the priority list. The selection of PPP arrangements has been stated using the qualitative selection methodology. PPP project in Kenya is reasonably regulated by PPP Act No.15 2013 together with referenced laws. Indispensable Project Facilitation Fund Regulations have been issued. There is still a notable “issues” between the government’s desire and the reality of the business industries, such as investors, contractors and financiers.

(2) Policy

The Government of Kenya has been considering to utilize the private financial initiatives (PPP) for the infrastructural projects in order to achieve the targets in Vision 2030. Kenya’s PPP program is being promoted as a long term program and not as a series of independent projects. This is evidenced by the Government’s focus on PPP as a way of encouraging private sector participation, which has disclosed a pipeline of projects that presently stand at 71 as of August 2015.

The PPP Unit is the technical arm of the PPP Committee as well as the center of expertise for PPP matters in the country. The PPP Unit is equipped with experts on legal, technical, financial and communication matters to guide contracting authorities which are keen to undertake PPP projects. PPP Unit was established in 2013 as the promulgation of PPP Act 15, 2013.

(3) Resources of fund for PPP

Draft PPP Project Facilitation Fund (PFF) Regulations, 2015 was published in March 2015. Its functions are to; a) Support contracting authorities in preparation and tendering of PPP projects,

b) Support the activities of the Unit, c) Provide viability gap finance to PPP projects, d) Provision to any contingent liabilities arising from a PPP project, and e) Settlement of transaction advisory costs.

The government is in the process of establishing a new facility to be known as viability gap fund to assure investors in public private partnerships that their money would be safe even if the projects do not make them profits. The fund is designed to attract private sector money to fund large scale projects in infrastructure.

“Transport Sector Funding Policy” developed by TradeMark East Africa on 22 December 2015 suggest the alternative source of fund for fulfillment of funding gaps. Some of the recommendations are; increased fuel levy, annual licensing charges, tax on motor insurance premiums, contributions from project beneficiaries and roads for tolling for road sector. For rail sector, higher rail development levy (RDL) and higher rail freight charge are recommended. For ports and pipeline sector, almost positive financial situation is stated.

(4) Participation of private sector

The Local Commercial Banks understood the PPP Act No.15 and PPP Unit well. The Bank shall also require the government guarantee and the Top 10 banks in Kenya may be able to participate.

Concerning participation in the infrastructure business, the Japanese trading companies could participate in the operation of ports, IPP projects and pipeline projects in this region. A limited number of Japanese companies have shown interest in participating in projects in the region according to the survey conducted by OCAJI (Overseas Contractors Association of Japan Inc.) in 2016. However, their interests to participate are rather ODA not for PPP type. The possible investors for PPP in Kenya may be a Kenyan or an Indian according to the Local Commercial Banks.

9.1.2 Overview of Uganda

(1) Overview

The project implementation scheme is focused on Public Private Partnership (PPP) arrangement while the conventional procurement methodology is left out from this study. The Government of Uganda has already announced a clear policy for the involvement of private sectors into public service fields. The PPP Act 2015 was promulgated in 16 September 2015. While on-going PPP projects are rare, the Kampala-Jinja Expressway project and Bus Rapid Transit for Greater Kampala project are studied as the case of Uganda. The PPP arrangements for the funding projects under M/P study are classified into four categories taking into account the information of demand forecast, project cost, economic impact and delivery of Right of Way. The selection

of PPP arrangement is presented utilizing the qualitative selection methodology. Finally, although the issues are similar to Kenya, current gaps and bottlenecks are raised in the fields of affordability, political, legal and economic aspects.

(2) Policy

According to the Public-Private Partnership Framework Policy for Uganda, the Government of Uganda has adopted a policy of Public-Private Partnership (PPP) as a tool for the provision of public services and public infrastructure. The Ministry of Finance Planning and Economic Development has set up a unit ("the PPP Unit) to advise Government on PPP, ensure best practice and standardize processes and documentation. It will assess "projects for PPP to confirm that they are affordable and that financial commitments are manageable in terms of the debt management policy and that they are within the Government policies".

(3) Resources of fund for PPP

The Government of Uganda shall have a certain amount of allowance to support the PPP Project. In consideration of the high rate of interest, the difficulty to rely on the beneficiary payment to infrastructure, the private investor shall have the way to reduce its investment burden. The Government of Uganda should have to provide the fund to allocate to PPP projects. This will be clarified in the future study.

(4) Participation of private sector

According to the information from the private financing groups, they have an interest in the field of agriculture, steel, mining industry and construction of road infrastructure by PPP. Regarding to the PPP Act, the government support shall be essential. The concern is how to collect the toll without causing any inconvenience to the users. The international commercial bank can play for both the structure of financial scheme and the lender for the PPP project according to the Standard Chartered Bank Uganda. Such international banks have an interest to participate in PPP infrastructure as they did for hydro power project in past (i.e., Bujaggali and UMEME hydro power projects).

9.1.3 Joint Agreement between Kenya, Uganda and Other Countries

(1) Overview

The master plan for NEC covers from the various industrial development and transport and logistic infrastructure development for both Kenya and Uganda. Such projects may extend to neighboring countries in future as well. The goal of these projects is heading to Mombasa as gate-city crossing over the border. Without continuous completion of the project, beneficiaries cannot enjoy their business merits, subsequently unexpected loss will be encountered by the countries. Therefore, there is a strong necessity for the joint agreement among the countries.

(2) Points to be raised

Joint agreement raised in (1) above will become more complicated than the government deal under the PPP scheme. In order to achieve the impartial, bankable and acceptable to all stakeholders, the extraordinary measure shall be legislated among the countries.

9.2 PPP Approach

9.2.1 PPP Approach in Kenya

(1) Legal Framework

The governance of the legal framework for the implementation of the public works and PPP are promulgated by the various laws. The items 3, 5 and 6 of the following will be expected to be promulgated in the near future according to the PPP Unit. The synthesis of the laws between the national level and county level will be verified in the future study. The PPP Act No.15 of 2013 is defined as the nation laws, so that any arrangements under the Act will be fairly sustained.

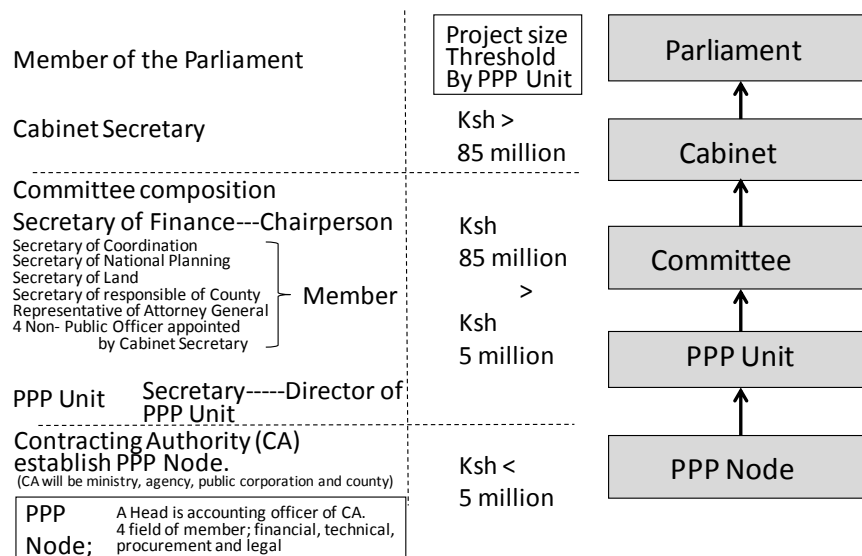
Table 9.2.1: Legal Framework in Kenya

Ref	Law No.	Law Title
1	No.15/2013	Public Private Partner Ships
2	No.15/2013 Legislative Supplement No.58	The Public Private Partnerships regulations, 2014 Arrangements of Regulations,
3	NA.(Draft)	Draft County Government PPP Regulations
4	Procurement manual	Procurement Manual for Works (April 2009)
5	NA.(Draft)	The Public Private Partnerships (Project Facilitation Fund) Regulations 2015
6	NA	PPP Manual
7	Chapter 518	Foreign Investment Protection Act

Source: PPP Unit

(2) PPP Law No.15 2013

The PPP Act No.15 was promulgated in January 2013 and came into effect on 8th February 2013 in order to achieve the Policy of the Kenyan Government. The PPP Act has been comprehensively written for the implementation of the PPP project. Under the PPP Act 2013, the PPP Unit is mandated to articulate the PPP policy so that its objectives and mechanisms are understood by Contracting Authorities and State agencies, funders, contractors, the press and the general public.



Source: PPP Unit

Figure 9.2.1: Approval Procedure of PPP Project under PPP Act No.15

(3) Review on-going and Planned Project using Public Private Partnership Scheme

According to the presentation at 7th African PPP Conference & Showcase held November 2015 in London UK, numbers of PPP Projects were demonstrated. In order to realize the status quo of the PPP project circumstances, study team selected the following two projects.

Second Nyali Bridge

- Development, operation and maintenance of a Second Nyali Bridge Draft Feasibility Report under discussion
- Detailed engineering, environmental, social and financial analysis on-going.
- Final Feasibility Study report - December 2015

Table 9.2.2: Second Nyali Bridge

2nd Nyali Brdige		
USD	Lower Range	Upper range
CAPEX	163 million	236 million
OPEX	8 million	2.175 million

Source: PPP Unit

Nairobi-Mombasa Road Expansion

- Project: Involves upgrading and capacity expansion and subsequent operation and maintenance of the Nairobi-Mombasa Highway
- Profile of Highway: Mombasa–Nairobi Highway (A109) forms part of the Trans-African Highway (Northern Corridor)
- Key transport route serving East and Central African countries from the seaport of Mombasa
- Project Length : 482 Km
- Estimated Capex: USD 1 BILLION

- Feasibility study report submitted by TA (PWC)
- RFQ to commence on December 2015

O&M Nairobi- Thika Road (A2)

- Nairobi – Thika (50.4 kms)
- Upgrading of road completed in Nov 2012 at a cost of USD 350million.
- Project structured to recover cost through tolling (stand-alone): Ksh. 7.5Bn (i.e. CAPEX – Ksh. 2.78Bn and OPEX - Ksh. 4.875Bn)
- No alternative road
- Traffic at 135,000 vehicles a day, a major challenge

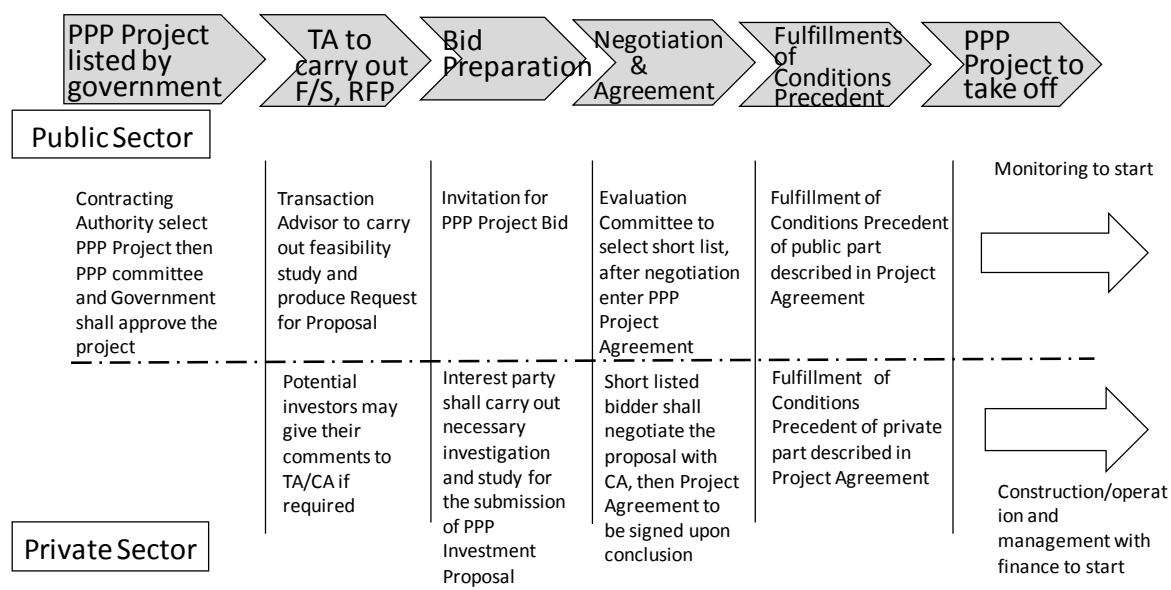
(4) Selection of Public Private Partnership Project Arrangements

PPP arrangement is specified in the Second Schedule of PPP Act No.15. There are Management Contract (MC), Output Performance based Contract (OPbC), Lease, Concession, Build-Own-Operate-Transfer (BOOT), Build-Own Operate (BOO), Build-Operate-and-Transfer(BOT), Build-Lease-and-Transfer (BLT), Build-Transfer-and-Operate (BTO), Develop-Operate-and-Transfer (DOT), Rehabilitate-Operate-and- Transfer (ROT), Rehabilitate-Own-and-Operate (ROO) and Land Swap (LS).

(5) Recommendable preparatory considerations for the Project Agreement

1) Background to focus on the PPP Project Agreement

The Process of PPP project procurement is shown in the following figure. Contracting Authority shall provide the set of bid documents which will be followed by the investors/bidders.



Source: PPP Unit

Figure 9.2.2: Guidance for Successful PPP Project Agreement

In the many documentations required in the process, PPP Project Agreement shall be the constitutional document for the PPP project. Third Schedule of PPP Act No.15 2013 specified items to be described the rights and obligations for the public and the private party in the Project Agreement. These items, however, have been written for the indication of incidents only, therefore Third Schedule does not provide the extent of the responsibility for the public and private party for neither quantitatively nor qualitatively.

Among the many PPP project around the world which have been under planning, negotiation and implementation stages, it is said that numbers of projects are in abeyance for contract close or dispute among the parties during the execution stages. The reason of such incidents is due to the misunderstanding and discrepancy of interpretation of the PPP Agreement by the parties. Therefore, the PPP Project Agreement shall be designed to be able to perform accordingly by the parties so that highly indispensable PPP Project can be taken off successfully.

On the items in 3rd Schedule of PPP Act No.15 2013, some characteristically items shall be left with private part under the policy of transferring risk to private as much as possible.

Demand Focus	<ul style="list-style-type: none"> ● Demand Focus shall be reference only even shown in in RFP. Private party shall bear the risk of demand of the project. However, if the project is almost uncertain greenfield and/or indispensable infrastructure, CA may guarantee demand level as to encourage Private Party.
Construction Schedule	<ul style="list-style-type: none"> ● Construction Schedule is solely responsible by private party. Private party also owe the responsibility against shareholders and lenders to complete the project on time otherwise it will encounter the significant penalty.
Project Cost	<ul style="list-style-type: none"> ● Private party shall determine the cost to conform the required scope of work with proper design. The responsibility of the project cost remain with Private Party unless public party order significant change order.
Tariff, Toll	<ul style="list-style-type: none"> ● Level of Tariff, Toll and fares first proposed by private part then CA and relevant ministries to approve. If political requirement exist, tariff shall set at lower level then CA shall pay the Gap by VGF, Annuity, etc.

Source: PPP Unit

Figure 9.2.3: Guidance to Success: Major Items to be left for the Responsibility of Private Part

2) Recommendation for the performable Project Agreement

In this section, the major agenda for the smooth dispatch of PPP Project will be recommended with the consideration of mutual understanding among parties. It is recommended that the Public Private Partnership Agreement shall be contracted as clear as possible to avoid any disputes which arise from ambiguous interpretation of the clauses at the time of procurement and/or negotiation stage. Under the PPP Act, Contracting Authority shall procure the Transaction Advisor (TA) to produce the feasibility study and request for proposal which includes technical requirement, financial configuration and a

draft Project Agreement. The request for proposal may include the conditions that non-conforming bids shall be rejected in order to maintain the impartiality and policy of the Contracting Authority for accountability.

The recommendation of the section focus on the items of “the Conditions Precedent” which shall be the most significant conditions to start the rights and obligations for parties.

Table 9.2.3: Guidance to Success: Major Items for Conditions Precedent

No	Items of Conditions Precedent	Third Schedule of PPP Act 2013	Obligation of Public Part	Obligation of Private Part
1	Delivery of Right of Way, Land and utilities	Item 3 & 4.	All of the land shall be delivered to SPC, utilities shall be available	
2	Juristic entity to carry out PPP project has been registered under Kenyan laws	N.A.		Special purpose company shall be registered
3	Shareholder Agreement shall be entered into effect. A copy of Shareholder Agreement has been available to CA	N.A.		Shareholders of SPC shall sign on shareholder Agreement
4	Specified amount of Equity of SPC to be paid up at bank account	N.A.		Shareholder of SPC shall pay in an amount they commit
5	Loan Agreement has been signed and a copy of LA is available	Item 8.		All debt amount shall be included in loan Agreement
6	Project Security (i.e., bank guarantee, etc) has been submitted to CA	Item 20.		Bond and any guarantee shall be submitted to CA
7	Conditions of Contract with EPC has been completed	N.A.		The copy of contract document to be submitted
8	Appointment of Independent Engineer	N.A.	CA to give the consent to IE.	To select the IE
9	Permit, Licenses, approval etc to carry out PPP Project by private party are available	Item 6.	CA shall coordinate with relevant authorities to furnish permit, licenses and approval to SPC	
10	Any incentives to private has been granted	N.A.	CA shall coordinate and obtain the incentives to SPC	
11	Financial support of government shall be given to private	N.A.	CA shall coordinate to obtain the government support to SPC	
12	Procurement of Insurance has been completed	Item 13.		Insurance to cover the construction, O & M

Source: PPP Unit

Conditions Precedent shall be the conditions which shall be performed by the public and private parties respectively within the agreed time limit stipulated in the Project Agreement. The project Agreement usually shall become null and void in case of failure of achievement by either parties. The conventional issues are mutual compromise for further extension of limit for the fulfillment to Conditions Precedent as the failure of the original fulfillment

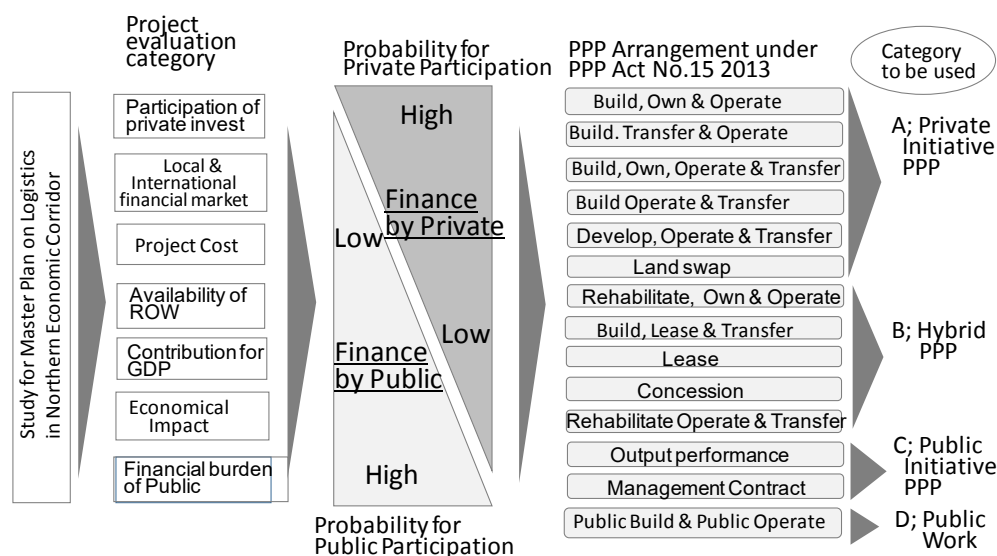
limit. By this compromise, the parties may be condemned for its non-accountability unless the clear reason exist.

(6) Project Implementation Scheme for Master Plan

1) Selection methodology of PPP arrangement

Given the information of the projects under the study, this section aims to classify the selection principle.

Typical Qualitative Selection Methodology was presented at Table 7.1.4 in Progress Report I. There were 12 evaluation categories which should be weighed by conformity of the evaluation categories. Based on the actual information out of interim study, however, 12 evaluation categories cannot not be fulfilled by the various information of study. In order to reflect the given information into consideration uniformly as much as possible, simplified multi-criteria matrix evaluation methodology has been adopted to address the appropriate category of Implementation Scheme.



Source: PPP Unit

Figure 9.2.4: Selection of PPP Arrangement for Implementation Scheme in Kenya

The PPP Arrangement specified in PPP Act has been categorized into 4 areas; i))Private Initiative PPP consist of BOO, BTO, BOOT, BOT, DOT and LS, ii) Hybrid PPP consist of ROO, BLT, Lease, Concession and ROT, iii) Public Initiative PPP of OP, MC, and iv) Public Works.

The following table shows the example of “Selection of PPP Arrangement”, using four information, demand, cost, economic impact and delivery of Right of Way as the key factor.

Table 9.2.4: Selection of PPP Arrangement

Project Evaluation Category to be conceptually considered							Appropriate Category
Private Investor	Financier market	Project Cost	User to pay	Contribution GDP	Economic impact	Finance by Public	
High	High	Medium	High	High	High	Low	A (BOO, DBFO, BTO, BOOT, BOT, DOT, LS, etc)
Medium	Medium	Medium	High	High	High	Medium	B (LDO, ROT, BOM, BLT, Lease, Concession, etc)
Low	Low	Medium to High	Low	Med.	Med.	High	C (O&M, Public Build-Private Operate, OPbC, MC, etc)
None	None	High	Low	Medium	Medium to High	High	D (Public Build-Public Operate)

Source: PPP Unit

2) Financial implication

Under the any category in (1) above, the financing structure for PPP project may require a certain government support to make the project viable. Notwithstanding in item 9.1.1 (3) “Resource of fund for PPP”, following tools of public sector may be considered to regulate;

- Availability payment system
- Viability gap fund
- Annuity payment
- Transportation tax and/or levy
- others

(7) Issues

1) Cross border issues

According to the spatial structure plan of NEC, number of the area of infrastructure lay in regional area. Such projects are trans boundary and shall cross over the border once or many times in future. Although the PPP Act in Kenya and Uganda has rather similarity in its configuration, both effects have been limited within the country. In order to implement the same characteristic of infrastructure on the two or more countries, it will be indispensable conditions to deliver the infrastructure project on the same time. Major points to be considered are as follows among others;

- Joint Agreement among the countries to govern the comprehensive projects
- The competent Authorities to govern the project including the liaisons among the countries
- Coincided PPP arrangement and/or agreement with the private sectors among the countries

- Detailed schedule for any particular PPP project in relation to the commissioning
- Unified and integrated quality assurance

2) General and Political gap

Actually, the National Priority List for PPP Projects contains the various fields of business that may attribute to the complicated PPP arrangement in future. In particular, the affordability of the users and society to utilize the projects may become the breaking point for the PPP scheme.

There is therefore an urgent need for specific guidelines on where the jurisdiction of county government ends and that of the central government begins, including the actual procedures for the PPP project between PPP Unit and PPP node.

3) Legal issues

The following points may be necessary to check and confirm with the PPP Unit and/or a contracting authority prior to the planning of the PPP project.

- Procurement time limits and costs
- Restrictions on assignment or transfer of tenders and successful projects
- Restriction of Share Transfer
- PPP contract standardization across the public sector
- Administrative review of public procurement
- Ambiguity of some clause in the PPP Act

4) Financial and others

Table 9.2.5: Magnitude of PPP Financing Needs

(unit: USD million)

	SECTOR	AMOUNT
1	Energy	19,808
2	Ports	4,800
3	Roads	9,000
4	Water & sanitation	4,567
5	Railways	7,248
6	Airports	906
7	Tourism	2,050
8	ICT	7,850
9	Local government	2,000
10	Housing	2,901
11	Public Works	1,000
12	Lamu Port Corridor	3,723
Total Needs		62,176
Available(GOK-2012-2020)		25,000
Funding Gap		37,000

Source: Ministry of Finance

- Funding Gap between the plan and the affordable public budget
 - Little provability of the payment by beneficiaries
 - Insufficient statements for guarantee and support of government under PPP Act-Project Facilitation Fund
-

- Insufficient incentives in PPP Act
- Insufficient ability of Local financial institutions
- Issues concerning the Organization/Staff domain

9.2.2 PPP Approach in Uganda

(1) Legal Framework

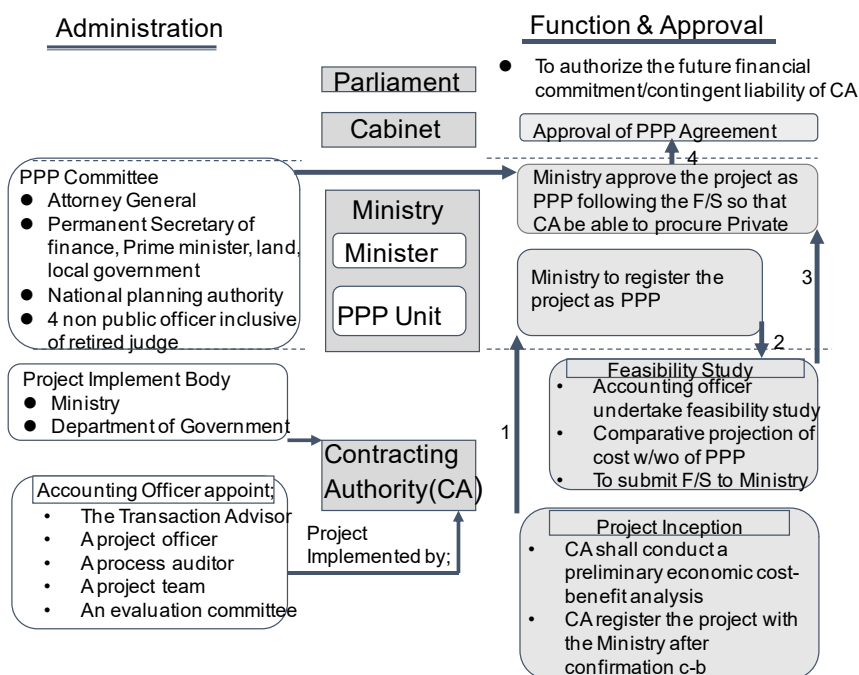
Public Private Partnerships Act 2015 was promulgated on 16th September 2015. Major revisions from Public Private Partnerships Bill 2012 have been made on a) description for “Public Private Partnership Committee” and b) deletion of “department for public private partnership within executing ministry”. The Process ladder for the approval of Public Private Partnership Project is shown in the Figure 9.2.5 below.

According to the observation by David Baxter, who is a director of the Institute of Public Private Partnership, has raised the following comments;

- A framework of PPP Act 2015 is not over-prescriptive on focus on developing and implementing successful PPP programs and projects, and a focus on PPP infrastructure development that fulfils the objectives of the National Development Plan.
- It is encouraging to note that the PPP Act lays out a detailed procurement cycle process and sets rules on project evaluation, disqualification and oversight including the contracting authority’s monitoring which must be supplemented by an annual audit by the Auditor General. Thus it is critical that institutions prepare themselves adequately by ensuring that they have the capacity to follow the rule of law.
- According to PPP Unit, Implementation Rules and Regulation or PPP manual has been under preparation and issuance will be in near future.

Regarding to the financial support of Contracting Authority and/or Government, PPP Unit emphasizes the clear clause for financial support. According to the PPP Act, Contracting Authority has been entitled to make a money contribution to the capital of the project, to use of an asset of the Contracting Authority or of Government and to operate and exploit an asset of the Contracting Authority or of Government, provided that Government or a Contracting Authority shall not borrow, guarantee or raise a loan for a Public Private Partnership, except as authorized by the Parliament Resolution.

Therefore, any financial support for the private party of a public PPP project, if any, shall be included in the bid document, pending the final consent of grant shall be determined after the negotiation of PPP agreement.



Source: PPP Unit

Figure 9.2.5: Approval Process of PPP Project under PPP Act 2015 in Uganda

(2) Review on-going and Planned Project using Public Private Partnership Scheme

Project information as of 2016

The Ministry of Work and Transport has been conducting the following projects under PPP scheme. Two projects are presented below as the examples in Uganda.

Table 9.2.6: PPP project candidate under Ministry of Works and Transport

Project Name	Description	Contracting Authority	Status
Kampala-Jinja Expressway	Total 93km, USD1,400 mil. with DBFOT	Uganda National Road Authority	RFQ 1 st Q, RFP 2 nd Q, 2016
Kampala-Entebbe Expressway	Under study	Ditto	PPP list
Kampala-Busnngi Expressway	Ditto	Ditto	Ditto
Kampala Outer Beltway	Ditto	Ditto	Ditto
Kampala-Bombo Expressway	Ditto	Ditto	Ditto
Kamlapa-Mpigi Expressway	Ditto	Ditto	Ditto
Bus Rapid Transit for Greater Kampala	3 pilot lines, 49.1km, Gross Cost Contract	(Tentative)Transport Authority	F/S complete, wait approval

Source: MoWT and IFC

Kampala-Jinja Expressway

According to the International Finance Corporation (IFC), advisor to Uganda National Road Authority (UNRA), Pass-through toll structure from one based on real tolls being considered. This is in response to market soundings which have uncovered widespread concerns over private sector investors taking on all of the traffic risk for the project. Under a pass-through structure collected tolls would be given to the grantor, rather than the road operator, with the government then paying a fixed availability payment to the sponsors. A structure where the sponsors put a portion of equity at risk in exchange for part of the revenues from the tolls if they

exceed a certain level, is also being discussed. No definitive structure has been decided upon in advance of the issuance of the project’s request for proposals documents.

Engineering, procurement and construction contractors, road operators and financial investors from Europe, China and Africa are understood to be interested in the concession. At least two consortia are said to have already been formed ahead of the RFP.

The large capital cost will mean the government will need to cover a large chunk of the funding requirement either through a grant or equity investment. Regional development finance institutions are likely to provide loans to assist the government meet its obligations to the project.

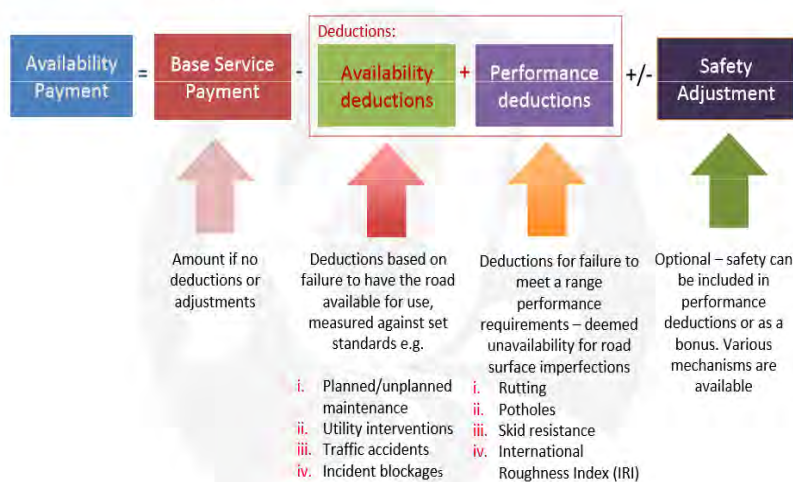
There is an existing road connecting Kampala and Jinja which will remain untolled once the new road becomes operational. Uncertainty over the likely usage of the parallel toll road means the government will have to take most if not all of the project’s traffic risk, whatever structure the UNRA settles upon.



Source: UNRA

Figure 9.2.6: Project Alignment

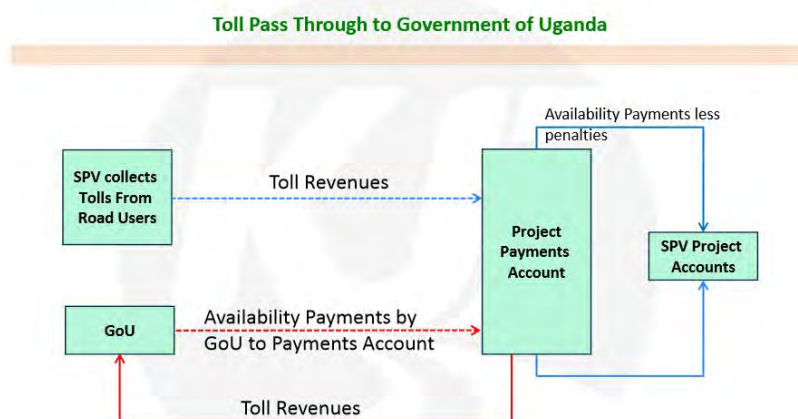
The Availability Payments



Source: UNRA –IFC Presentation in 2015

Figure 9.2.7: The Availability Payment

Proposed Revenue Flow



Source: UNRA –IFC Presentation in 2015

Figure 9.2.8: Proposed Revenue Flow

Bus Rapid Transit for Greater Kampala

The Ministry of Works & Transport (MoWT) intends to introduce a “Bus Rapid Transit (BRT) system in the Greater Kampala Metropolitan Area (GKMA)” to meet the growing demand for mobility. GKMA is a fast growing city with a population of approximately 3 million at present and focused approximately 5 million in 2022 and at least 10 million in 2040. The feasibility study has been conducted in 2014 and the project has been in process for the registration in the government. Although the study was conducted before the promulgation of PPP Act 2015, the officials of MoWT has commented that the BRT will be implemented by the stipulation of PPP Act 2015.

Notwithstanding 7 full BRT network were suggested in the study, the BRT Pilot project has been taken up for the evaluation of the feasibilities as shown in the following table.

Table 9.2.7: Description of Pilot BRT

Line	From	To	Via	Length
BRT1	Bwaise Terminal	Kireka Terminal	Gayaza Road-Jinja Road	16.1 km
BRT2	Kireka Terminal	Zana Terminal	Jinja Road-Entebbe Road	18.5 km
BRT3	Bwaise Terminal	Zana Terminal	Gayaza Road-Entebbe Road	14.5 km

Source: Bus Rapid Transit for Greater Kampala Final report (MOWT)

Economical evaluation and allocation of responsibilities are shown in the following table.

Table 9.2.8: BRT for Greater Kampala Project

1. Project Aspects for pilot BRT scheme

Items	Description	Remark
Total Length of Service (Pilot lines)	BRT 1; From Bwaise to Kireka via Gayaza Road – Jinja Road, Length 16.1 km	3 lines out of total 7 BRT lines
	BRT 2; From Kireka to Zana via Jinja Road- Entebbe Road, Length 18.5 km	
	BRT 3; From Zana to Gayaza via Gayaza Road- Entebbe Road, Length 14.5 km	
Infrastructure investment (USD, million)	Total investment costs 428.8 (construction-299.8, consultant-101.0, Land-28.0)	See 2. below
Contract Type	Gross Cost Contract between the Transport Authority and the BRT Operator	
PPP Arrangement	Concession under PPP Act 2015	PPP Act to adopt
Fare System	800 UGX to 1200 UGX for financial analysis	
Revenue of BRT Operator	Transport Authority to pay BRT Operator a per km rate plus overhead plus bus capital costs plus a 7% profit	All revenue to TA'account
Financial Aspects (USD, million)	NPV; +150.2, EIRR;19%, good value for money	

2. Allocation of responsibilities to Transport Authority (public) and Operator (private)

Area of responsibility	Transport Authority	BRT Operator	Third Party
Planning (Transport Strategy, Network and route planning, etc.)	✓ owe		
Rolling Stock (Technical requirement, Provision and ownership of rolling stock (including financing), etc.		✓ owe	
Infrastructure (Provision and Ownership) (Bus lane, stations, depots,)	✓ owe		
Infrastructure (Management) (Bus lanes, stations, terminals, depots,)	✓ owe	✓ owe	
Fares (Setting fares and ticket products)	✓ owe		
Ticketing (1) (Ticketing System provision, maintenance)			
Ticketing (2) (Selling and collection, Revenue ownership & disbursement, etc.)			
Passenger Information (Real-time passenger information system_station, vehicle)			
BRT Operation (Daily Operations & management, Costs of operations)		✓ owe	
Management of Contract (Monitoring of Contract, Reporting, etc.)		✓ owe	

Source: Final Report for Bus Rapid Transit for Greater Kampala (MoWT)

(3) Selection of Public Private Partnership Project Agreement

PPP arrangement is specified in the clause 38 to 45 of PPP Act 2015. They are Concession, Operation and maintenance (OM), Lease develop and operate (LDO), Build own and maintain (BOM) Build own operate and transfer (BOT) Design build finance and operate (DBFO), Build own and operate (BOO) and Other public private partnership agreements. Clause 37 state that A contracting authority shall, taking into account risk allocation, financing and operating methods, use of any of the public private partnership agreements specified in sections 38 to 45 or a combination of any of these, using the procedures in this Act and as may be prescribed by

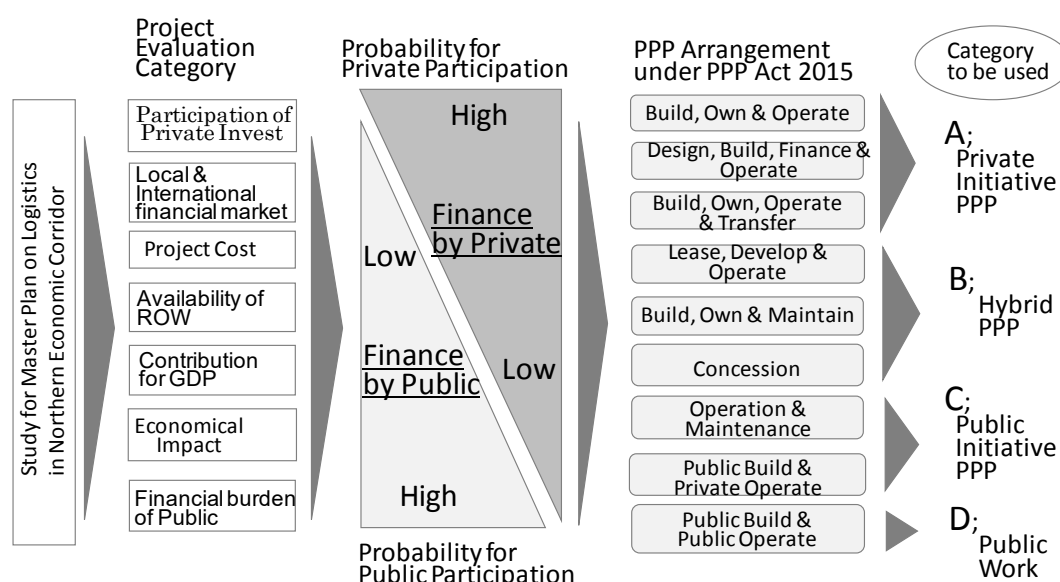
regulations. Attention shall be drawn to clause 45 which state that the Minister may by statutory instrument, prescribe any other type of public private partnership agreement to be used for a project. Thus any other type may be applicable following the conditions therein.

(4) Recommendable classifications for the Project Agreement

To refer to section 9.2.1 (4) with the taking PPP Act 2015 through PPP Act No.15 2013.

(5) Project Implementation Scheme

Given the information of the projects under the study, this section aims to classify the selection principle (To refer to section 9.2.1 (6) 1)). The following figure shows the PPP arrangement under PPP Act 2015 in Uganda.



Source: PPP Unit

Figure 9.2.9: Selection of PPP Arrangement for Implementation Scheme in Uganda

1) Financial implication

Under the any category above, the financing structure for PPP project may require a certain government support to make the project viable. Notwithstanding in item 9.1.1 (3) “Resource of fund for PPP”, following tools of public sector may be considered to regulate;

- Availability payment system
- Viability gap fund
- Annuity payment
- Transportation tax and/or levy
- Others

(6) Issues

1) Cross border issues

To refer to section 9.2.1 (7) 1).

2) General and Political Gap

A PPP can make a project affordable evidenced by the value for money realized through PPP procurement instead of traditional public procurement. Even if PPP projects are off budget, governments should not be tempted to ignore the affordability issue. In general, the government should not use PPP in times of fiscal restraint, but rather undertake PPP projects only and only if they represent value for money and are in the affordability limit.

Apparent prediction of any incidents may discourage the private investor and financiers.

3) Legal issues

Although positive observation has been made in section 9.2.2 (1), a number of points are raised for the consideration of PPP Unit.

- Implementing ministries expects the Implementation Rules and Regulation or PPP Manual for PPP Act 2015 to be developed
- PPP pipeline projects list including guidance documents to be issued from time to time for the timely preparation work by the stakeholders
- PPP Unit hold public relations often with implementing ministries for the public relations and education of PPP
- Governmental organization among the implementing ministries is useful for the alignment of PPP project implementation
- Government support
- Absence of supporting laws and regulations
- Restrictions on assignment or transfer of share
- Regulations

4) Financial and others

- Financial gaps between plan and the affordable public budget.
- Little provability of the payment by beneficiaries
- Insufficient incentives in PPP Act 2015
- High and unstable financial cost
- Insufficient ability of Local financial institutions
- Issues concerning the Organization/Staff domain

9.3 Overall Implementation Plan

9.3.1 Overview

The projects for the selection of implementation plan have been taken from the outcome of the Report. As stated in section (6) of 9.2.1 and section (5) of 9.2.2, the classification of Implementation Plan is divided into 4 categories. Category A represents the Private Initiative PPP, Category B represents the Hybrid PPP, Category C represents the Public Initiative PPP and Category D represents the conventional Public Work. Table 9.2.4 describes the 7 field of multi-criteria analysis methodologies by a means of qualitative evaluation.

Since the projects recommended by the Master Plan are either directly connected to more than one countries or indirectly related to EAC countries, the summary includes all projects as the candidate for NEC. Therefore, any extended or inter-countries projects on the border are considered as a project.

Table 9.3.1 below shows the summary of PPP Arrangement for the projects for Master Plan Study.

9.3.2 Overall Implementation Plan

(1) The result of analysis for PPP Project Arrangement

All suggested projects (119 projects) were analyzed using “Selection of PPP Arrangement for Implementation Scheme by Simplified Multi-Criteria Analysis”. In the evaluation, following qualitative appraisal is adopted; i) High means that comprise to highly existence, contribution, affordable and pay, ii) Medium means that comprise to appropriate amount, limitedly exist and moderately contribute, and iii) Low means that comprise to a little exist, harder affordability, low participation and none to participate. The result of evaluation is summarized below.

Table 9.3.1: Result of Evaluation on PPP Arrangement

Reference Number	Sector	No.	PPP Category				Total
		Amount (Million USD)	A	B	C	D	
1	Road	No.	2	1	6	12	21
		Amount	19.6	800.0	2,211.0	3,469.9	6,500.5
2	Port	No.	0	1	4	0	5
		Amount	0.0	519.1	2,165.6	0.0	2,684.7
3	Airport	No.	0	2	2	0	4
		Amount	0.0	228.1	257.2	0.0	485.3
4	Waterway	No.	0	1	0	0	1
		Amount	0.0	133.6	0.0	0.0	133.6
5	Railway	No.	1	2	8	6	17
		Amount	300.0	1,300.0	14,200.0	975.0	16,775.0
6	Logistic Hub	No.	5	2	0	0	7
		Amount	151.3	120.6	0.0	0.0	271.9
7	Border Post	No.	0	0	0	15	15
		Amount	0.0	0.0	0.0	105.3	105.3
8	Oil & Gas	No.	3	1	0	0	4
		Amount	2,085.0	1,000.0	0.0	0.0	3,085.0

Reference Number	Sector	No.	PPP Category				Total
		Amount (Million USD)	A	B	C	D	
9	Agribusiness	No.	0	2	10	6	18
		Amount	0.0	123.6	248.8	59.8	432.2
10	Industry	No.	0	4	0	6	10
		Amount	0.0	48.0	0.0	31.0	79.0
11	Water	No.	0	0	2	9	11
		Amount	0.0	0.0	990.0	875.0	1,865.0
12	Power	No.	0	3	0	3	6
		Amount	0.0	6,777.0	0.0	16.1	6,793.1
13	Total	No.	11	19	32	57	119
		Amount	2,555.9	11,050.0	20,072.6	5,532.1	39,210.6

Note: Category A; Private Initiative PPP (BOO, BOOT, BTO, BOT, DOT, DBFO, LS)
 Category B; Hybrid PPP (ROO, BLT, Lease, Concession, ROT, BOM, LDO)
 Category C; Public Initiative PPP (OPbC, MC, O&M, Public Build & Private Operate)
 Category D; Public Work (Public Build & Public Operate)

Source: JICA Study Team

In general, Private Initiative PPP arrangement appears hard pr

obability to implement these projects while conventional public work has been recognized more likely. This represents some difficulties for the participation of private sector into the infrastructure business. Obvious remarks from the Table 9.3.1 are summarized as follows;

- Category A and B represents 25% of total project cost while rest 75% shall be burden of public sector.
- 60% of mega infrastructures of Road sectors depend on public work due to uncertainty of toll system.
- 85% of mega infrastructures of Rail sectors is under category C due to uncertainty of the income and service level to be provided by private operators.
- 50% of cost and 30 % of number out of total is under category C.
- Approximately 85 % projects of total amount involve private sector participation heavily or lightly.

In order to activate the PPP scheme for the necessary infrastructure, the following measures are recommended for the further considerations.

- To seek the possible methodologies for the encouragement for private sector.
- To strengthen and widen the financial resources of public sector.
- The countries along the NEC shall commence the dialogue to cope with these projects which cross the borders.
- PPP arrangement shall be flexibly designed for the cooperative working conditions between public, private and financier.
- Public relations for the contracting authorities, private sectors, financial institutions and people/society shall be deeply developed for the better understanding of PPP scheme.
- Rules and Regulations for the PPP Act shall be promulgated as early as possible for the smooth procedure of PPP project application and implementation.

(2) Necessary action for PPP

The priority list of projects shall be established then feasibility study will be carried out to classify the suitable PPP project in the various business fields.

(3) Implementation Plan

All the suggested projects were divided into: i) the project should be implemented and completed by 2020 (development at short term), ii) the project should be implemented and completed by 2025 (development at middle term), iii) the project should be implemented and completed by 2030 (development at long term), and iv) the project should be implemented after 2030. The necessity, the maturity, the project scale, and the sequence of other projects were examined and the implementation term was proposed. The result of analysis is summarized below.

Table 9.3.2: Implementation Terms of Suggested Projects for NEC

Reference number	Sector	No.	Implementation Terms				Total
		Amount (Million USD)	Short	Medium	Long	After 2030	
1	Road	No.	4	4	5	8	21
		Amount	539.1	1,889.6	1,379.0	2,692.8	6,500.5
2	Port	No.	3	1	1	0	5
		Amount	1,437.5	728.1	519.1	0.0	2,684.7
3	Airport	No.	2	1	1	0	4
		Amount	257.2	67.5	160.6	0.0	485.3
4	Waterway	No.	0	1	0	0	1
		Amount	0.0	133.6	0.0	0.0	133.6
5	Railway	No.	14	3	0	0	17
		Amount	15,115.0	1,660.0	0.0	0.0	16,775.0
6	Logistic Hub	No.	1	3	3	0	7
		Amount	46.7	175.9	49.3	0.0	271.9
7	Border Post	No.	8	5	2	0	15
		Amount	67.8	33.5	4.0	0.0	105.3
8	Oil & Gas	No.	2	2	0	0	4
		Amount	1,505.0	1,580.0	0.0	0.0	3,085.0
9	Agribusiness	No.	0	12	6	0	18
		Amount	0.0	270.4	161.8	0.0	432.2
10	Industry	No.	0	9	1	0	10.0
		Amount	0.0	59.0	20.0	0.0	79.0
11	Water	No.	4	6	1	0	11
		Amount	522.0	1,300.0	43.0	0.0	1,865.0
12	Power	No.	0	6	0	0	6
		Amount	0.0	6,793.1	0.0	0.0	6,793.1
13	Total	No.	38	53	20	8	119
		Amount	19,490.3	14,690.7	2,336.8	2,692.8	39,210.6

Note: Short; A project should be implemented and completed by 2020
 Medium; A project should be implemented and completed by 2025
 Long; A project should be implemented and completed by 2030
 After 2030; A project will be implemented after 2030

Source: JICA Study Team

Obvious remarks from the Table 9.3.2 are summarized as follows;

- Short term developments represent 50% of total project cost and 32 % of total number of project.

- Middle term developments represent 37% of total project cost and 45 % of total number of project.
- Long and more term development represents 13% of total project cost and 23% of total number of project.
- 76% of number and 84% of cost for railway and oil sector developments are under short term development since those are most important sectors for future economic development for NEC.

The following tables show the implantation schedules in Uganda and Kenya respectively.

Table 9.3.3: Implementation Terms of Suggested Projects for NEC in Uganda

Reference number	Sector	No.	Implementation Terms				Total
		Amount (Million USD)	Short	Medium	Long	After 2030	
1	Road	No.	1	2	2	5	10
		Amount	125.0	809.8	200.0	1,134.0	2,268.8
2	Port	No.	0	0	0	0	0
		Amount	0.0	0.0	0.0	0.0	0.0
3	Airport	No.	1	1	1	0	3
		Amount	201.6	67.5	160.6	0.0	429.7
4	Waterway	No.	0	0.5	0	0	0.5
		Amount	0.0	66.8	0.0	0.0	66.8
5	Railway	No.	4	3	0	0	7
		Amount	3,490.0	1,660.0	0.0	0.0	5,150.0
6	Logistic Hub	No.	1	3	0	0	4
		Amount	46.7	49.3	0.0	0.0	96.0
7	Border Post	No.	5	5	2	0	12
		Amount	49.5	33.5	4.0	0.0	87.0
8	Oil & Gas	No.	2	1	0	0	3
		Amount	1,505.0	580.0	0.0	0.0	2,085.0
9	Agribusiness	No.	0	5	4	0	9
		Amount	0.0	109.9	127.0	0.0	236.9
10	Industry	No.	0	6	0	0	6
		Amount	0.0	41.0	0.0	0.0	41.0
11	Water	No.	1	2	0	0	3
		Amount	1.0	150.0	0.0	0.0	151.0
12	Power	No.	0	4	0	0	4
		Amount	0.0	702.1	0.0	0.0	702.1
13	Total	No.	15	33	9	5	62
		Amount	5,418.8	4,269.9	491.6	1,134.0	11,314.3

Note: Short; A project should be implemented and completed by 2020
 Medium; A project should be implemented and completed by 2025
 Long; A project should be implemented and completed by 2030
 After 2030; A project will be implemented after 2030

Source: JICA Study Team

Table 9.3.4: Implementation Terms of Suggested Projects for NEC in Kenya

Reference number	Sector	No.	Implementation Terms				Total
		Amount (Million USD)	Short	Medium	Long	After 2030	
1	Road	No.	3	2	3	3	11
		Amount	414.1	1,079.8	1,179.0	1,558.8	4,231.7
2	Port	No.	3	1	1	0	5
		Amount	1,437.5	728.1	519.1	0.0	2,684.7
3	Airport	No.	1	0	0	0	1

Reference number	Sector	No.	Implementation Terms				Total
		Amount (Million USD)	Short	Medium	Long	After 2030	
		Amount	55.6	0.0	0.0	0.0	55.6
4	Waterway	No.	0	0.5	0	0	1
		Amount	0.0	66.8	0.0	0.0	66.8
5	Railway	No.	10	0	0	0	10
		Amount	11,625.0	0.0	0.0	0.0	11,625.0
6	Logistic Hub	No.	0	0	3	0	3
		Amount	0.0	126.6	49.3	0.0	175.9
7	Border Post	No.	3	0	0	0	3
		Amount	18.3	0.0	0.0	0.0	18.3
8	Oil & Gas	No.	0	1	0	0	1
		Amount	0.0	1,000.0	0.0	0.0	1,000.0
9	Agribusiness	No.	0	7	2	0	9
		Amount	0.0	160.5	34.8	0.0	195.3
10	Industry	No.	0	3	1	0	4
		Amount	0.0	18.0	20.0	0.0	38.0
11	Water	No.	3	4	1	0	8
		Amount	521.0	1,150.0	43.0	0.0	1,714.0
12	Power	No.	0	2	0	0	2
		Amount	0.0	6,091.0	0.0	0.0	6,091.0
13	Total	No.	23	21	11	3	58
		Amount	14,071.5	10,420.8	1,845.2	1,558.8	27,896.3

Note: Short; A project should be implemented and completed by 2020
Medium; A project should be implemented and completed by 2025
Long; A project should be implemented and completed by 2030
After 2030; A project will be implemented after 2030

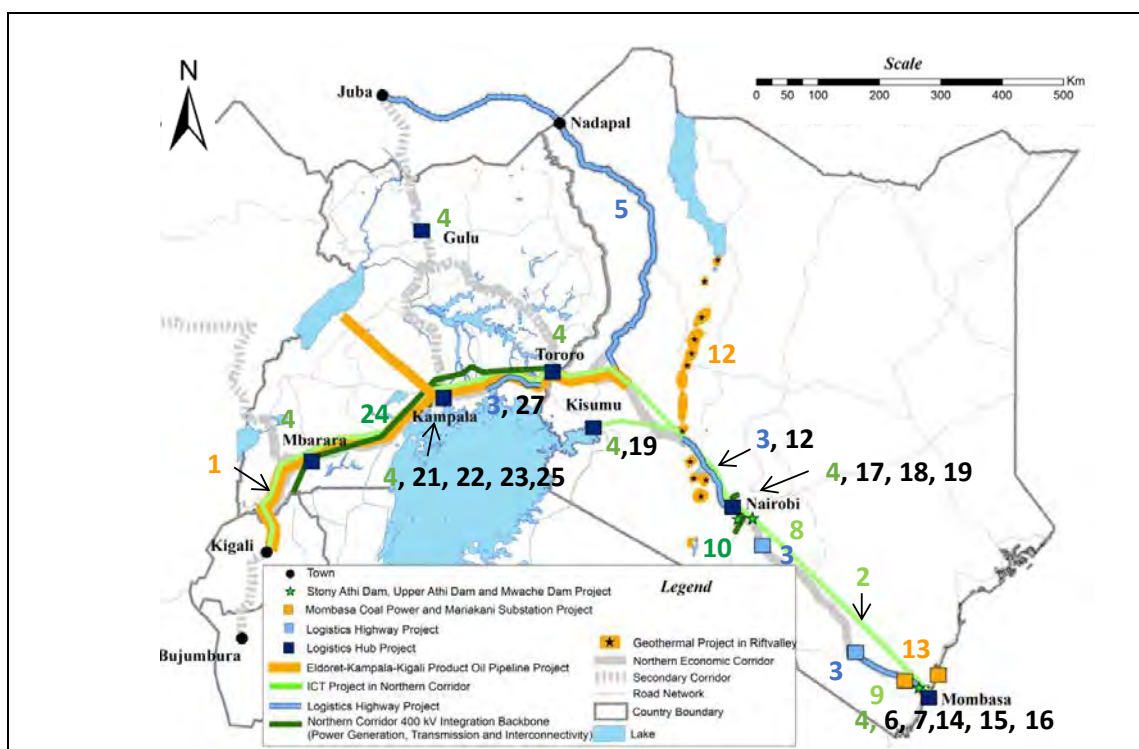
Source: JICA Study Team

9.4 NEC Flagship Projects

Out of all suggested projects (119 projects), 27 NEC Flagship projects are selected from the following viewpoints in order to increase foreign investment in the region.

- Solve future logistic bottlenecks along the NEC including port, road, and logistic hubs,
- Contribute to cross boarder infrastructure such as pipeline and transmission line,
- Develop key industrial area along NEC,
- Ensure power and water supply to identified key industrial areas, and
- Support agribusiness and mining business

The 27 NEC Flagship projects can contribute to continued logistic improvement along the NEC and future economic development of each country as well as the region. The location of 23 NEC Flagship projects are shown in the following figure.



No.	Sector	Status	Project Title
1	Oil & Mining	Examined	Eldoret-Kampala-Kigali Oil Pipeline Project
2	ICT	Examined	ICT Project in Northern Corridor
3	Road	Examined	Logistics Highway Project
4	Logistics	Partially Implemented	Logistic Hub Project
5	Road	Examined	Eldoret-Juba Highway Project
6	Port	Not Examined	Mombasa Port Development Project
7	Urban Dev't	Examined	Project for Support of Re-organizing Logistics Facilities around Mombasa Port Area
8	Water	Prepared	Stony Athi Dam and Upper Athi Dam Project
9	Water	Examined	Mwache Dam Project
10	Power	Prepared	Isinya-Nairobi East Transmission Line Project
11	Manufacturing	Partially Implemented	Geothermal Energy Based Regional Industrial Development in Rift Valley
12	Power	Examined	Geothermal Project in Rift Valley
13	Power	Examined	Mombasa Coal Power and Mariakani Substation Project
14	Power	Examined	Dongo Kundu-Mariakani Transmission Project
15	Manufacturing	Not Examined	Mombasa Special Economic Zone Project
16	Manufacturing	Not Examined	Project for Building Up Competitiveness of Construction Materials and Machinery Industry in Kenya
17	Agriculture	Not Examined	Agricultural Financing Improvement Project in Nairobi
18	Agriculture	Examined	Value Chain of Agriculture Development Pilot Project in Kenya
19	Urban Dev't	Not Examined	Great Kisumu Metropolitan Logistic Based Regional Development Project
20	Oil & Mining	Not Examined	Study on Mining Master Plan in Uganda
21	Manufacturing	Not Examined	Project for Building Up Competitiveness of Construction Materials and Machinery Industry in Uganda
22	Agriculture	Examined	Value Chain of Agriculture Development Pilot Project in Uganda
23	Power	Examined	Kampala-North-Namungona-Mutundwe 132 kV Transmission Line Refurbishment
24	Power	Examined	Northern Corridor Integration Backbone (Power Generation, Transmission and Interconnectivity)
25	Urban Dev't	Not Examined	Great Kampala (including Jinja) Logistic Based Urban Development Project
26	Transport	Not Examined	MP for Urban Transport Development for Regional cities
27	Manufacturing	Not Examined	Special Economic Zone Development Project in Jinja

Source: JICA Study Team

Figure 9.4.1: Location Map of 27 NEC Flagship Projects

The detailed content of each Flagship Project is explained below.

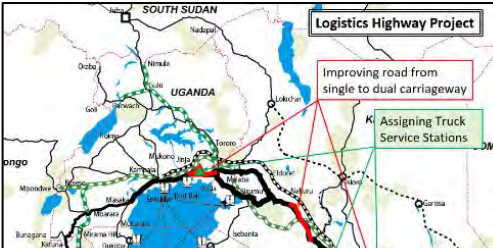
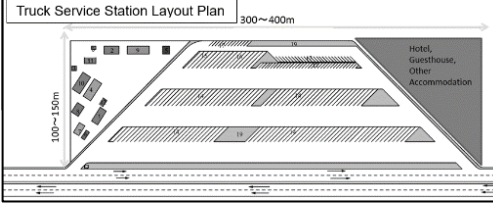
Project Sheet Flagship Project No. 1

Project Title Eldoret-Kampala-Kigali Product Oil Pipeline Project	
Project Location Kenya, Uganda, Rwanda	
Background and Issues KPC of Kenya has developed product oil pipeline to transport gasoline, diesel, and kerosene from refinery in Mombasa boost up to 2000m high Nairobi/Eldoret. The system has contributed to deliver product oils to domestic market at the lowest cost. Part of product oils are shipped out to land locked countries (Uganda, South Sudan, Rwanda, and part of DRC and Tanzania). With the economic development of these land locked countries, demand of product oils has increased significantly and road traffic is started to be over loaded. To mitigate the road traffic situation, and to enhance the traffic safety, extension of the pipeline to Kampala, and to Kigali is considered one of the best options to be constructed.	
Project Purpose To deliver Gasoline, Diesel, and Kerosene to land locked countries at the lowest cost, and to mitigate road traffics from Eldoret to Kampala, and to Kigali.	
Implementing Agencies KPC and JV	Project Cost (million USD) 600-700
Project Period 3 years	
Outline Project (Project Map if any)	
<div style="text-align: center; border: 1px solid black; padding: 5px; margin-bottom: 10px;"> Oil Product Pipeline System East African Community </div> <p>The map illustrates the 'Oil Product Pipeline System' across the East African Community. It shows the following components:</p> <ul style="list-style-type: none"> Existing Pipeline (Solid Blue Line): Connects Mombasa (Kenya) to Nairobi (Kenya), and then to Eldoret (Kenya). Proposed Project (Dashed Red Line): Extends from Eldoret (Kenya) through the 'Cross Border Section' to Kampala (Uganda), and further to Kigali (Rwanda). Another proposed section is shown from Eldoret to Mbarara (Uganda). Future/by Others (Dotted Black Line): A section from the refinery in Hoima (Uganda) to Eldoret (Kenya), labeled as 'Part of Refinery Project'. Geographic Labels: Uganda, Kenya, Rwanda, and Tanzania are clearly marked. Key Locations: Mombasa, Nairobi, Eldoret, Kampala, Kigali, Mbarara, and Hoima (Refinery). Legend: <ul style="list-style-type: none"> Solid Blue Line: Existing Dashed Red Line: Proposed Project Dotted Black Line: Future/by Others 	

Project Sheet Flagship Project No.2

Project Title ICT Project in Northern Corridor							
Project Location Kenya-Uganda-Rwanda							
Background and Issues KPC of Kenya has operated product oil pipeline from the port of Mombasa to Eldoret. Fiber optics cable was installed along the side of pipeline to support operation of the pipeline system. To diversify the business line, KPC is intending to lease the spare capacity of the fiber optics out to telecommunication companies. In General, acquisition of right of way for fiber optic cable installation is very difficult and costly, however, this project can be done at a minimum cost and time if it is constructed together with pipeline. KPC is interested in forming partnership with Japanese business entities and develop the project jointly. Note that initial pipeline system constructed by Japanese engineering company 40 years ago is still working without problems and Japanese quality and workmanship is highly appreciated.							
Project Purpose Establish cross border ITC network							
Implementing Agencies Ministry of Energy and Mineral Development	Project Cost (million USD) 10 if right of way is provided						
Project Period 2-3 years							
Outline Project (Project Map if any)							
<div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 80%;"> <p>Project for Information & Communication Technology</p> <p>Along with Oil Product Pipeline & Supervisory Control And Data Acquisition (SCADA) System</p> </div>							
<p>The diagram illustrates the pipeline route from Kigali to Mombasa. It is divided into three sections: Rwanda Pipeline Section (Kigali to Kampala, 450 km), Uganda Pipeline Section (Kampala to Eldoret, 325 km), and Kenya Pipeline By KPC (Eldoret to Nairobi to Mombasa, 325 km and 450 km respectively). The route is shown as a dashed red line with yellow circles at Kigali and Kampala, and a solid red line with blue circles at Eldoret, Nairobi, and Mombasa.</p>							
<table border="1" style="margin: 10px auto; width: 80%;"> <tr> <td style="background-color: #90EE90;">Pipeline Company</td> <td style="background-color: #ADD8E6;">KPC</td> </tr> <tr> <td style="background-color: #90EE90;">SCADA System</td> <td style="background-color: #ADD8E6;">SCADA System</td> </tr> <tr> <td colspan="2" style="background-color: #90EE90; text-align: center;"> Common SCADA Platform or Protocol for pipeline Operation Project for Information & Communication Technology </td> </tr> </table>		Pipeline Company	KPC	SCADA System	SCADA System	Common SCADA Platform or Protocol for pipeline Operation Project for Information & Communication Technology	
Pipeline Company	KPC						
SCADA System	SCADA System						
Common SCADA Platform or Protocol for pipeline Operation Project for Information & Communication Technology							
Expected Project Impact Necessary infrastructure to support increasing data communication volume in inland countries. Support IT industries in these countries, i.e., Rwanda							
Remark if any First comer first served.							

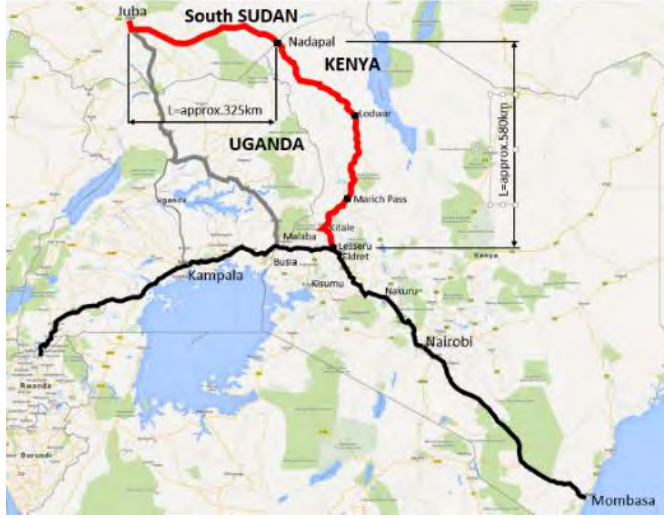
Project Sheet Flagship Project No.3

Project Title Logistics Highway Project	
Project Location [Kenya] from Mombasa to Voi, from Nairobi to Nakuru [Uganda] from Jinja to the Junction to Malaba and Busia	
Background and Issues Under the assumption of the Base Case, truck share of cargo from and to Mombasa will be 46% in tonnage in 2030 and, as a result, truck traffic will be 1.38 times in tonnage or in number of vehicle from 2015 to 2030. This increasing demand will influence greatly on the road from Mombasa to Kampala. In particular, road sections of Mombasa-Nairobi and Nairobi-Nakuru will be the most affected as heavy congestion sections until 2030 unless road capacity improvement is implemented. In addition, congestion at the Malaba border will become busier and it makes passing time longer unless passing border capacity is improved. Under the assumption of this future demand increase, not only congestion but also traffic accidents will be more serious and be more required to improve.	
Project Purpose To improve road traffic capacity and traffic safety To manage efficient heavy goods traffic movement by the introduction smart mobility To reduce the maintenance cost by the introduction of continuous monitoring system	
Implementing Agencies Kenyan Government (MoTI, KeNHA) Ugandan Government (MoWT, UNRA)	Project Cost (million USD) [Highway (Kenya)] Mombasa to Voi: 277.0, Nairobi to Nakuru: 415.0 [Truck Service Station (Kenya)] 19.6 [Highway (Uganda)] Jinja to Junction to Malaba and Busia: 229.1 [Truck Service Station (Uganda)] 9.8
Project Period Medium/Long Term	
Outline Project (Project Map if any) Improving road from single to dual carriageway with median strip [Kenya]: Widening of 6 lanes from 4 or 2 lanes (Nairobi-Nakuru: L=136km), Widening of 4 lanes from 2 lanes (Mombasa-Voi: L=121km) [Uganda]: Widening of 4 lanes from 2 lanes (Jinja- Junction to Malaba and Busia: L=100km) Assigning Truck Service Stations along logistics highway To facilitate enough large sized parking lots of more than 100 and sufficient accommodations for long distance drivers [Kenya]: installation of 2 truck service stations at Emili and Voi [Uganda]: installation of 1 truck service station before the junction to Malaba and Busia Introduction of Smart Mobility Introduction of continuous road monitoring system for the reduction of maintenance cost	
	
	
Expected Project Impact Strengthening and stability of international logistics network Improvement of Road traffic safety Reduction of maintenance cost by continuous monitoring	
Remark if any Tunnel section will be one of the option at the section of lift valley, if there are difficulties to widen the existing road at this section.	

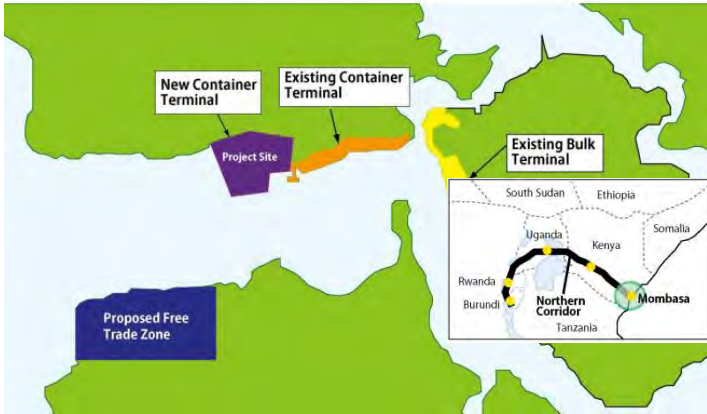
Project Sheet Flagship Project No.4

Project Title Logistic Hub Project			
Project Location Mombasa, Nairobi, Kisumu, Tororo, Kampala, Juba, Mbarara			
Background and Issues A logistic hub can be defined as a center or specific area designated to deal with activities related to transportation, collection, distribution, and storage of goods for national and international transit where traffic is exchanged across several modes of transport. A potential logistic hub could have multi-modal facilities such as ICD that connect railway to road, inland water, and airport. In addition to multi-modal facilities, a logistic hub provides logistic center with facilities and services such as warehouse, distribution center, and one stop shop.			
Project Purpose The purposes are to: i) provide modal shift function between rail, truck, and inland water way, ii) provide container depot function to reduce export cost, and iii) provide logistic service including warehouse, distribution center, and one stop shop.			
Implementing Agencies KPA for Kenya, Ministry of Works and Transport for Uganda, Private Investors		Project Cost (million USD) Mombasa:2.5, Nairobi: 118, Kisumu:55, Tororo:19, Kampala: 47, Mubarana:4, Gulu:26	
Project Period Short-Long term			
Outline Project (Project Map if any) All logistics hubs have two common functions; i) Inland Container Depot (ICD) function for modal shift and empty container depot service as far as SGR extension is expected, and ii) logistics center function which focuses on inventory and delivery service whose catchment area is set up approximately 200km in order to achieve one-day delivery.			
Target of Logistics Hub Service			
	ICD function	Logistics center	Additional target
Mombasa	Smooth cargo release	Regional distribution center Warehouse regime for transit railway cargo	Shortening CY cut off time
Nairobi	Modal shift function Empty container depot function	Regional distribution center Warehouse regime for transit railway cargo	Promotion export for industrial goods
Kisumu	Modal shift function Empty container depot function	Regional distribution center Warehouse regime for transit railway cargo	Agricultural goods export promotion
Tororo	Modal shift function Empty container depot function	Regional distribution center Warehouse regime for transit railway cargo	Agricultural goods export promotion
Kampala (Mukono)	Modal shift function Empty container depot function	Regional distribution center Warehouse regime for transit railway cargo	Agricultural goods export promotion
Gulu	Modal shift function Empty container depot function	Regional distribution center Warehouse regime for transit railway cargo	Targeting South Sudan distribution
Mbarara	Modal shift function Empty container depot function	Regional distribution center Warehouse regime for transit railway cargo	Targeting DRC distribution
Source: JICA Study Team			
Expected Project Impact To realize seamless movement of freight and provide good logistic service for customers with reasonable cost.			
Remark if any None			

Project Sheet Flagship Project No.5

Project Title Eldoret-Juba Highway Project	
Project Location [Kenya] from Lesseru/Eldret to Nadapal (South Sudan Border) via Marich Pass, Lodwar	
Background and Issues Juba is a capital city in South Sudan which is a landlocked country. Main logistic networks to Juba are mainly from Mombasa, Kenya. There are 2 main routes which are Mombasa-Juba via Uganda route and Eldoret-Juba route (Mombasa-Juba though northwest region in Kenya). Unfortunately, Eldoret-Juba route has few traffic because of unpaved road surface and security reasons in northwest region in Kenya. If road surface and security will be improved, logistics networks will be strengthened between Mombasa and Juba.	
Project Purpose To develop the road from Eldoret to the border of South Sudan as a branch line of the NEC To improve cross-border trade between South Sudan and Kenya and reduce transportation costs from Mombasa to Juba To create employment opportunities, and develop a sustainable economy while contributing to poverty reduction	
Implementing Agencies KeNHA	Project Cost (million USD) 500 (World Bank)
Project Period Short-Medium term (for 6 years)	
Outline Project (Project Map if any) Construction of paved road from Eldoret to the border of South Sudan (L=approx..580km) Construction of OSBP with weigh bridge, security outposts and other facilities	
	
Expected Project Impact To improve cross-border trade and reduce transport costs between Kenya and South Sudan To improve livelihoods and vitalization of the regional economy in northwest Regions in Kenya.	
Remark if any Recovery of the security in the project area is necessary.	

Project Sheet Flagship Project No.6

Project Title Mombasa Port Development Project	
Project Location Mombasa Port, Kenya	
Background and Issues Majority of the cargoes handled at Mombasa port are imported goods, such as fuel, iron and steel products, fertilizer, food, and Japanese used cars from Japan and other countries, but container traffic has been on the rise recently with the volume handled at the port more than tripling over the past decade from 300,000 TEUs (twenty-foot equivalent units) in 2002 to 900,000 TEUs in 2012. It is predicted that the demand will continue increasing, with a projection of more than 2.6 million TEUs in 2025. Given these circumstances, the Government of Kenya has made plans for a new container terminal, and with a Japanese ODA loan for Mombasa Port Development Project (Phase 1) has been completed in 2016. However, even with the new terminal constructed by phase 1 Project adding capacity of approximately 580,000 TEUs, the total capacity will be 1.3 million TEUs, falling short of the projected 1.32 million TEUs of demand in the year 2016. The ability to meet the on-going growing demand will thus approach its limit, which may disrupt distribution of goods. In order to cope with a rapid increase in the volume of container cargo handled at the port, boosting the container-handling capacity is a priority. In addition to the container terminal construction, KPA will invite a private operator to operate the container terminal under Concession Agreement between the operator and KPA for an efficient operation that can meet the rapidly rising container demand. As this will be the first case to allow a private firm to handle the operations of a port terminal in Kenya, there is a great deal of interest from within the country and abroad.	
Project Purpose This project responds to the increasing demand for cargo volume and makes port management more efficient, with the objectives of promoting trade and contributing to socioeconomic development in the region overall, including Kenya and the neighboring countries.	
Implementing Agencies KPA	Project Cost (million USD) 270 (Japanese Yen Loan)
Project Period March 2015 to June 2021	
Outline Project (Project Map if any) Construction of Container Terminal: 300m x -15m at Reiz Berth No.22 Provision of Cargo-handling Equipment: Gantry Crane, Transfer Crane, etc. Procurement of Security Facilities: Fence, etc. Consulting Services: Detailed Design, Tender, Construction Supervision.	 <p>The map shows the Mombasa Port area with the following labels: 'New Container Terminal' (purple), 'Existing Container Terminal' (orange), 'Existing Bulk Terminal' (yellow), and 'Project Site' (purple). A 'Proposed Free Trade Zone' is also indicated in blue. An inset map shows the 'Northern Corridor' route connecting Mombasa to South Sudan, Ethiopia, Uganda, Kenya, Somalia, Rwanda, Burundi, and Tanzania.</p>
Expected Project Impact Promotion of Trade and Socioeconomic development in the region overall, including Kenya and the neighboring countries.	
Remark if any None	

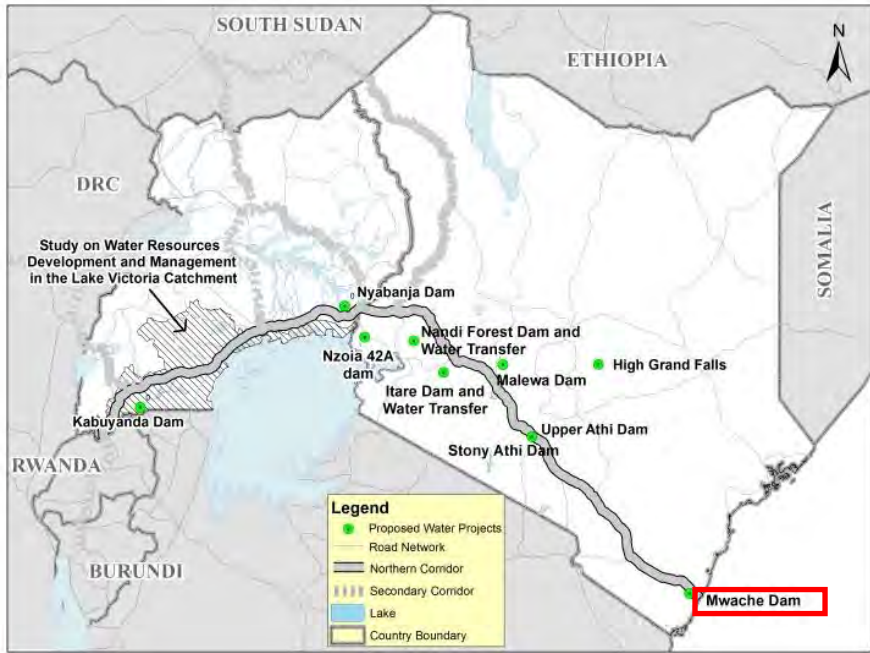
Project Sheet Flagship Project No.7

Project Title Project for Support of Re-organizing Logistic Facilities around Mombasa Port area	
Project Location Mombasa port area	
Background and Issues Promotion of SCT scheme and expansion of new container terminal can reduce current function of CFS, since most of custom clearance for import to Kenya will be done inside of the port. Even now, some CFSs handle only limited volume and therefore it will be difficult to sustain all the CFSs as it is and consolidation of CFSs will be required. Although number of CFS will decrease, CFSs will be required for current CY berths (14-19) since those berths cannot improve the productivity. In addition, the number of CFS will be depending on the progress of SCT. The shortage of parking lots for trailers along access road to the port creates serious road congestion. To solve those issues, the following action will be required namely i) consolidation of CFSs, ii) new service to CFS, and ii) parking lot development	
Project Purpose The main purposes of the project are: i) smooth movement of cargo track around Mombasa port, and ii) diversification of CFS role, iii) formulation of contingency plan for the case where SCT scheme is not completely developed.	
Implementing Agencies KPA, KRA, Mombasa county	Project Cost (million USD) 2.0 for pilot project (Further project cost will be estimated at pilot project stage.)
Project Period 1 year	
Outline Project (Project Map if any) The project includes i) selection of 2 CFSs for pilot project, ii) review of current capacity of 2 CFS (trailer/cargo transshipment at CFS/parking lot, document check ability, possibility of x-ray check function instead of port, truck turnaround ratio, truck driver's working condition etc.). In addition, the following will be studied. Possibility of consolidation or transshipment from bulk truck to container truck as well as "drop-off" practice Possibility of CFS function as new role for transit countries Formulation of contingency plan for the case where SCT scheme is not completely developed Possibility of further project covering all the CFS	
Expected Project Impact Export cargo promotion Lead time and cost reduction Improving truck turnaround ratio Reduction of idle/waiting time for driver and trucks Avoiding long queue on port access road Contingency plan for transit countries under the condition enforcing incomplete SCT scheme CFS consolidation	
Remark if any "Drop-off practice" is export practice adopted by specific forwarders in NEC. The process is summarized below: i) forwarders carry shipping line "A" containers with export goods to Mombasa, ii) amend transit permit and transshipped cargo to shipping line "B" containers, and iii) export by shipping line "B" container. Normally, shipping lines do not want to rent their containers for shipper who use another shipping line for export even though empty container is available in domestic transport portion. This practice can realize cost saving by using empty container to main ports.	

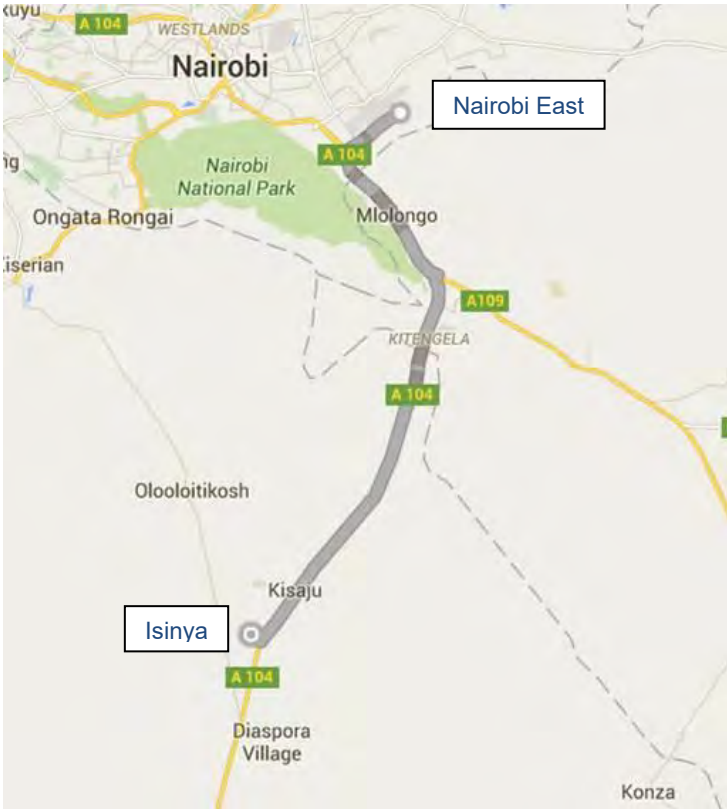
Project Sheet Flagship Project No.8

Project Title Stony Athi Dam and Upper Athi Dam Project	
Project Location Machakos, Kenya	
Background and Issues The NEC MP proposes the Athi River EPZ, which is located near Nairobi. The Athi River EPZ and Nairobi areas have many heavy chemical industries, which generally require large amount of water supply compared to the other industry types. The Stony Athi and Upper Athi dams are neither defined as flagship project of the Kenya Vision 2030 nor advanced in terms of status, however their locations are favorable for the NEC's industrial development.	
Project Purpose To supply domestic and industrial water to Nairobi and satellite towns.	
Implementing Agencies Athi Water Services Board (AWSB)	Project Cost (million USD) 40 for Stony Athi Dam 28 for Upper Athi Dam
Project Period Short term for Stony Athi Dam Short/Medium term for Upper Athi Dam	
Outline Project (Project Map if any) The Stony Athi and Upper Athi dams with respective effective storages of 23 and 24 MCM are two of the dams to be newly developed for domestic and industrial water supply purposes to Nairobi and satellite towns. The locations are presented in the map below.	
Expected Project Impact The Stony Athi and Upper Athi dams will contribute to water supply for the EPZ. They are also expected to indirectly contribute to the industrial activities of Japanese firms entering into the EPZ.	
Remark if any None	

Project Sheet Flagship Project No.9

Project Title Mwache Dam Project	
Project Location Kwale, Kenya	
Background and Issues The NEC MP proposes the Mombasa industrial park, which is located near Mombasa. The Mwache dam is one of the flagship projects of the Kenya Vision 2030. The project is financed by World Bank and in the process of procurement of consultant as of June 2016.	
Project Purpose To supply domestic and industrial water to Mombasa and surrounding areas.	
Implementing Agencies National Water Conservation and Pipeline Corporation (NWPC)	Project Cost (million USD) 44.0
Project Period Short/Medium term	
<p>Outline Project (Project Map if any) The Mwache dam with an effective storage of 16 MCM will supply domestic and industrial water to Mombasa and surrounding areas. The location is presented in the map below.</p> 	
Expected Project Impact The Mwache dam will contribute to water supply for the industrial park. It is also expected to indirectly contribute to the industrial activities of Japanese firms entering into the park.	
Remark if any A Japanese consulting firm has been selected for design review and construction supervision.	

Project Sheet Flagship Project No.10

Project Title Isinya - Nairobi East Transmission Line Project	
Project Location Isinya and Nairobi (Kenya)	
Background and Issues The growing of power demand with the need to reduce technical losses and improve the quality of power to Nairobi is the main reasons of this project. This project is intended to offer an evacuation outlet for the 280MW Olkaria IV geothermal power plant, which cannot reach the city through the existing Nairobi North 220kV double circuit transmission lines.	
Project Purpose The transmission line between Isinya and Nairobi East will increase transfer capacity to meet the city of Nairobi's rising demand.	
Implementing Agencies Kenya Electricity Transmission Co. Ltd. (KETRACO)	Project Cost (million USD) 43
Project Period Short term	
Outline Project (Project Map if any) 110km of 400kV double circuit line will be constructed from Isinya to Nairobi East and associated 350MVA substations for increasing transfer capacity. The locations are presented in the map below.	
	
Expected Project Impact Enhance power security by providing alternative electricity paths.	
Remark if any None	

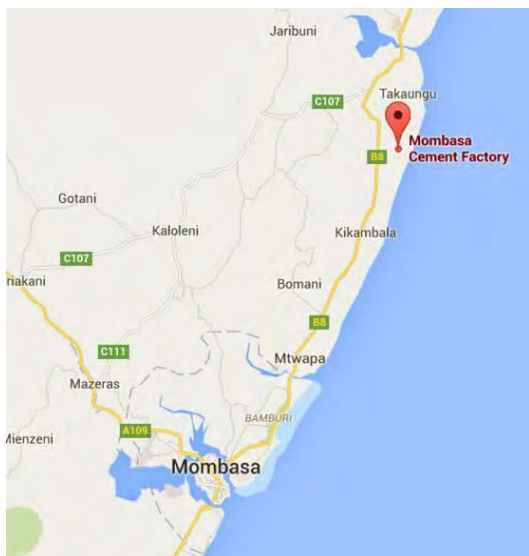

Project Sheet Flagship Project No.11

Project Title Geothermal energy based regional industrial development in Rift Valley	
Project Location Naivasha and Nakuru, Kenya	
Background and Issues Geothermal potentials in Rift Valley provide various solutions for industrial upgrading with efficient utilization of power through geothermal power generation as well as the heat waste. Rift Valley area along NEC is a major agricultural production area where floriculture and dairy as well as other types of farming are taken place. It is also in the proximity with the greater Nairobi area, the major market center. Linking up with agro and other productions with geothermal energy is expected to diversify and upgrade agro-based and food processing industries and other manufacturing capacity. The plan of establishing a special economic zone in the proximity to geothermal plants is available. The overall regional development strategy is necessary to effectively facilitate the industrial development in the area coordinating such large-scale projects.	
Project Purpose To upgrade industrial production for economic development of the Rift Valley area	
Implementing Agencies Ministry of Industry, Trade and Cooperatives, county governments	Project Cost (million USD) 5.0
Project Period 5 years	
Outline Project (Project Map if any) The project provides both comprehensive industrial development design considering geothermal potentials. It will envisage a wider spectrum of industries. Both the production of raw materials and the processing can be the core of the regional development. Other supporting industries of agro-machinery, chemicals are also in picture. At the same time, such industries as pharmaceuticals and cosmetics, industrial services as research and development and certification may be also placed in the area. The project also looks at the private participation for infrastructure development as well as investment into the areas identified as potential. The project comprises the following areas of activities. <ol style="list-style-type: none"> 1) Formulation of regional industry development policy 2) Detailed designing of industrial parks and facilities 3) Investment promotion support to the national and county government 4) Coordination with various supporting measures as financing, industrial park development 	
Expected Project Impact Increased agricultural and manufacturing production capacity Employment generation Strengthening the institutional capacity of government for investment promotion	
Remark if any None	

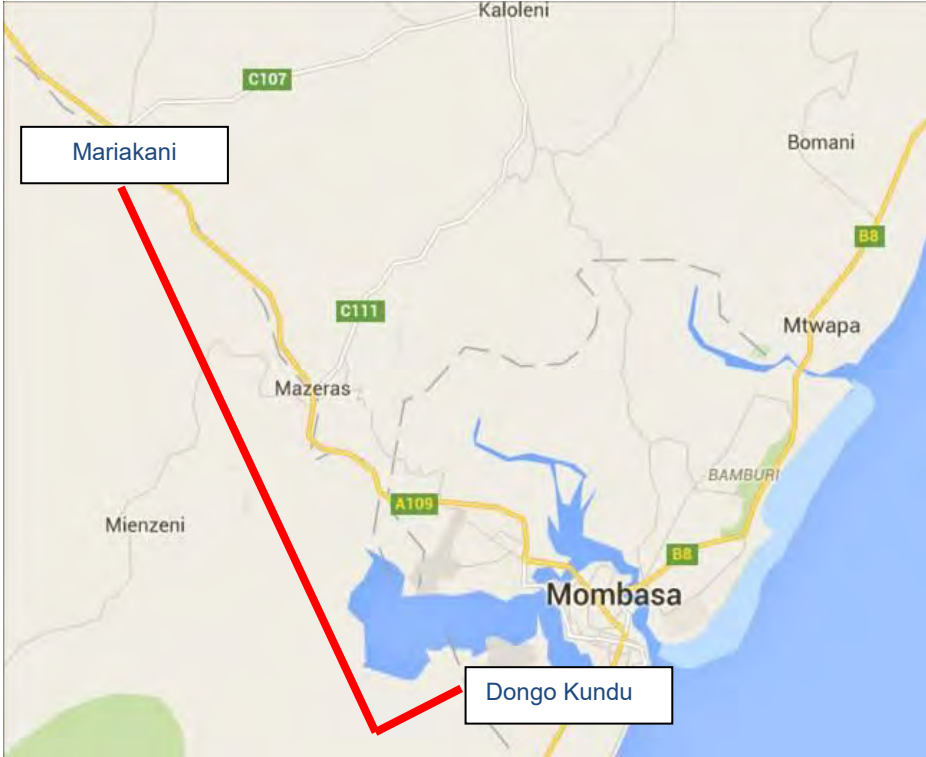
Project Sheet Flagship Project No.12

Project Title Geothermal Project in Rift Valley	
Project Location Rift Valley (Kenya)	
Background and Issues Currently 603MW geothermal capacity has already been developed comprising of 493MW by KenGen and 110MW by Orpower4.	
Project Purpose With the need of rising power demand, geothermal power plant in Rift Valley is the solution with a model of environmentally sustainable energy.	
Implementing Agencies Geothermal Development Company (GDC), Kenya Electricity Generating Company (KenGen) and IPPs	Project Cost (million USD) 4,443
Project Period Short/Medium term	
Outline Project (Project Map if any) 1,335 MW geothermal capacity to be generated at Olkaria, Eburru, Menengai, Suswa, and Baringo/Silali will be developed by 2020. The locations are presented in the map below.	
Expected Project Impact Geothermal development is a flagship project of Kenya's Vision 2030 (a long term blueprint for economic development).	
Remark if any None	

Project Sheet Flagship Project No.13

Project Title Mombasa Coal Power and Mariakani substation project	
Project Location Coast Province (Kenya)	
Background and Issues To address the increasing power supply-demand imbalance, KenGen has been mandated to construct Mombasa Power Plant with capacity 600MW. In addition, the system losses in the evacuation of power from Coast-based Rabai Power plant to Kenya's capital through the Mombasa-Nairobi transmission line is high, the Mariakani substation should be installed.	
Project Purpose Mombasa coal power plant at the North Coast of Kenya and Mariakani substation are built for supplying electricity to Coast province and national grid as well.	
Implementing Agencies Kenya Electricity generating company (Kengen)	Project Cost (million USD) 1,000 for Mombasa Coal Power 27 for Mariakani substation
Project Period Short/Medium term	
Outline Project (Project Map if any) Mombasa Coal power plant with the capacity of 600MW and Mariakani substation with voltage of 400/220kV and the capacity of 4x200MVA will be constructed. Those will contribute to electric supply for coast and national power grid. The locations are presented in the map below.	
 <p>Mombasa Coal Power Plant</p>	 <p>Mariakani Substation</p>
Expected Project Impact The project is expected to stabilize the country's power supply, especially in Coast province and Nairobi.	
Remark if any None	

Project Sheet Flagship Project No.14

Project Title Dongo Kundu - Mariakani Transmission Line Project	
Project Location Mombasa, Coast Province (Kenya)	
Background and Issues 700MW Liquefied Natural Gas/Compressed Natural Gas Power plant will be installed at Dongo Kundu to supply electricity to Mombasa SEZ and National Grid.	
Project Purpose This transmission line project is built to evacuate 700MW from Mombasa LNG Power plant and supply electricity for Mombasa SEZ.	
Implementing Agencies Kenya Electricity Transmission Co. Ltd. (KETRACO)	Project Cost (million USD) 40
Project Period Short term	
Outline Project (Project Map if any) 50km of 400kV double circuit, from Dongo Kundu to Mariakani to evacuate 700MW of power from the proposed Liquefied Natural Gas/Compressed Natural Gas plant at Dongo Kundu, Mombasa and supply for Mombasa SEZ as well. The locations are presented in the map below.	
	
Expected Project Impact This transmission line will contribute to supply electricity to Mombasa SEZ located in Dongo Kundu and National Grid.	
Remark if any None	

Project Sheet Flagship Project No.15

Project Title Mombasa Special Economic Zone development	
Project Location Mombasa	
Background and Issues Kenya Vision 2030 identifies setting up three special economic zone (SEZ) in three locations. Mombasa SEZ is one of them. The master plan of Dongo-Kundu SEZ was developed through the support of the Government of Japan. While to development SEZ is the measure for industrial development, it is a part of greater development in Mombasa area including the port upgrading and urban development.	
Project Purpose Facilitate the high-quality SEZ as the driver of industrial development in Mombasa and the surrounding areas	
Implementing Agencies Ministry of Industry, Trade and Cooperatives, Kenya Port Authority	Project Cost (million USD) 2.0
Project Period 3 years	
Outline Project (Project Map if any) The master plan identified the Dongo-Kundu SEZ as the key sites to serve as sophisticated logistics hub. Processing and assembling the imported raw materials, packing and re-packing imported and exporting products, service hubs for the trade logistics are expected to be major activities in the SEZ. While the administrative functions within the SEZ will be supported, investment promotion for the infrastructure development is also a key area for the development. 1) Capacity building of investment promotion of the Government entities (SEZ Authority and other relevant institutions) 2) Capacity building of SEZ Authority for physical development planning and management of development activities 3) Support activities for investment promotion 4) Support for the capacity building of on-site services such as one-stop services and business development services	
Expected Project Impact Functional SEZ to be in place with the inflow of investment Employment generation	
Remark if any None	

Project Sheet Flagship Project No.16

Project Title Project for Building up Competitiveness of Construction Materials and Machinery Industry in Kenya	
Project Location Kenya: Nairobi, Mombasa	
Background and Issues 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 growth. 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.	
Project Purpose Strengthening technical capacity of construction material industries in Kenya	
Implementing Agencies Ministry of Industry, Trade and Cooperatives, Kenya Bureau of Standard	Project Cost (million USD) 2.5
Project Period 5 years	
Outline Project (Project Map if any) The project aims at strengthen the capacity of the industries through three-step approach. 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 The following activities should be included in the project. <ol style="list-style-type: none"> 1) Formulation of construction material industry development policy 2) Public procurement system review and improvement of the national standards 3) Improving testing and certification capacity of the national and private standard and quality assurance service providers 4) Strengthening the technical capacity of manufactures through matching technical cooperation, supporting quality certification process and supporting acquisition of new machinery 	
Expected Project Impact Increased capacity of manufacturing sector. Employment generation Strengthening the institutional capacity of standard and quality assurance administration	
Remark if any None	

Project Sheet Flagship Project No.17

Project Title Agricultural Financing Improvement Project	
Project Location Nairobi, Kenya	
Background and Issues In Kenya agricultural productivity of small scale farmers is very low because they can't fully purchase agricultural materials such as seeds, fertilizer. It is difficult to receive a loan for agricultural cooperatives, farmers' organization, agriculture-related small and medium-sized enterprises.	
Project Purpose The purpose is to improve agricultural productivity and rural livelihood by the financing support that make farmers can access the seeds, fertilizers, agricultural machinery. It will promote value adding by agricultural products processing. Also it will lead the creation of employment in rural area and agricultural development in Kenya can be achieved.	
Implementing Agencies Ministry of Agriculture, Ministry of Finance, African Development Bank	Project Cost (million USD) 17.4
Project Period 7 years	
Outline Project (Project Map if any) 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. The project include empowerment both of borrower and lender. The supports are to strengthen audit capacity, speed up of loan application procedures and bookkeeping skill for lenders and to improve of getting a loan and to develop business such as sales promotion and marketing for borrowers.	
Expected Project Impact 1) The financing supports make it easy to direct invest to agricultural business in Kenya 2) To promote purchase of agricultural material and equipment (agricultural machinery, irrigation, better varieties, fertilizers, pesticides) 3) The financing supports make it possible to provide stable supply of stable quality	
Remark if any None	

Project Sheet Flagship Project No.18

Project Title Value chain of agriculture development pilot project	
Project Location Nairobi, Kenya	
Background and Issues Most agricultural products in Kenya is sold by raw material without value addition. These are several challenges in each section of value chain such as production, processing, distribution and marketing. Therefore, agriculture needs comprehensive development program to cover whole sections of value chain development including related industries (cultivation technology, agricultural machinery, irrigation, better varieties, fertilizers, pesticides)	
Project Purpose Establishing agricultural value chain will bring higher values to each player in the agricultural value chain such as producers, manufacturers, distributors and consumers.	
Implementing Agencies The Agriculture, Fisheries and Food Authority (AFFA)	Project Cost (million USD) 17.4
Project Period 7 years	
Outline Project (Project Map if any) <u>Production</u> The project comprises i) to create cultivation schedule based on market needs, ii) to access good seed and nursery, iii) to implement the farmers for training on proper fertilizer usage, iv) to control shipping schedule based by using proper storage condition. <u>Processing</u> The project comprises i) to build processing facilities, ii) to enhance competitiveness of fresh and semi-processed agricultural products through appropriate processing and packaging technology and preserving technique such as cold storage iii) to develop home-meal replacement for public consumers and restaurants. <u>Distribution</u> The project comprises i) distribution facility improvement, ii) distribution system improvement by using IT system, iii) strengthening capacity of operation of cooperative and medium and small enterprises. <u>Organization</u> The project comprises i) to develop business plan and action plan, ii) to formulate direct contract agricultural cooperative cluster and private company iii) to expand organization through using good finance scheme.	
Expected Project Impact Establish agricultural value chains in the potential items such as tea, coffee, cut flower, processed fruits and vegetable, rice, meat and meat production etc. will advance private sectors investments through Public - Private Partnership. In addition, the opportunity to use modernized equipment and materials (rice milling machine, fruit sorting machine, refrigerated facilities, fertilizer, good seeds, etc.) will be increased.	
Remark if any None	

Project Sheet Flagship Project No.19

Project Title Great Kisumu Metropolitan Logistic Based Regional Development Project	
Project Location Kisumu, Kenya	
Background and Issues SGR will be developed through Kisumu from Nairobi to Malaba. In addition, inland water ways will be rehabilitated in Lake Victoria and therefore Kisumu port will be important port in Lake Victoria. It is recommended to establish a logistic hub in Kisumu for multi transport modes including truck, rail, water way, and air. Kisumu and other cities located around Lake Victoria have potentials for agriculture, fishery and agro/fishery processing. Moreover, Special Economic Zone (SEZ) will be formulated in Kisumu in future. To utilize such opportunities and potentials effectively and efficiently, Great Kisumu Metropolitan Logistic Based Regional Development Project was proposed.	
Project Purpose To create new linkage of industries among agriculture, fishery and processing using new logistic hub at Kisumu along SGR and realize regional development in Great Kisumu Metropolitan.	
Implementing Agencies Ministry of Industry, Trade and Cooperatives, Ministry of Urban Planning, county governments	Project Cost (million USD) 5.0
Project Period 5 years	
Outline Project (Project Map if any) The project provides both comprehensive industrial development design considering regional potentials and logistic hub at Kisumu along new SGR line. It will envisage a wider spectrum of industries. Both the production of raw materials and the processing can be the core of the regional development. The logistic industry has a important role for adjustment of balance between supply and demand as well as timely distribution of materials in the import and export. Other supporting industries of agro-machinery, chemicals are also in picture. At the same time, such industries as pharmaceuticals and cosmetics, industrial services as research and development and certification may be also placed in the area. The project also looks at the private participation for infrastructure development as well as investment into the areas identified as potential. The project comprises the following areas of activities. <ol style="list-style-type: none"> 1) Formulation of regional logistics and industry development policy 2) Identification of projects and preparation of implementation plan 3) Detailed designing of logistic/industrial parks and facilities 3) Investment promotion support to the national and county government 4) Coordination with various supporting measures as financing, logistics/industrial park development 	
Expected Project Impact Increased logistics, agricultural and manufacturing production capacity Employment generation Strengthening the institutional capacity of government for investment promotion	
Remark if any None	

Project Sheet Flagship Project No.20

Project Title Study on Mining Master Plan in Uganda	
Project Location Uganda	
<p>Background and Issues Uganda possesses a wealth of metallic and non-metallic minerals. These include tin, cobalt, copper, lead, zinc, PGMs, phosphate, iron ore, coltan, salt, tungsten, limestone and REEs. 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 system, Exploration License (EL) has been granted to private entities to encourage initiating the exploration. Although legal framework is in place, there are still areas needed to be developed. These areas will be covered by Mining Master Plan which supports framework and capacity building to implement the framework. Serious issue at the moment is the Dodd Frank Act which list Uganda as an illegal mining country. After acquisition of Mineral Identification Capability, Minerals from Uganda will be proved and sold at the international market. Ministry of Energy and Mineral Development expects that Government of Japan could assist formulation of the Master Plan using the past experiences of Japan. Note that: The Dodd Frank Wall Street Reform and Consumer Protection Act, passed by the US Congress in July 2010, includes a provision – section 1502 – aimed at stopping the national army and rebel groups in the DRC from illegally using profits from the minerals trade to fund their fight. Section 1502 is a disclosure requirement that calls on companies to determine whether their products contain conflict minerals – by carrying out supply chain due diligence – and to report this to the Securities and Exchange Commission (SEC).</p>	
Project Purpose Formulate the Mining Master Plan in Uganda	
Implementing Agencies Ministry of Energy and Mineral Development	Project Cost (million USD) 5.0
Project Period 2 years	
<p>Outline Project (Project Map if any) The overall goal of the Project is to maximize the value of mineral resources and boost initial part of the economic development of the country. Associated infrastructure will contribute to the regional economical development and support industries in the area. Through the process of formulating Master Plan, sales strategy to sell the products in the international market will also be developed and contribute to configure sustainable mining development. The Master Plan consist of following: Mineral Strategy List of Strategic Minerals and Target area Development of Strategic Mineral Mapping and Database Mineral Identification Capability Funding Scheme to support Mining Industry Technical transfer to officers in the Ministry, and such include on-the-job training and seminars to be held in Uganda, and training in Japan under the Master Plan project. Strategic mining plan will be developed through the process of formulating the Mining Master Plan. Technology of mineral analysis and tagging system will be introduced and will work to prevent illegal mining.</p>	
<p>Expected Project Impact Role of economic booster Prevention of illegal mining through capacity building Direct access to international market</p>	
<p>Remark if any Current mineral buyers are mostly from China, and deals are made on a bilateral agreement base, however, Uganda wishes to sell at the international market price. Inevitable Project.</p>	

Project Sheet Flagship Project No.21

Project Title Project for Building up Competitiveness of Construction Materials and Machinery Industry in Uganda	
Project Location Uganda: Kampala	
Background and Issues 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 growth. 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.	
Project Purpose Strengthening technical capacity of construction material industries in Kenya and Uganda	
Implementing Agencies Ministry of Trade, Industry and Cooperatives, Uganda National Bureau of Standard	Project Cost (million USD) 2.5
Project Period 5 years	
Outline Project (Project Map if any) The project aims at strengthen the capacity of the industries through three-step approach. 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 The following activities should be included in the project. 1) Formulation of construction material industry development policy 2) Public procurement system review and improvement of the national standards 3) Improving testing and certification capacity of the national and private standard and quality assurance service providers 4) Strengthening the technical capacity of manufactures through matching technical cooperation, supporting quality certification process and supporting acquisition of new machinery.	
Expected Project Impact Increased capacity of manufacturing sector. Employment generation Strengthening the institutional capacity of standard and quality assurance administration	
Remark if any None	

Project Sheet Flagship Project No.22

Project Title Value Chain of Agriculture Development Pilot Project	
Project Location Kampala, Uganda	
Background and Issues Trough agricultural development program of recent years, organizations of small-scale farmers are advanced in Uganda. But following value adding issues are raised as challenging of agricultural business i) commercialization of farmers' groups, ii) the spread of good agricultural materials, iii) modernization of production technology, iv) improvement of the financing system, v) promotion of branding.	
Project Purpose Establishing agricultural value chain will bring higher values to each player in the agricultural value chain such as producers, manufacturers, distributors and consumers.	
Implementing Agencies The Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)	Project Cost (million USD) 17.4
Project Period 7 years	
Outline Project (Project Map if any) <u>Production</u> The project comprises i) to implement the baseline survey for fertilizer use and pesticide usage, ii), to implement the farmers for training on proper fertilizer usage iii) to get certificate and special buyers for safe (chemical free) production, iv) to implement the farmers for training on proper fertilizer usage, v) to survey the condition of land owners in target area. <u>Processing</u> The project comprises i) to adopt processing equipment, ii) to enhance competitiveness of fresh and semi-processed agricultural products through storage facilities, iii) to develop packaging technique. <u>Distribution</u> The project comprises i) distribution facility improvement through IT networking system, ii) strengthening capacity of operation of cooperative and medium and small enterprises by cooperative purchase and cooperative shipping. <u>Organization</u> The project comprises i) to promote activation to join the small-scale farmers to cooperatives, ii) to provide training for agricultural cooperatives for strengthening organizations, iii) to develop business plan and action plan, and iv) to formulate agricultural cooperative cluster and v) to monitor and evaluate the implementation of the business plan and develop future plan.	
Expected Project Impact Establish agricultural value chains in the potential items such as coffee, oil Seed (Sesame), palm oil, rice, maize, meat production etc. will advance private sectors investments through Public - Private Partnership. In addition, the opportunity to use modernized equipment and materials (rice milling machine, fruit sorting machine, refrigerated facilities, fertilizer, good seeds, etc.) will be increased.	
Remark if any None	

Project Sheet Flagship Project No.23

Project Title Kampala North – Namungona - Mutundwe 132kV Transmission Line Refurbishment	
Project Location Kampala - Namungona – Mutundwe (Uganda)	
Background and Issues The transmission line is over current. It should be changed by the High Temperature Low Sag Conductor.	
Project Purpose Increase of line capacity in the current transmission line from Kampala North to Namungona and Mutundwe.	
Implementing Agencies Uganda Electricity Transmission Company (UETCL)	Project Cost (million USD) 6.11
Project Period Short term	
Outline Project (Project Map if any) Reconductoring the 11km transmission line with High Temperature Low Sag (HTLS) Conductor from Kampala North to Namungona and Mutundwe to increase of line capacity. The locations are presented in the map below.	
Expected Project Impact Increase of line capacity to supply to Kampala City.	
Remark if any None	

Project Sheet Flagship Project No.24

<p>Project Title Northern Corridor 400kV Integration Backbone (Power Generation, Transmission and Interconnectivity)</p>	
<p>Project Location Tororo - Bujagali – Kawanda – Masaka – Mbarara – Mirama (Kenya – Uganda – Rwanda)</p>	
<p>Background and Issues: The Cluster on Power Generation, Transmission and Inter-Connectivity is mandated to spearhead energy generation, transmission and interconnectivity across Kenya – Uganda – Rwanda.</p>	
<p>Project Purpose This transmission line is build to facilitate power trade among Kenya, Uganda and Rwanda.</p>	
<p>Implementing Agencies Government of Kenya Government of Uganda Government of Rwanda</p>	<p>Project Cost (million US\$) US\$ 858 Million</p>
<p>Project Period Medium term</p>	
<p>Outline Project (Project Map if any) 850km of 400kV power transmission line is connected from Tororo - Bujagali – Kawanda – Masaka – Mbarara – Mirama to facilitate power trade among Northern Corridor Partners. The locations are presented in the map below.</p>	
<p>Expected Project Impact Spearhead energy generation, transmission and interconnectivity across Northern Corridor Partners as well as development of crude oil and refined oil products pipelines.</p>	
<p>Remark if any None</p>	

Project Sheet Flagship Project No.25

Project Title Great Kampala (including Jinja) Logistic Based Regional Development Project	
Project Location Kampala Metropolitan, Uganda	
Background and Issues SGR will be developed from Mombasa to Kampala. The station will be constructed near Jinjar. In addition, inland water ways will be rehabilitated in Lake Victoria and Jinjar port will be important port in addition to Port Bell in Lake Victoria. Therefore, it is recommended to establish a logistic hub in Kamphala linked with Jinja for multi transport modes including truck, rail, water way, and air. Jinja and other cities located around Lake Victoria have potentials for fishery and agro/fishery processing. Moreover, Special Economic Zone (SEZ) will be formulated in Jinja using raw materials from other area in Uganda. To utilize such opportunities and potentials effectively and efficiently, Great Kampala Metropolitan Logistic Based Regional Development Project was proposed.	
Project Purpose To create new linkage of industries among agriculture, fishery and processing using new logistic hub at Kampala along SGR and realize reginal development in Great Kampala Metropolitan.	
Implementing Agencies Ministry of Trade, Industry and Cooperatives, Ministry of Land, City governments	Project Cost (million USD) 5.0
Project Period 5 years	
Outline Project (Project Map if any) The project provides both comprehensive industrial development design considering reginal potentials and logistic hub at Kampala including Jinjar along new SGR line. It will envisage a wider spectrum of industries. Both the production of raw materials collected from other area in Uganda and the processing at Kampala and Jinjar can be the core of the regional development. The logistic industry has an important role for adjustment of balance between supply and demand as well as timely distribution of materials in the import and export. Other supporting industries of agro-machinery, chemicals are also in picture. The project also looks at the private participation for infrastructure development as well as investment into the areas identified as potential. The project comprises the following areas of activities. <ol style="list-style-type: none"> 1) Formulation of regional logistics and industry development policy 2) Identification of projects and preparation of implementation plan 3) Detailed designing of logistic/industrial parks and facilities 4) Investment promotion support to the national and county government 5) Coordination with various supporting measures as financing, logistics/industrial park development 	
Expected Project Impact Increased logistics, agricultural and manufacturing production capacity Employment generation Strengthening the institutional capacity of government for investment promotion	
Remark if any None	

Project Sheet Flagship Project No.26

Project Title Transport Master Plan for Regional Cities	
Project Location Gulu, Mbale, Mbarara, and Arua, Uganda	
Background and Issues Regional Cities in Uganda were chosen based on Uganda Vision 2040 and those are Gulu, Mbale, Mbarara, and Arua. All the cities are working as urban centres and regional hubs for their surrounding areas. Gulu is an important multi-modal transportation hub including trunk road, railway (although Meter Gauge Railway has closed, SGR is planned to go through) and airport. 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. Mbarara town is further enhanced by its location along the Kampala-Kabale, and Kampala-Kasese-Fort Portal highways. Arua municipality is the largest commercial/business hub, transportation and social coordinating point in the Albertine Graben region. Employment opportunities and social amenities are pulling mass migration into these cities and as the result the urban environment will get worse. The proper urban transportation system will be required to protect from the congestion in the cities as well as to maintain the urban function properly.	
Project Purpose To formulation of transport master plan till year 2040 in regional cities: Gulu, Mbale, Mbarara, and Arua, in Uganda.	
Implementing Agencies Ministry of Works and Transport,	Project Cost (million USD) 4.0
Project Period 3 years	
Outline Project (Project Map if any) The master plan study will carry out the following work items. <ol style="list-style-type: none"> 1) Analyze current situation and development issues in 4 regional cities, 2) Conduct traffic volume survey/household survey in 4 regional cities, 3) Formulate socio-economic framework for 4 regional cities, 4) Develop future OD, 5) Project traffic demand in 4 regional cities, 6) Formulate urban traffic network in 4 regional cities, 7) Formulate land use plan in 4 regional cities, 8) Formulate plan for public transport system for 4 regional cities, 9) Identify project/program for urban and public transports, 10) Develop implementation schedule and schemes, 11) Formulate organizational and institute plans, 12) Estimate cost and formulate financial plan, 13) Implementation of Strategic Environmental Assessment (SEA), and 14) Formulate transport master plan with recommendations. 	
Expected Project Impact Install proper urban transport and public transport systems Strengthening the institutional capacity of government for maintain and traffic flows	
Remark if any None	

Project Sheet Flagship Project No.27

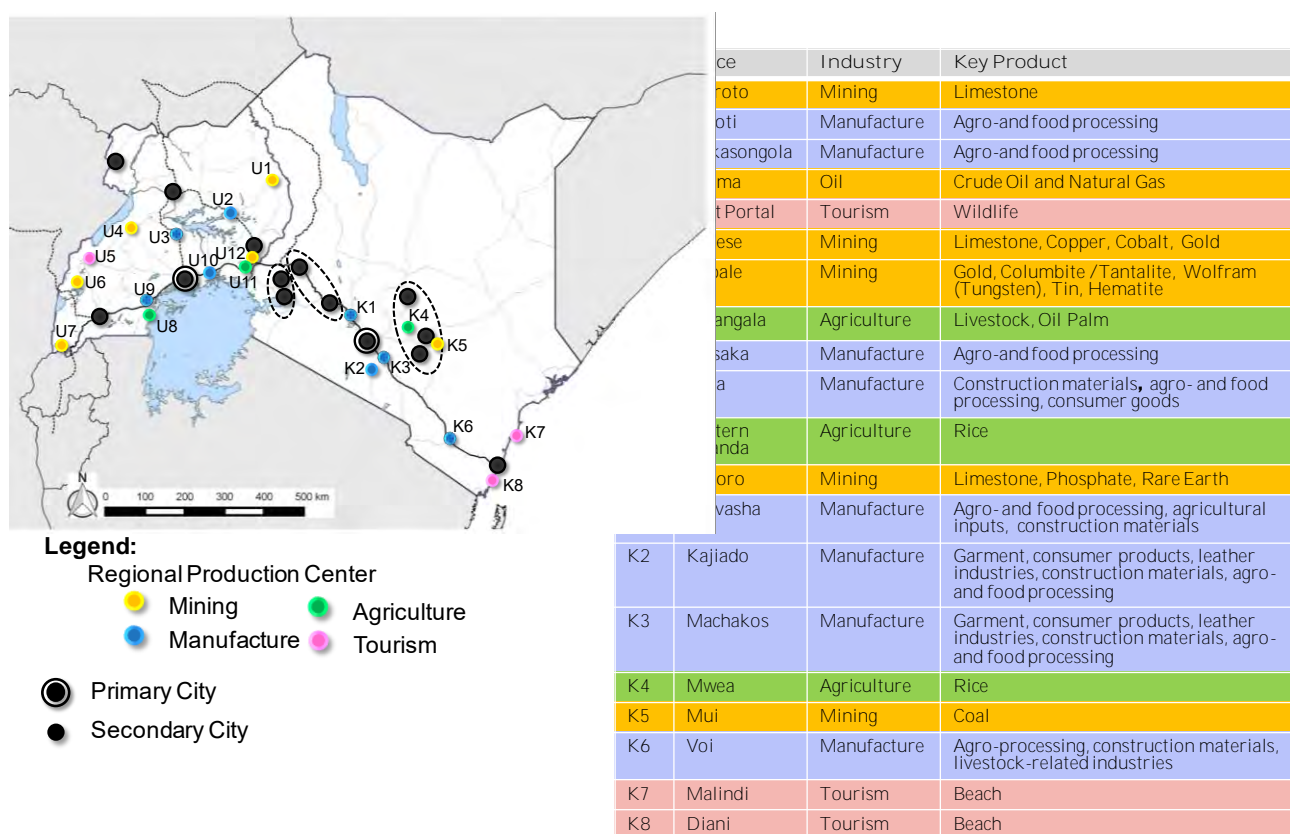
Project Title Special Economic Zone Project in Jinjar	
Project Location Jinjar, Uganda	
Background and Issues Uganda Vision 2040 emphasize setting up special economic zone (SEZ) in potential locations. Jinjar SEZ is one of them. The Jinjar has multi-facitions such as: i) core area for industrial development in Uganda, ii) SGR station to be developed near Jinjar, iii) entrance for new highway, and iv) part for Lake Victoria to be rehabilitated. While to development SEZ is the measure for industrial development, it is a part of greater development in Kampala area including the port upgrading and urban development.	
Project Purpose Facilitate the high-quality SEZ as the driver of industrial development in Jinjar and the surrounding areas	
Implementing Agencies Ministry of Trade, Industry and Cooperatives,	Project Cost (million USD) 5.0
Project Period 5 years	
Outline Project (Project Map if any) The master plan for Jinjar SEZ should be formulated to utilize industrial potential and sophisticated logistics hub. Processing and assembling the imported raw materials, packing and re-packing imported and exporting products, service hubs for the trade logistics are expected to be major activities in the SEZ. While the administrative functions within the SEZ will be supported, investment promotion for the infrastructure development is also a key area for the development. <ol style="list-style-type: none"> 1) Formulation of Master Plan including Land Use, Infrastructure Development, and Institutional Development etc. for Jinjar SEZ 2) Capacity building of investment promotion of the Government entities (SEZ Authority and other relevant institutions) 3) Capacity building of SEZ Authority for physical development planning and management of development activities 4) Support activities for investment promotion 5) Support for the capacity building of on-site services such as one-stop services and business development services 	
Expected Project Impact Functional SEZ to be in place with the inflow of investment Employment generation	
Remark if any None	

9.5 Impact of Master Plan

The Master Plan should be implemented according to the proposed schedule. The expected impact of the Master Plan is analyzed in terms of regional development, import and export of growth drivers, and transit time and cost.

9.5.1 Regional Development

Regional Production Centers proposed in the Structure Plan as Alternative-C will generate key industries and products including growth drivers. In addition, primary and secondary cities will serve as centers of urban service or/and key logistic hubs for the regions. The Regional Production Centers as well as primary and secondary cities are illustrated in the following figure.



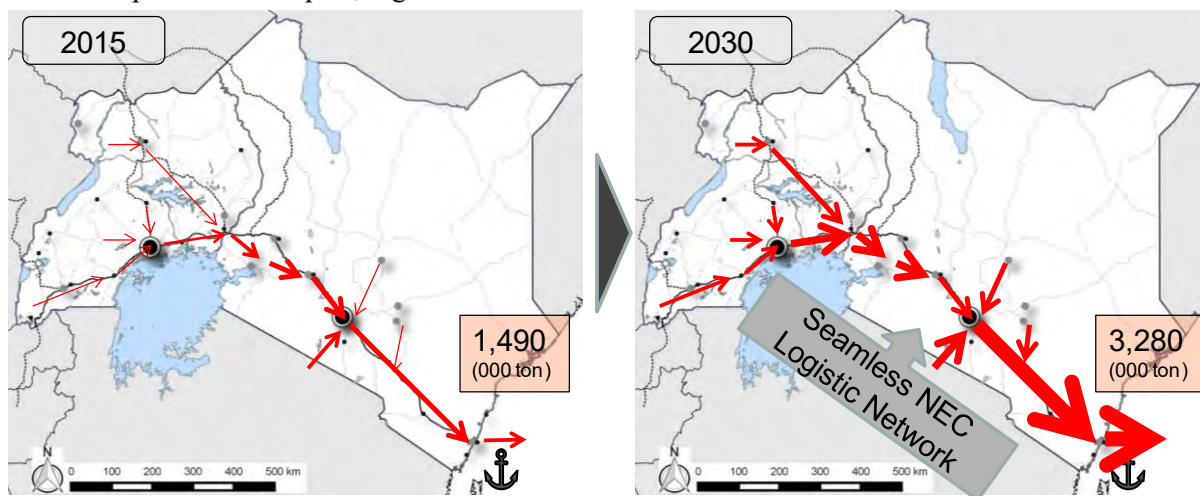
Source: JICA Study Team

Figure 9.5.1: Proposed Regional Production Centers and Primary & Secondary Cities

9.5.2 Development of Growth Drivers

Export-oriented growth drivers produced at production centers are tea, coffee, textile and apparel products, Niobium, soda ash, processed fruits and vegetables, palm oil products, and oil seed products. Those are expected to contribute to much growth in volumes of export cargo in future. Current import of 1.5 million ton will grow to 3.3 million ton by 2030 which is 85% increase in export cargo between 2014 and 2030. The export-oriented growth drivers will have a

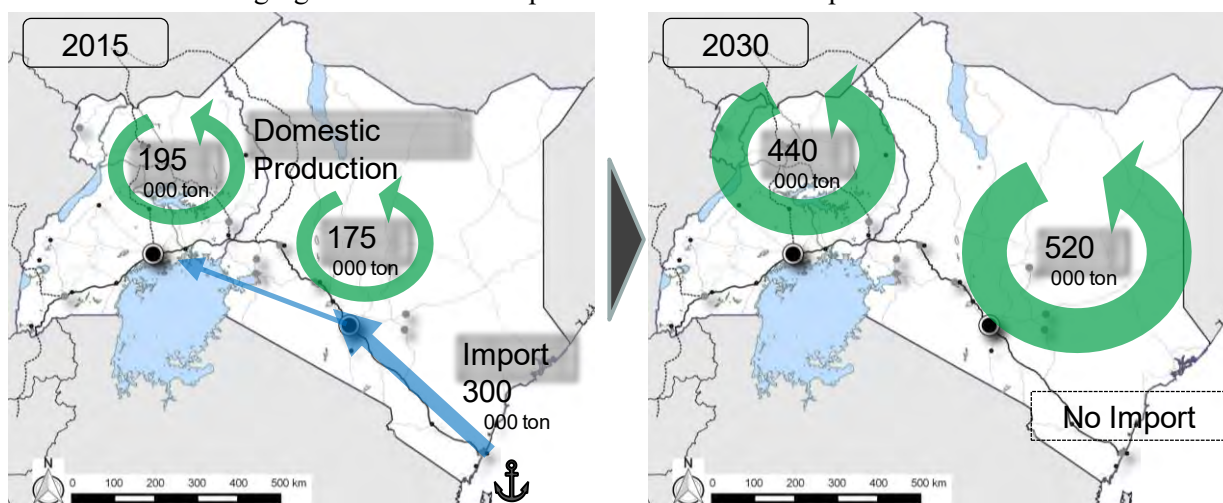
more competitive advantage through effective and efficient logistical system including improved border post, logistic hubs etc.



Source: JICA Study Team

Figure 9.5.2: Flow of Export-oriented Growth Drivers through Mombasa Port

Some of the growth driver products from the production centers can replace import goods. Those are rice, oil products, phosphate fertilizer and maize. The total reduction will be 3.5 million ton by 2030 and that will be 10% increase of freight import in 2030 at Mombasa port. The following figure shows the rice products flow as an example.



Source: JICA Study Team

Figure 9.5.3: Flow of Rice Products

9.5.3 Logistics Improvement

The impact of the improvement on the overall reduction of inland transport cost in truck from Mombasa to Nairobi and Kampala was estimated. Three major cost reducing factors are: i) reduction of truck charges and transport time, ii) reduction of costs of various procedures and formalities, and iii) reduction of cost due to the use of SGR for returning empty containers. As a result, approximately 20-25% of the total inland transport cost is reduced in case of the transport in truck from Mombasa to Nairobi and to Kampala as shown below (Table 9.5.1).

Table 9.5.1: Summary of Estimated Reduction of Inland Transport Cost in Truck (USD/40 Feet Container)

From Mombasa	Item	Current cost	Reduction of truck charges	Reduction of cost for procedures	Returning empty containers by rail
To Nairobi	Reduction rate(USD)	0	45	200	180
	Amount(USD)	1,915	1,870	1,670	1,490
	Degree of Reduction (%)	100%	98%	87%	78%
To Kampala	Reduction rate(USD)	0	50	400	450
	Amount(USD)	3,600	3,550	3,150	2,700
	Degree of Reduction (%)	100%	98%	87%	75%

Source: Estimated by JICA Study Team

The impact of the overall reduction of inland transport cost in rail from Mombasa to Nairobi and Kampala was also estimated. Two major cost reducing factors are: i) reduction of costs of various procedures and formalities, and ii) reduction of cost due to the use of SGR for returning empty containers. As a result, approximately 30-40% of the total inland transport cost is reduced in case of the transport in rail from Mombasa to Nairobi and to Kampala as shown below (Table 9.5.2).

Table 9.5.2: Summary of Estimated Reduction of Inland Transport Cost in Rail (USD/40 Feet Container)

From Mombasa	Item	Current cost	Reduction of transport time	Reduction of cost for procedures	Returning empty containers by rail etc.
To Nairobi	Reduction rate(USD)	0	-	200	682
	Amount(USD)	2,280	2,280	2,080	1,398
	Degree of Reduction (%)	100%	100%	91%	61%
To Kampala	Reduction rate(USD)	0	-	400	1,050
	Amount(USD)	3,260	3,260	2,860	1,810
	Degree of Reduction (%)	100%	100%	88%	56%

Source: Estimated by JICA Study Team

The total inland transport cost to Mombasa port for export was examined. The cost reduction will be realized through efficient use of empty containers using empty container depo. As the result, approximately 30-40% of the total inland transport cost in Track and approximately 50-60% of the total inland transport cost in Rail are reduced (see Table 9.5.3).

Table 9.5.3: Summary of Estimated Reduction of Inland Transport Cost for Export (USD/40 Feet Container)

To Mombasa	2015		2030		Reduction	
	Track	Rail	Track	Rail	Track	Rail
From Nairobi	1,580	2,080	1,080	830	500(68%)	1,250(40%)
From Kampala	3,130	2,810	1,930	1,330	1,200(62%)	1,480(47%)

Source: Estimated by JICA Study Team

Based on the above cost reductions as well as the balance between “Without MP case” and “With MP case”, the total reduction in 2030 was estimated (see Table 9.5.4). As the result, 988 million USD in total that is 0.9 % of GDP in 2030 can be saved in Kenya and Uganda. It is expected that the reduction cost will be utilized for more efficient investment.

Table 9.5.4: Total Reduction of Inland Transport Cost in 2030 (Million USD)

	Without MP Case		With MP Case		Total reduction of Inland Transport Cost			GDP in 2030	Reduction / 2030 GDP
	Import	Export	Import	Export	Import	Export	Total		
Kenya	1,610	543	1,203	325	407 (75%)	218 (60%)	625	91,257	0.7%
Uganda	1,063	137	762	75	300 (72%)	63 (54%)	363	19,491	1.9%
Total	2,673	680	1,966	399	707 (74%)	281 (59%)	988	110,748	0.9%

Note: Without MP Case: Truck Modal Share 71% Railway Modal Share 8%, and no above reduction per container was realized in 2030. With MP Case: Truck Modal Share 46%, Railway Modal Share 33%, and the reduction per container was realized in 2030.

Source: Estimated by JICA Study Team

Assuming the same degree of cost reduction per container as shown above will occur on various types of products, the cost of inland transport per container for plastic materials will be reduced to the amount of “After” of “Cost of inland transportation per container” in the table below (Table 9.5.5).

Table 9.5.5: Projection of Reduction of Inland Transport Cost and Production Cost

	Cost of inland transportation per container (USD)		Total cost of production using one container of raw materials (USD)		Percentage of reduced cost in total cost
	Before	After	Before	After	
To Nairobi	1,000	780	25,000	24,780	0.9%
To Kampala	4,250	3,188	28,333	27,271	3.8%

Note: The inland transportation cost per container is calculated using the lowest price per ton per container obtained through interview. One container is assumed to be 25t of raw materials.

Source: Estimated by JICA Study Team

In Kenya, approximately 1% cost reduction of the total production can be realized, whereas the cost will shrink by almost 4% in Uganda. It should be noted that the impact of transportation and procedural streamlining will also improve the logistics between the factories to customers, and sometimes across borders. Therefore, the impact should not be limited to the above-mentioned volume.

9.5.4 Job Creation

It is technically difficult to estimate job creations in Kenya and Uganda by realization of the master plan due to non-availability of statics data on employment by sector and inter-industry relations table. In Japan, one ton of international freight requires approximately 0.085 annual employment. If this ration is applied in the balance of international freight between 2015 and 2030, the following job creation will be expected (see Table 9.5.6).

Table 9.5.6: Preliminary Estimation of Annual Job Creations

Country	International Freight in 2015 (ton)	International Freight in 2030 (ton)	The Balance between 2015 and 2030 (ton)	Annual Job Creation (Jobs)
Kenya	18,000,000	42,800,000	24,800,000	140,000
Uganda	6,000,000	14,500,000	8,500,000	47,900

Source: Estimated by JICA Study Team

The above preliminary estimate shows that logistic sector will create 140,000 jobs every year in Kenya and 50,000 jobs every year in Uganda. In addition to logistics sector, other industries including construction, manufacture, agriculture, and mining sectors will create new jobs through realization of suggested projects.

CHAPTER 10 ENVIRONMENTAL AND SOCIAL CONSIDERATION FOR MASTER PLAN

10.1 Strategic Environmental Assessment Approach in Kenya

10.1.1 Overview

In Kenya, there exists a Strategic Environmental Assessment (SEA) guideline titled “National Guideline for Strategic Environmental Assessment 2012” (hereinafter referred as SEA Guideline in Kenya) developed by the National Environment Management Authority (NEMA) which is the body mandated, by Environmental Management and Coordination Act (EMCA) number 8 of 1999, as the principal instrument of the Government for the implementation of all policies relating to environment.

The 74 pages guideline indicates 1) Outline of SEA, 2) Stages and Steps for Undertaking SEA at Policy, Plan and Program Level, 3) Stage 1: Establish the Need and Context for the SEA, 4) Stage 2: Implementing the SEA, 5) Stage 3: Informing and Influencing Decision Making, and 6) Stage 4: Monitoring and Evaluation.

So far more than 10 SEAs have been conducted in Kenya, according to NEMA.

NEMA was established based on “The Environmental Management and Co-ordination Act, 1999” (the Act has since been amended. The act states “The object and purpose for which the Authority is established which is to exercise general supervision and co-ordination over all matters relating to the environment and to be the principal instrument of Government in the implementation of all policies relating to the environment.” (in Article 9 (1)).

MEWNR has Finance and Administration Department, Directorate of Environment and Directorate of Natural Resources and Kenya Meteorological Department. Apart from the departments, the ministry also has semi-autonomous agencies under it. These include National Environment Management Authority (NEMA), Kenya Water Towers Agency (KWTA), Kenya Wildlife Service (KWS), Kenya Forest Service (KFS) and Kenya Forest Research Institute (KEFRI).

Regarding SEA, “The Environmental (Impact Assessment and Audit) Regulation, 2003”, states:

- “strategic environment assessment” means the process of subjecting public policy, programmes and plans to tests for compliance with sound environmental management; (Article 2, in Part I)
- Lead agencies shall in consultation with the Authority Strategic subject all proposals for public policy, plans and programmes for environmental implementation to a strategic environmental assessment to determine which ones are the most environmentally friendly

and cost effective when implemented individually or in combination with others. (Article 42(1) in Part VI)

- The Government and all the lead agencies shall in the development of sector or national policy, incorporate principles of strategic environmental assessment. (Article 42(3) in Part VI)

The SEA Guideline in Kenya was established in 2012.

NEMA will issue an approval for SEA only when such SEA studies have been done by a consultant registered and licensed by NEMA as provided by the Environmental (Impact Assessment and Audit) Regulation, 2003. There are three categories of licenses, namely;

- Associate Expert
- Lead Expert
- Firm of Experts

Both “Associate Expert” and “Lead Expert” are licenses for individual persons with “Lead Expert” only authorized to undertake SEA. An Associate expert can only work under a lead expert. “Firm of Experts” on the other hand is a license for the consulting firms. In order to carry out SEA in Kenya, a consulting firm must be registered as Firm of Experts and the team leader of the firm must hold and licensed as a ‘Lead Expert’.

10.1.2 Implementation Schedule of SEA

Main Tasks of SEA stipulated in the SEA Guideline of Kenya is shown in **Table 10.1.1**.

Table 10.1.1: Main Tasks of SEA stipulated in the SEA Guideline of Kenya

1. Preparatory Work (Preparation and submission of PPP Brief)	
This task is to be conducted by both Mombasa County Government and JST.	
2. Scoping	
2-1	Determine the scope of SEA
2-2	Carry out Scoping.
2-3	Process Criteria
2-4	Stakeholder Identification and Schedule of Stakeholder Meeting
2-5	Alternative Plan Identification
2-6	Preparation and Submission of Scoping Report
3. Detailed SEA Study	
3-1	Collection of Baseline Information
3-2	Situation Analysis
3-3	Identification, Prediction and Evaluation of Potential Impacts
3-4	Alternative Comparison
3-5	Impact Mitigation and Opportunities Enhancement.
3-6	Preparation and Submission of Draft SEA Report
4. Public Review	
5. Stakeholder Meeting	
5-1	Conduct Stakeholder Meeting
5-2	Collect all comments and/or opinions from those meetings.
6. Revising of Draft SEA Report, Preparation and Submission of SEA Final Report	
All revising works shall be conducted based on collected comments and/or opinions, mentioned above.	
7. Stakeholder Validation Meeting	
8. Approval of SEA Final Report	
9. Monitoring and Evaluation	

Source: NEMA (Kenya), 2012

The implementation schedule of SEA is shown below:

- August to September 2015: Selection of SEA Consultant
- November 2015: First Stakeholder Meetings
- November 2015: Submission of Scoping Report to NEMA
- November 2015 to May 2016: Detailed Study of SEA and Preparation of Draft SEA Report
- May 2016: Second Stakeholder Meetings
- November 2016: Submission of Draft SEA Report to NEMA
- January 2017: Validation Workshop
- February 2017: Submission of SEA Final Report and Approval by NEMA

10.1.3 Environmental Scoping

Following “Japan International Cooperation Agency (JICA) Guidelines for Environmental and Social Considerations” (April 2010), “National Guidelines for Strategic Environment Assessment (SEA) in Kenya” (NEMA, 2012) and other international guidelines, the SEA consultant (local consultant, which has necessary licenses in Kenya) prepared Scoping Report of the SEA. The views and opinions from stakeholders at the first round stakeholder meetings were the input for this preparation. Official approval letter of the Scoping Report was issued by NEMA on April 6, 2016.

In the JICA’s guideline, following impacts are listed as examples of impact regard to environmental and social considerations:

- Human health and safety
- Natural environment (air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and flora) including trans-boundary or global scale impacts
- Social impacts (migration of population and involuntary resettlement, local economy such as employment and livelihood, utilization of land and local resources, social institutions such as social capital and local decision-making institutions, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children’s rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety)
- The derivative, secondary, and cumulative impacts

For each aspect of environmental impact, degree of impact and expected to be affected was evaluated through the Detailed SEA Study.

Since this master plan is for “multi-modal” corridor and the target area is so extensive, so various impacts are expected. Therefore, especially following aspect was carefully examined through Detailed SEA Study.

- Land acquisition / Involuntary resettlement

- Public health and safety (during construction and after completion)
- Traffic safety issue
- Positive and negative impact on local economy and business (especially road side business)
- Security issue (crime and border security)
- Natural environment (during construction and after completion)
- Global scale impact e.g. greenhouse gas

10.1.4 Baseline Information

“National Guidelines for Strategic Environment Assessment (SEA) in Kenya” (NEMA, 2012) gives examples of baseline information as shown below:

Table 10.1.2: Baseline Environmental and Social Conditions

1. Physical environment
including PPP-relevant aspects of: Climate, air quality, water resources and water quality, noise, topography, soils, geology, hydrology, and risks of natural disasters
2. Biological environment
including PPP-relevant aspects of: Biodiversity, ecology and nature conservation (including endangered species, protected ecosystems, habitats, species of commercial importance, and invasive species and their impacts).
3. Socio-cultural and socio-economic conditions and human health
including PPP-relevant aspects of: Archaeology, cultural heritage, landscape, recreational activities, human health, social-economic aspects, resource use (including land and water use), transportation, infrastructure, agricultural development, and tourism.

Source: NEMA (Kenya), 2012

Baseline information collection was conducted at the beginning stage of Detailed SEA Study. The information collected is presented in the SEA Report, which is attached with this M/P report.

10.1.5 Assessment of Past and Current Environmental Issues

Following issues are currently identified through surveys, views/opinions at the first round of stakeholder meetings and observation. Some of issues are relevant issues to this master plan, therefore such issues shall be considered in the Detailed Study of SEA and the master plan itself.

- Road infrastructure
- Traffic jam (in both city area and trunk road)
- Road safety / Traffic accident
- Exhaust gas (vehicle movement and parking/waiting cargo vehicle)
- Health issues for road side people
- Too much rely on road transport (Importance of modal shift)
- Land acquisition
- Required duration of land compensation
- Proper compensation to proper person(s)
- Urban planning and construction

- No proper physical planning
- Sanitation
- Design of infrastructure (water drainage etc.)
- Social impact
- Impact to road side business (both negative and positive)
- Infectious diseases such as HIV/AIDS
- Border security
- Border control
- Movement of stolen goods beyond the border
- Natural environment
- Air
- Water
- Flood water management
- Illegal collection of sand (to be carried by empty container from Malaba to Nairobi or Mombasa)

10.1.6 Result of First Stakeholder Meetings

The first round of stakeholder meetings was conducted in November 2015, and more than 150 participants attended the meetings. The main purpose was to present the outline of both master plan and SEA activity. Animated discussions were held at the all meetings even at lunch time. However, the attendance at some meetings was not impressive. The summary of date and venues, and example of time schedule of the meeting are shown below.

Table 10.1.3: Summary of Date and Venue of 1st Round of Stakeholder Meetings in Kenya

Date	Venue
November 2, 2015 (Monday)	Nairobi (Silver Springs Hotel)
November 4, 2015 (Wednesday)	Mombasa (Best Western Plus Creekside Hotel)
November 6, 2015 (Friday)	Nakuru (Merica Hotel)
November 9, 2015 (Monday)	Kisumu (Imperial Hotel)
November 11, 2015 (Wednesday)	Malaba (Levantes Hotel)

Note: Beside these meeting, the Study Team and SEA consultant had several meetings at the various stakeholders' offices to explain the project and ask for their comments and further cooperation

Source: JICA Study Team

Table 10.1.4: Example of Time Table of 1st Round of Stakeholder Meetings in Kenya

Time	Activity	Facilitated By
8.00 am – 8.30 am	Registration	SEA Consultant
8.30 am – 9.00 am	Welcome Address and Self-Introductions	MOTI (or SEA Consultant)
9.00 am – 9.30 am	Overview of the Master Plan	MOTI (or JICA Study Team)
9.30 am – 10.15 am	Q&A session	MOTI (or JICA Study Team)
10.15 am – 10.45 am	Tea Break	
10.45 am – 11.30 am	SEA Presentation	SEA Consultant
11.30 am – 12.30 pm	Q&A session	SEA Consultant
12.30 pm – 12.50 pm	Wrap up /way forward	SEA Consultant
12.50 pm – 1.00 pm	Closing	SEA Consultant
1.00 pm – 2.00 pm	Lunch and Collection of opinion surveys	SEA Consultant

Note: Actual schedules were varied depending on the situation of each meeting. SEA Consultant and JICA Study Team facilitated some of session instead of MOTI at some meetings those MOTI could not attend.

Source: JICA Study Team

Following interest were mainly raised by the participants.

- Current bottleneck, especially road
- Importance of modal shift
- Importance of proper zoning and physical planning
- Synchronization to development plan of other infrastructure
- Relationship with existing plans to be implemented by local county government
- Issue of land acquisition at the time of project implementation
- Funding issue for project implementation stage
- Consideration of negative social and environmental impact (border security and safety)
- Protection of nature (e.g. empty trucks carry sand collected without proper environment consideration)
- Civic education and sensitization of this master plan to local people
- Involvement of other sector to this master plan formulation
- Additional stakeholder to be involved
- Harmonization and providing information to other country than Kenya and Uganda
- Technical / legal issue of SEA implementation
- Difference between EIA and SEA



Source: JICA Study Team

Figure 10.1.1: Photographs on 1st Round Stakeholder Meetings in Kenya

10.1.7 Result of Second Stakeholder Meetings and Alternative Discussion

(1) Second Round Stakeholder Meetings

The second round of stakeholder meetings were conducted in May 2016, and more than 100 participants attended the meetings (The sheets of participant list will be attached in the SEA Report). The main purpose was to present the result of M/P study (based on Interim Report) and the result of SEA activity (initial draft level of Draft SEA Report). Same as the first round stakeholder meetings, animated discussions were held at the all meetings and the meetings are closed after 1 pm due to hot discussion.

The summary of date and venues, and example of time schedule of the meeting is shown below.

Table 10.1.5: Summary of Date and Venue of 2nd Round of Stakeholder Meetings in Kenya

Date	Venue
May 4, 2016 (Wednesday)	Kisumu (Imperial Hotel)
May 6, 2016 (Friday)	Malaba (Levantes Hotel)
May 9, 2016 (Monday)	Mombasa (Best Western Plus Creekside Hotel)
May 11, 2016 (Wednesday)	Nakuru (Merica Hotel)
May 13, 2016 (Friday)	Nairobi (Silver Springs Hotel)

Source: JICA Study Team

Table 10.1.6: Example of Time Table of 2nd Round of Stakeholder Meetings in Kenya

Time	Activity	Facilitated By
8.00 am – 8.30 am	Registration	SEA Consultant
8.30 am – 9.00 am	Welcome Address and Self-Introductions	MOTI
9.00 am – 9.30 am	Master Plan Presentation	MOTI and JICA Study Team
9.30 am – 10.00 am	Q&A session	MOTI and JICA Study Team
10.00 am – 10.30 am	Tea Break	
10.30 am – 11.30 am	SEA Presentation	SEA Consultant
11.30 am – 12.30 pm	Q&A session	SEA Consultant
12.30 pm – 12.50 pm	Wrap up /way forward	SEA Consultant
12.50 pm – 1.00 pm	Closing	SEA Consultant
1.00 pm – 2.00 pm	Lunch and Collection of opinion surveys	SEA Consultant

Note: Actual schedules were varied depending on the situation of each meeting.

Source: JICA Study Team

Following comments and clarifications were raised by the participants. Details of comments will be attached with the SEA Report.

- Timeline for implementation
- Relationship among existing plan or project (by regional level or other national level project e.g. SGR)
- Other economic corridor as example
- Importance of involvement of regional level organization and coordination
- Impact to climate change issue
- How strengthen agriculture industry through the M/P
- How increase export of local product
- Mitigation measures for environmentally sensitive areas
- Road/railway reserve and compensation issues

- Trans boundary conventions/legislations
- Transport safety
- Budget/funding for implementation of the M/P and each project
- Identification of archaeological and cultural heritage along the corridor
- Identification/protection of nature and environment
- Speculating on land for implementation of the M/P (occupying land)
- Crosscutting issue like gender, HIV/AIDS (STD), the elderly etc.
- Influence from political side
- Land acquisition and land owner right issue (incl. unregistered land)
- Criteria for production center


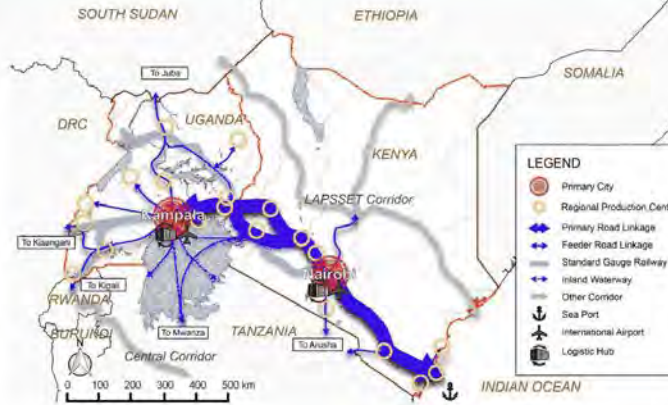
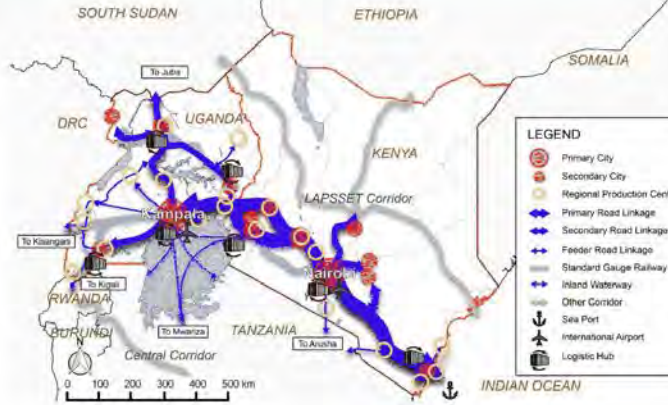


Source: JICA Study Team

Figure 10.1.2: Photographs on 2nd Round Stakeholder Meetings in Kenya

(2) Alternative Options

At the second round stakeholder meetings, alternative options of spatial structure plan were presented as a part of M/P presentation. The alternative options are shown below.

Structure Plan	Image of Structure	
<p>Alternative-A</p> <p>“Super Double-core Type”</p> <p>Concentrating investment on capitals as usual (= Zero Option)</p>		<ul style="list-style-type: none"> • Urban functions including business, commerce and services will be centralized in “Primary Cities” (PC) and they will grow into much larger consumption areas. • Goods supply will rely heavily on imports. PCs will become logistic hubs for surrounding regions and beyond.
<p>Alternative-B</p> <p>“Double-core with Regional Industrial Promotion Type”</p> <p>For expanding export with industrial promotion</p>		<ul style="list-style-type: none"> • Similar to Alternative-A, urban functions will be centralized in Primary Cities (Capitals). • Key industries in “Regional Production Centers” will be promoted to produce goods for export utilizing resources with comparative advantage. • Involvement of local governments will be required.
<p>Alternative-C</p> <p>“Multi-core with Regional Industrial Development Type”</p> <p>For expanding export with industrial and balanced development</p>		<ul style="list-style-type: none"> • Similar to Alternative-B, Regional Production Centers will be promoted. • Urban and logistics functions of “Secondary Cities” will be promoted into hubs of business, commerce, service and logistics for surrounding region. • Involvement of local governments will be required.

Source: JICA Study Team

Figure 10.1.3: Alternative Options

Estimation of expected effect of each alternative is given in below:

Table 10.1.7: Estimation of Expected Effect of Each Alternative

		Alternative-A	Alternative-B	Alternative-C
Public Benefit	i) Efficiency of logistics	Bad	Good	Good
	ii) Regional impartiality	Bad	Good	Very Good
	iii) Living and environmental condition	Bad	Not Good	Good
Public Intervention	iv) Cost for realization	Little Needed	Needed	Needed Much
	v) Public management capacity	Little Needed	Needed	Needed Much
Vision	vi) Accordance with the vision for NEC	Bad	Good	Very Good

Source: JICA Study Team

10.1.8 Result of Validation Workshop

The validation workshop was conducted on January 24, 2017 (Tuesday) at Kenyatta International Convention Centre (KICC), Nairobi, and 50 participants attended the meeting. The main purpose was to validate the Draft SEA Report for the finalization of SEA Report.

Table 10.1.8: Time Table of Validation Workshop in Kenya

Time	Activity	Facilitated By
8.30 am – 8.45 am	Registration	SEA Consultant
8.45 am – 9.00 am	Welcome Address	MOTI
9.00 am – 9.15 am	Self-Introductions	MOTI
9.15 am – 9.30 am	Overview of SEA	NEMA
9.30 am – 10.15 am	Presentation of the Draft NEC SEA Report (1)	SEA Consultant
10:15 am - 10:30 am	Tea Break	
10.30 am – 11.00 am	Presentation of the Draft NEC SEA Report (2)	SEA Consultant
11.00 am – 12.00 am	Q&A session	SEA Consultant
12.00 pm – 12.15 pm	Way Forward	MOTI

Source: JICA Study Team

Following comment/interest were mainly raised by the participants.

- Synchronization to development plan of other infrastructure
- Relationship with existing plans to be implemented by local county government
- Importance of proper zoning and physical planning
- Consideration/Mitigation of negative social and environmental impact
- Protection of nature/culture
- Importance of modal shift
- Issue of land acquisition at the time of project implementation
- Funding issue for project implementation stage



Remark by MOTI Official

During Workshop

Source: JICA Study Team

Figure 10.1.4: Photographs on Validation Workshop in Kenya

10.1.9 Environmental Impact and Mitigation Measures

Through the process of SEA, following environmental impact with its significances are identified and mitigation measure are proposed as a part of Environmental and Social Management Framework.

Table 10.1.9: Environmental Impact, Significance and Mitigation Measures

Impact	Significance	SEA Mitigation Measure
Habitat Alteration and Biodiversity Impacts	Major (negative)	<ul style="list-style-type: none"> ● Avoiding PAs and other Category A Constraints. This is the key mitigation measure, and is of paramount importance given the pressures such areas are currently facing given rampant urbanisation and unplanned developments. ● Where avoidance is unavoidable, consider offsets ● Aligning new infrastructure with existing RoWs or defined corridors. ● Limiting the size of construction RoWs where possible. ● Complying with existing land use and PA management plans. ● Supporting conservation strategies in the NEC. ● Enforcing regulations on transboundary movement of species and establishing monitoring systems. ● Engaging stakeholders in project design particularly where constraints are involved. ● Phasing construction as to avoid any sensitive periods.
Air Emissions	Moderate (negative)	<ul style="list-style-type: none"> ● Complying with the Air Quality Regulations (2014) and emission standards as provided in KS 1515. ● Using cleaner energy sources and promoting their use. ● Limiting land conversion to only necessary areas. ● Managing wastes according to regulations in addition to employing the 3Rs to ensure they are managed sustainably. ● Supporting the development of an air quality baseline through monitoring. ● Supporting climate change response and adaptation strategies as guided by national strategies. ● Promoting resource efficiency programs. ● Avoiding the use of toxic or hazardous materials through engineering design measures where feasible. ● Monitoring air quality in the target areas of the NEC Projects.
Landscape Modifications	Minor (negative)	<ul style="list-style-type: none"> ● Locating infrastructure in compliance with existing land use plans. ● Complying with ecosystem management plans of protected areas. ● Limiting the size of construction RoWs. ● Avoiding protected areas and settlements. ● Involving stakeholders in the design phase of projects particularly those located in or close to settlements and/or protected areas.

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Impact	Significance	SEA Mitigation Measure
Impacts on Soils	Moderate (negative)	<ul style="list-style-type: none"> ● Avoidance of areas listed as constraints. ● Implementing run-off and water management measures. ● Limiting excavations to only necessary areas. ● Implementing soil conservation strategies in areas with high Soil Erosion Potential. ● Complying with waste management regulations. ● Complying with regulations and guidelines on soil conservation such as those provided by land use plan, ecosystem management plans and those gazetted by the Agriculture and Food Authority. ● Supporting other soil conservation and management strategies in the NEC. ● Completing erosion modelling studies at the project level and taking necessary action according to those studies. ● Monitoring soil quality in the target areas of the NEC Projects.
Impacts on Hydrology and Hydrogeology	Moderate (negative)	<ul style="list-style-type: none"> ● Avoiding wetlands, water towers, groundwater conservation areas and flood plains. ● Implementing water ingress management measures as appropriate at the project level. ● Controlling run-off from infrastructure and using sustainable drainage systems (SUDS) which mimic or allow natural percolation of water. ● Supporting Integrated Water Resource Management Strategies. ● Monitoring water quality in water bodies that could be affected by the NEC.
Risk of Pollution	Major (negative)	<ul style="list-style-type: none"> ● Developing complementary waste management facilities including a sanitary landfill and a hazardous waste disposal facility. ● Integrating Life Cycle Assessments into the project level environmental risk management. ● Managing wastes (collection, transport and disposal) in accordance to the provisions of the Waste Management Regulations (2006) and providing adequate equipment and facilities to do so. ● Integrating the 3Rs (Reduce, Reuse, Recycle) of waste management in NEC MP and at the project level. ● Avoiding the use of toxic and hazardous substances where possible. ● Where this won't be possible they should be managed according to regulations such as EMCA and OSHA, as well as industry best practice as guided by manufacturers of the substances and institutions such as WHO, FAO and International Commission on Non-Ionizing Radiation Protection amongst others. ● Implementing resource efficiency strategies at the project level to minimize waste generation.
Natural Resource Demand	Major (negative)	<ul style="list-style-type: none"> ● Integrating Life Cycle Assessment into the project level environmental risk management. ● Complying with regulations governing resource extraction such as Forests Act (2005), EMCA (2014), Sand Harvesting Guidelines (2009), Water Resource Management Rules (2006) and Water Act (2014) amongst others. ● Adopting sustainability standards at the project level such as those pertaining to green building and energy efficiency (LEED). ● Ensuring building materials are sourced from sustainable sources. ● Implementing demand management and resource efficiency measures for water, electricity and materials.
Loss of Cultural Heritage	Major (negative)	<ul style="list-style-type: none"> ● The presence of cultural heritage should be considered as part of the site selection process for all potential developments in the NEC and a framework for the site selection process should be included in the Plan as part of a Cultural Heritage Management Plan. ● Incorporation of heritage sites into tourism master plans as a way of preserving such sites ● Confirm presence of heritage assets through detailed studies ● ESIA's to include consideration of cultural heritage and the development of appropriate mitigation and management plans. ● In terms of locally important cultural heritage sites, any loss or alteration to such sites should be consulted on, and agreed, with the local communities and the custodians of the site. If necessary, appropriate rituals should be undertaken to move the cultural asset, or to otherwise expiate disturbance or loss of the site
Impact on Livelihoods	Major (negative)	<ul style="list-style-type: none"> ● Conduct ESIA that include consideration of livelihood impacts ● Institutional strengthening and capacity building for agencies across the NEC who are responsible for promoting and coordinating commercial developments to ensure that social risks are adequately understood and addressed through mitigation
Rural-Urban Migration	Major (negative)	<ul style="list-style-type: none"> ● Conduct ESIA that include consideration of rural-urban migration ● Ensuring that rural-urban migration is updated in County Integrated Development Plans

Impact	Significance	SEA Mitigation Measure
		(CIDP) as well as Urban Master Plans.
Public Health	Minor (negative)	<ul style="list-style-type: none"> ● Conduct ESIA that include consideration of health impacts ● Develop and implementation of HIV/AIDS/malaria policies and information documents for all workers directly related NEC projects ● Working in conjunction with relevant partners (eg health authorities, NGOs, development agencies), information, education and communication campaigns around diseases and health practices should be developed as part of Plan implementation.
Insecurity	Minor (negative)	<ul style="list-style-type: none"> ● Capacity building for security agencies
Land Acquisition and Resettlement	Major (negative)	<ul style="list-style-type: none"> ● Formulation and implementation of a land title management project to establish a land title database with cadastral map information, and ● Arrangement of technical assistance for a land acquisition and resettlement program ● Any physical or economic resettlement be subject to RAP/LRP ● Institutional strengthening and capacity building for agencies across the NEC ● who are responsible for promoting and coordinating commercial developments to ensure that social risks are adequately understood and addressed through mitigation ● The budgeting process for any of the NEC initiatives must also include a budget for resettlement and compensation, as these costs can be quite significant.
Land Use and Settlement Patterns	Major (negative)	<ul style="list-style-type: none"> ● Proper land use planning & appropriate settlement patterns within Urban Master Plans/CIDP ● Avoidance of conservation areas, national parks, wetlands, protected areas
Urbanisation	Moderate (negative)	<ul style="list-style-type: none"> ● Modification of urban development process through zoning and urban planning
Land Tenure	Moderate	<ul style="list-style-type: none"> ● Proper assignment of land rights

Source: JICA Study Team (from SEA Report)

10.1.10 Issue of Land Acquisition

Generally, land acquisition issue is unavoidable for infrastructure development.

In Kenya, there is “The Land Acquisition Act” (Commencement in 1968, and final revision in 2010), and the act regulates the issues of procedure for acquisition and compensation. However, as given by participants of stakeholder meetings, it might be facing difficulty of implementation of land acquisition. In many infrastructure development projects and other project under public sector, this kind of issues is pointed out. The major reasons are shown below:

- Price of Land (Amount of Compensation)
- Availability of Alternative Land
- Identification of Right Recipient (including Issues within Family)

And also, the land acquisition means the loss of job for the road side business. For the implementation of the land acquisition and the project, alternative job opportunity to getting income shall be considered.

In this master plan study, detailed impact caused by this issue is assessed at the stage of Detailed SEA Study, which is currently going on, as a part of social impact. And also, such issues will be taken into account for industry development as a part of employment issue and consideration of implementation schedule. For smooth land acquisition and compensation, benefits of this master plan and each project as a component of the master plan shall be disseminated, and it is

necessary to show how the value of the region is improved through development and redevelopment.

10.1.11 Reduction of Greenhouse Gas Emission

National Climate Change Action Plan (NCCAP) was established in 2013 under NEMA. In this action plan, specific actions are proposed for each national planning sector namely “Agriculture”, “Environment, Water and Sanitation”, “Tourism”, “Infrastructure for Transport and Energy”, “Manufacturing”, “Population, Urbanization and Housing”, “Health”, “Disaster Preparedness”. In this action plan, the issue of Greenhouse Gas (GHG) is emphasized as a part of integrated low carbon climate resilient pathway.

For each sector of this master plan, both negative and positive impact of the emission of GHG should be examined. For example, for transport sector, optimization of logistic (e.g. reduction of idling vehicle and engine idling time for waiting clearance), modal shift and energy saving caused by the improved infrastructure (e.g. better road condition) are to be positive impact to reduction of GHG. On the other hand, more GHG emission might be expected because of more traffic movement because of much economic activity.

Evaluation of the emission per certain unit is necessary, and getting consensus among stakeholders for this kind of evaluation, both the total amount of emission and the emission per unit are essential.

10.1.12 Consideration of Green Facilities

Planning of new development plan or project is good opportunity to establish “Green Facility” by considering energy conservation and impact to environment. Following points have a possibility as approach:

- Building design for energy conservation and less impact to environment
- Installation of solar/wind power generation system for own use energy
- Replacement of old facility to new facility with better energy consumption
- Opportunity to raise awareness of ecology and energy conservation

Not only for transport itself, but also energy conservation for air conditioning, lighting and refrigerator in each logistic process has a potential for consideration. Giving incentive to investor who will build building or install facility is one of option to promote “Green Facility”.

In Kenya, according to the website of U.S. Green Building Council (USGBC), so far 17 building got certification of Leadership in Energy & Environmental Design¹ (LEED). Encouraging obtaining such certification is good to promote “Green Facility” and reduce the

¹ A green building certification program that recognizes best-in-class building strategies and practices (Source: the website of USGBC)

environment impact as a part of Corporate Social Responsibility (CSR) of investor or project owner.

10.1.13 Way Forward for the Approval of the SEA in Kenya

Based on comments at the validation workshop held on January 24, 2017 and submitted comments to NEMA or MOTI directly, the SEA Consultant modified and finalized the SEA Report. The SEA Final Report was submitted in February 2017, and to be approved within a few weeks after submission.

10.2 Strategic Environmental Assessment Approach in Uganda

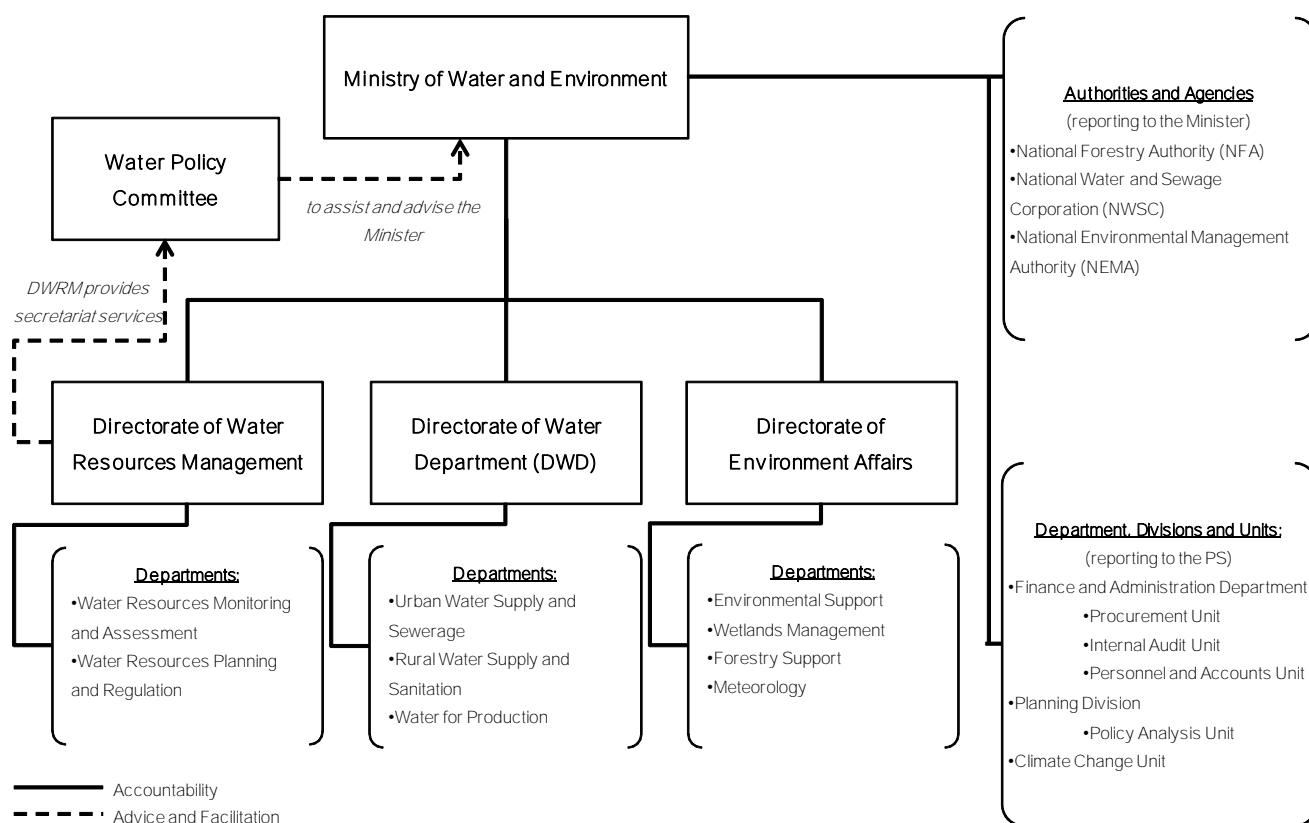
10.2.1 Overview

In Uganda, there is currently no established guideline for SEA. According to National Environment Management Authority (NEMA) “the National Environment Act” is under review to include a mandatory provision for SEA and it will probably be enacted by next year. NEMA is in the process of hiring a consultant to finalize the draft SEA guideline. This is as of November 2015.

NEMA is established based on “The National Environment Act, 1995”. Article 5 of the act states that “The authority shall be the principal agency in Uganda for the management of the environment and shall coordinate, monitor and supervise all activities in the field of the environment.”

NEMA is a semi-autonomous institution under Ministry of Water and Environment (MOWE).

Organization chart of MOWE is shown below:



Source: Prepared by JICA Study Team based on the website of MOWE

Figure 10.2.1: Organization Chart of MOWE

Since there is no legal provision for SEA at the moment, SEA can be implemented by utilizing the guideline of donor agency or common practice accepted internationally. As such therefore NEMA is not in a position to review and approve the SEA.

SEA guidelines will only be ready after review and publication of “the National Environment Act” with mandatory provision for SEA. This will provide a legal framework on SEA.

NEMA acknowledges that two (2) SEAs have been implemented in Uganda so far. The SEAs were for oil and gas sector and also road sector (National Road Master Plan).

For the sake, this master plan formulation, NEMA advised that the SEA shall be follow common practice of SEA and the guidelines of international donor agency. In this case NEMA’s participation will only be as a key stakeholder and not an authorizing agency because of the limitation on the current legal provision.

There is however a well-established legal framework of Environmental Impact Assessment (EIA) including sector wise guidelines. “Environmental Impact Assessment Regulations (1998)” and “Environmental Impact Assessment Public Hearing Guidelines (1999)” issued by NEMA are the two regulation/guideline for EIA. The Ministry of Works and Transport for instance has an EIA guideline titled “Environmental Impact Assessment Guideline for Road Project, June

2008”. Such EIA regulation/guidelines shall form part of reference documents for baseline data collection and implementation procedure of the assessment.

NEMA has three categories of license for environmental consultants. These license systems of environmental consultants. There are three kinds of license namely;

- Environment Impact Assessor (EIA)
- Environment Auditor (EA)
- Environment Partner (EP)

Both of EIA and EA are licenses for individual persons. EIA is for impact assessment and EA is for assessment after the completion of project. According to NEMA, most of environment consultants in Uganda hold both EIA and EA license. In the list of license EIA & EA license holders are either listed as “Team Leader/Member” or as “Team Member”. EP on the other hand is a license for partnership or consortium of firms, and not for individual persons.

For the sake of implementation of SEA in Uganda by Ugandan local consulting firm, although there is no legal framework for SEA implementation, the team leader of the local consulting team shall hold an EIA license with condition of “Team Leader/Member” as a requisite for selection for selection of such consulting firm.

10.2.2 Implementation Schedule of SEA

Since there is no legal framework for NEMA in Uganda be an approving authority for SEA at the moment, NEMA is involved as one of the key stakeholders. As such therefore, the approval of the outcomes of SEA consultant (local consultant) is done by MOWT and JST as the project owner and the employer of SEA consultant respectively.

The implementation schedule of SEA is shown below:

- August to September 2015: Selection of SEA Consultant
- November 2015: First Stakeholder Meetings
- November 2015: Submission of Scoping Report
- November 2015 to May 2016: Detailed Study of SEA and Preparation of Draft SEA Report
- May 2016: Second Stakeholder Meetings
- November 2016: Submission of Draft SEA Report
- January 2017: Validation Workshop
- February 2017: Submission of SEA Final Report

10.2.3 Environmental Scoping

Following “Japan International Cooperation Agency (JICA) Guidelines for Environmental and Social Considerations” (April 2010) and other common practice of SEA, the SEA consultant prepared Scoping Report of the SEA. The views and opinions from stakeholders at the first round stakeholder meetings were input for this preparation. “National Guidelines for Strategic

Environment Assessment (SEA) in Kenya” (NEMA, 2012) is considered as reference document for implementation of SEA since this master plan study covers both Uganda and Kenya. The Scoping Report was submitted to MOWT/JST for the approval of MOWT/JST.

In the JICA’s guideline, following impacts are listed as examples of impact regard to environmental and social considerations:

- Human health and safety
- Natural environment (air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and flora) including trans-boundary or global scale impacts
- Social impacts (migration of population and involuntary resettlement, local economy such as employment and livelihood, utilization of land and local resources, social institutions such as social capital and local decision-making institutions, existing social infrastructures and services, vulnerable social groups such as poor and indigenous peoples, equality of benefits and losses and equality in the development process, gender, children’s rights, cultural heritage, local conflicts of interest, infectious diseases such as HIV/AIDS, and working conditions including occupational safety)
- The derivative, secondary, and cumulative impacts

For each aspect of environmental impact, degree of impact and expected to be affected was evaluated through the Detailed SEA Study.

Since this master plan is for “multi-modal” corridor and the target area is so extensive, so various impacts are expected. Therefore, especially following aspect was carefully examined through Detailed SEA Study.

- Land acquisition / Involuntary resettlement
- Public health and safety (during construction and after completion)
- Traffic safety issue
- Positive and negative impact on local economy and business (especially road side business)
- Security issue (crime and border security)
- Natural environment (during construction and after completion)
- Global scale impact e.g. greenhouse gas

10.2.4 Baseline Information

Baseline information collection was conducted at the beginning stage of Detailed SEA Study. The information collected is presented in the SEA Report, which is attached with this M/P report.

For reference, “National Guidelines for Strategic Environment Assessment (SEA) in Kenya” (NEMA, 2012) gives examples of baseline information as shown below:

Table 10.2.1: Baseline Environmental and Social Conditions

1. Physical environment <i>including PPP-relevant aspects of:</i> Climate, air quality, water resources and water quality, noise, topography, soils, geology, hydrology, and risks of natural disasters
2. Biological environment <i>including PPP-relevant aspects of:</i> Biodiversity, ecology and nature conservation (including endangered species, protected ecosystems, habitats, species of commercial importance, and invasive species and their impacts).
3. Socio-cultural and socio-economic conditions and human health <i>including PPP-relevant aspects of:</i> Archeology, cultural heritage, landscape, recreational activities, human health, social-economic aspects, resource use (including land and water use), transportation, infrastructure, agricultural development, and tourism.

Source: NEMA (Kenya), 2012

10.2.5 Assessment of Past and Current Environmental Issues

Following issues are currently identified through surveys, views/opinions at the first round of stakeholder meetings and observation. Some of issues are relevant issues to this master plan, therefore such issues shall be considered in the Detailed Study of SEA and the master plan itself.

- Road infrastructure
- Traffic jam (mainly trunk road)
- Road safety / Traffic accident
- Road condition (especially road to northern part and branch road)
- Exhaust gas (vehicle movement and parking/waiting cargo vehicle)
- Health issues for road side people
- Too much rely on road transport (Importance of modal shift)
- Land acquisition
- Required duration of land compensation
- Proper compensation to proper person(s)
- Urban planning and construction
- No proper physical planning
- Sanitation
- Design of infrastructure (water drainage etc.)
- Social impact
- Impact to road side business (both negative and positive)
- Infectious diseases such as HIV/AIDS
- Border security
- Border control
- Movement of stolen goods beyond the border
- Natural environment
- Air
- Flood water management

10.2.6 Result of First Stakeholder Meetings

The first round of stakeholder meetings was conducted in November 2015, and more than 100 participants attended the meetings. The main purpose was to present the outline of both master plan and SEA activity. MOWT, as the project owner, chaired all meetings and animated discussions were held.

The summary of date and venues, and example of time schedule of the meetings are shown below.

Table 10.2.2: Summary of Date and Venue of 1st Round of Stakeholder Meetings in Uganda

Date	Venue
November 16, 2015 (Monday)	Kampala (Hotel Africana)
November 18, 2015 (Wednesday)	Mbarara (Lake View Hotel)
November 20, 2015 (Friday)	Tororo (Rock Classic Hotel)

Source: JICA Study Team

Table 10.2.3: Example of Time Table of 1st Round of Stakeholder Meetings in Uganda

Time	Activity	Facilitated By
8.30 am – 9.00 am	Registration	SEA Consultant
9.00 am – 9.15 am	Self-Introductions and Opening Remarks	MOWT
9.15 am – 9.45 am	Overview of the Master Plan	JICA Study Team
9.45 am – 10.30 am	SEA Presentation	SEA Consultant
10.30 am – 11.00 am	Tea Break	
11.00 am – 12.30 am	Q&A Session	
12.30 pm – 12.50 pm	Wrap up / Way forward	SEA Consultant
12.50 pm – 1.00 pm	Closing	SEA Consultant
1.00 pm – 2.00 pm	Lunch and Collection of Opinion Surveys	

Note: Actual schedules were varied depending on the situation of each meeting.

Source: JICA Study Team

Following interests are mainly raised by the participants.

- Current bottleneck, especially road
- Importance of modal shift
- Importance of proper zoning and physical planning
- Synchronization to development plan of other infrastructure
- Relationship with existing plan to be implemented by local government
- Issue of land acquisition at the time of project implementation
- Consideration of negative social and environmental impact (border security and safety)
- Protection of nature
- Civic education and sensitization of this master plan to local people
- Involvement of other sector to this master plan formulation
- Additional stakeholder to be involved
- Harmonization and providing information to other country than Kenya and Uganda
- Technical / legal issue of SEA implementation
- Difference between EIA and SEA



Source: JICA Study Team

Figure 10.2.2: Photographs on 1st Round Stakeholder Meetings in Uganda

10.2.7 Result of Second Stakeholder Meetings and Alternative Discussion

(1) Second Round Stakeholder Meetings

The second round of stakeholder meetings were conducted in May 2016, and around 100 participants attended the meetings (The sheets of participant list will be attached in the SEA Report). The main purpose was to present the result of M/P study (based on Interim Report) and the result of SEA activity (initial draft level of Draft SEA Report). Same as the first round stakeholder meeting, MOWT, as the project owner, chaired all meetings and animated discussions were held.

The summary of date and venues, and example of time schedule of the meeting is shown below.

Table 10.2.4: Summary of Date and Venue of 2nd Round of Stakeholder Meetings in Uganda

Date	Venue
May 16, 2016 (Monday)	Kampala (Hotel Fairway)
May 18, 2016 (Wednesday)	Mbarara (Lake View Hotel)
May 20, 2016 (Friday)	Tororo (Hotel Green Meadow)

Source: JICA Study Team

Table 10.2.5: Example of Time Table of 2nd Round of Stakeholder Meetings in Uganda

Time	Activity	Facilitated By
8.30 am – 9.00 am	Registration	SEA Consultant
9.00 am – 9.30 am	Welcome Address and Self-Introductions	MOWT
9.30 am – 10.00 am	Master Plan Presentation	JICA Study Team
10.00 am – 11.00 am	SEA Presentation (1/2)	SEA Consultant
11.00 am – 11.15 am	Tea Break	
11.15 am – 11.45 am	SEA Presentation (2/2)	SEA Consultant
11.45 am – 12.30 pm	Q&A session	SEA Consultant
12.30 pm – 12.50 pm	Wrap up /way forward	SEA Consultant
12.50 pm – 1.00 pm	Closing	SEA Consultant
1.00 pm – 2.00 pm	Lunch and Collection of opinion surveys	

Note: Actual schedules were varied depending on the situation of each meeting

Source: JICA Study Team

Following comments and clarifications were raised by the participants. Details of comments will be attached with the SEA Report.

- Timeline for implementation
- Relationship among existing plan or project (by regional level or other national level project e.g. SGR)
- Other economic corridor as example
- Importance of involvement of regional level organization and coordination
- Impact to climate change issue
- How strengthen agriculture industry through the M/P
- How increase export of local product
- Mitigation measures for environmentally sensitive areas
- Road/railway reserve and compensation issues
- Transboundary conventions/legislations
- Transport safety
- Budget/funding for implementation of the M/P and each project
- Identification of archaeological and cultural heritage along the corridor
- Identification/protection of nature and environment
- Speculating on land for implementation of the M/P (occupying land)
- Crosscutting issue like gender, HIV/AIDS (STD), the elderly etc.
- Influence from political side
- Land acquisition and land owner right issue (incl. unregistered land)
- Criteria for production center



Presentation by SEA Consultant (Kampala)

Meeting (Mbarara)

Presentation by SEA Consultant (Tororo)

Meeting (Tororo)

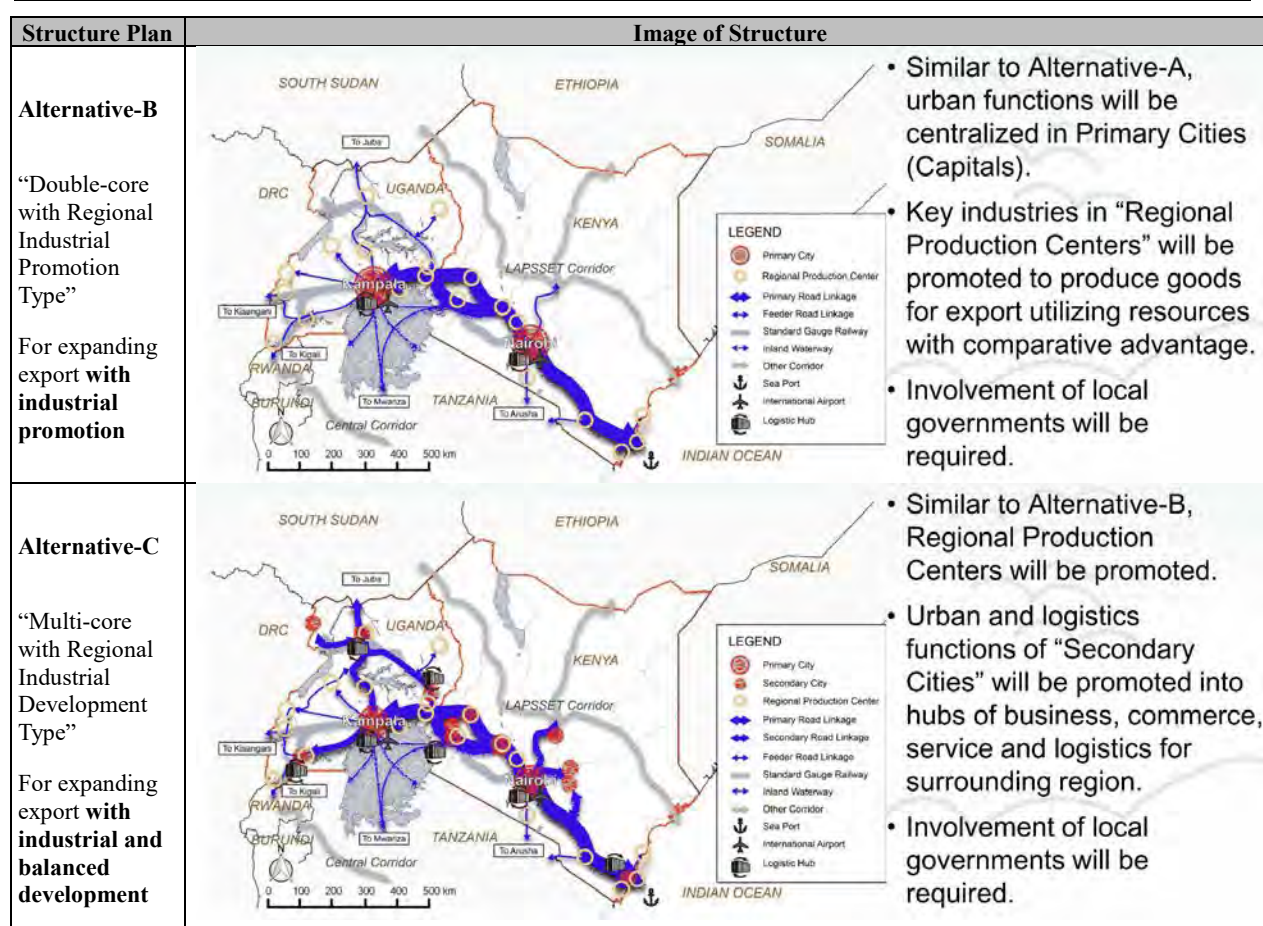
Source: JICA Study Team

Figure 10.2.3: Photographs on 2nd Round Stakeholder Meetings in Uganda

(2) Alternative Options

At the second round stakeholder meetings, alternative options of spatial structure plan were presented as a part of M/P presentation. The alternative options are shown below.

Structure Plan	Image of Structure
<p>Alternative-A</p> <p>“Super Double-core Type”</p> <p>Concentrating investment on capitals as usual (= Zero Option)</p>	<ul style="list-style-type: none"> • Urban functions including business, commerce and services will be centralized in “Primary Cities” (PC) and they will grow into much larger consumption areas. • Goods supply will rely heavily on imports. PCs will become logistic hubs for surrounding regions and beyond.



Source: JICA Study Team

Figure 10.2.4: Alternative Options

Estimation of expected effect of each alternative is given in below:

Table 10.2.6: Estimation of Expected Effect of Each Alternative

		Alternative-A	Alternative-B	Alternative-C
Public Benefit	i) Efficiency of logistics	Bad	Good	Good
	ii) Regional impartiality	Bad	Good	Very Good
	iii) Living and environmental condition	Bad	Not Good	Good
Public Intervention	iv) Cost for realization	Little Needed	Needed	Needed Much
	v) Public management capacity	Little Needed	Needed	Needed Much
Vision	vi) Accordance with the vision for NEC	Bad	Good	Very Good

Source: JICA Study Team

10.2.8 Result of Validation Workshop

The validation workshops were conducted in January 2017, and 103 participants attended the meetings in total of three meetings in Kampala, Mbarara and Tororo (The sheets of participant list will be attached in SEA Report). The main purpose was to validate the Draft SEA Report for the finalization of SEA Report.

The summary of date and venues, and example of time schedule of the meeting is shown below.

Table 10.2.7: Summary of Date and Venue of Validation Workshops in Uganda

Date	Venue
January 16, 2017 (Monday)	Mbarara (Lake View Hotel)
January 17, 2017 (Tuesday)	Kampala (Hotel Fairway)
January 20, 2017 (Friday)	Tororo (Hotel Green Medow)

Source: JICA Study Team

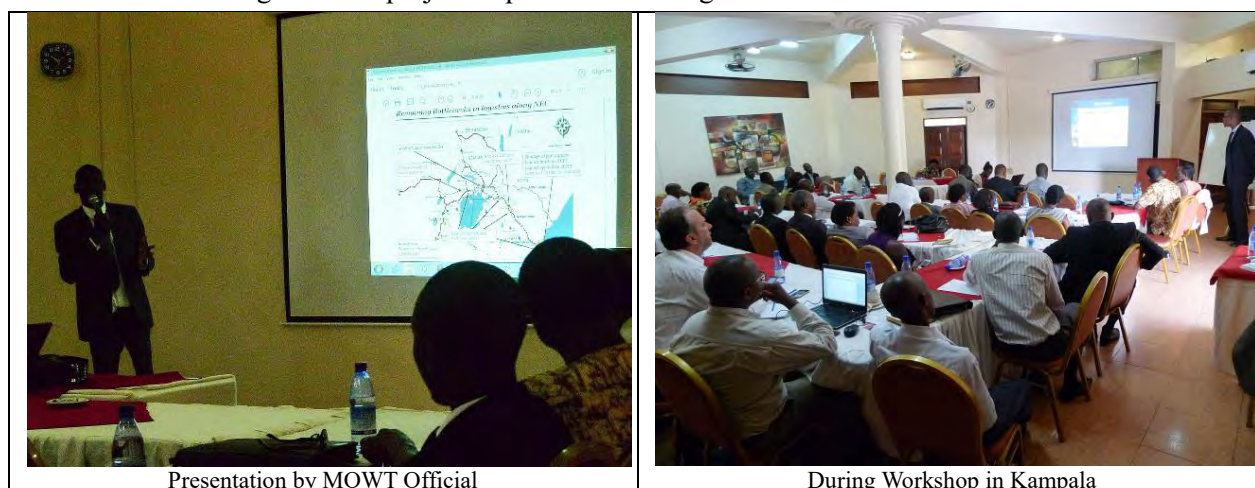
Table 10.2.8: Example of Time Table of Validation Workshops in Uganda

Time	Activity	Facilitated By
8.30 am – 9.00 am	Registration	SEA Consultant
9.00 am – 9.15 am	Self-Introductions and Opening Remarks	SEA Consultant / MOWT
9.15 am – 10.00 am	Presentation from MOWT	MOWT
10.00 am – 11.00 am	Presentation of the findings of the SEA study	SEA Consultant
11.00 am – 11.30 am	Tea Break	SEA Consultant
11.30 am – 12.45 pm	Q&A session	SEA Consultant
12:45 pm – 1:00 pm	Wrap up/Way forward	SEA Consultant
1.00 pm – 2.00 pm	Lunch	SEA Consultant

Source: JICA Study Team

Following interest were mainly raised by the participants.

- Synchronization to development plan of other infrastructure
- Relationship with existing plans to be implemented by local county government
- Importance of proper zoning and physical planning
- Consideration/Mitigation of negative social and environmental impact
- Protection of nature/culture
- Importance of modal shift
- Safety/security issue
- Political instability
- Issue of land acquisition at the time of project implementation
- Funding issue for project implementation stage



Presentation by MOWT Official

During Workshop in Kampala

Source: JICA Study Team

Figure 10.2.5: Photographs on Validation Workshop in Uganda

10.2.9 Environmental Impact and Mitigation Measures

Through the process of SEA, following environmental impacts are identified and mitigation measures are proposed as a part of Environmental and Social Management Framework.

Table 10.2.9: Environmental Impact, Significance and Mitigation Measures

Environmental / social aspect	Mitigation measures
Regional strategy monitoring programme	
Impacts on the integrity of water bodies.	<ul style="list-style-type: none"> ● If there is need for water abstraction, apply for a water abstraction permit from DWRM as required under Regulation 3 of the Water Resources Regulation S.I. 152-1, and adhere to the conditions stipulated in the permit. ● Undertake regular water quality monitoring of key parameters depending on potential project related impacts and ensure that the water quality parameters are within national potable water standards limit. ● Where there is a need to discharge wastewater, obtain a Waste Water Discharge Permit as required under the Water Act, Cap 152, Regulation 7 of the Water (Waste Discharge) Regulation, 1998 and Regulation 3 of the Water Resources Regulation S.I. 152-1 and adhere to the conditions stipulated in the permit – with the necessary/required treatment prior to discharge being undertaken. <hr/> <ul style="list-style-type: none"> ● Ensure that the implementation of any project/ inland waterways is in line with Lake Victoria Management plan and Lake Victoria Fisheries Management Plan (plans) developed by the Lake Victoria Management Programmes. ● Where there is a need to discharge wastewater, obtain a Waste Water Discharge Permit for discharge of waste water as required under the Water Act, Cap 152, Regulation 7 of the Water (Waste Discharge) Regulation, 1998 and Regulation 3 of the Water Resources Regulation S.I. 152-1 and adhere to the conditions stipulated in the permit – with the necessary/required treatment prior to discharge being undertaken. ● Undertake regular water quality monitoring for key parameters depending on project related impacts and ensure that the water quality parameters are within national potable water standards limit.
Biodiversity within protected areas	<ul style="list-style-type: none"> ● Ensure all proposed projects are subject to appropriate planning controls including EIA to establish the location of sensitive habitats such as breeding grounds and Ramsar sites; ● Ensure that the rate and location of development does not lead to unacceptable deterioration of water quality; ● Ensure acquisition of all requisite permits prior to implementation of any project /inland waterway along Lake Victoria, for example EIA certificate of approval, Wetlands, River Banks and Lake Shores User Permit from NEMA and adhere to the conditions stipulated in those permits; ● Engage in stakeholder consultations with environmental organisations that have vested interests in the sustainable use of Lake Victoria such as Nile Basin Initiative and Lake Victoria Basin Commission; ● Enforce any environmental conditionality attached to each development project; ● Develop biodiversity offsets to enhance, restore and support habitats that may be degraded during project implementation; ● All project activities should be in line with the Protected Area Management Plan; ● All water vessels should meet the International Industry Standards; to minimise, accidents and pollution leaks; ● Incorporate the polluter pays principle or other appropriate mechanisms in relation to damage to protected areas; ● Undertake regular water quality monitoring for key parameters depending on project related impacts and ensure that the water quality parameters are within national potable water standards limit; ● Develop an action plan for biodiversity conservation, including a detailed list of strategies for abating key threats, a timeline, responsible actors, costs, and indicators for success; and ● Have in place hazardous materials spill contingency plan as a safeguard against accidental large spillages.
Impacts on public health	<ul style="list-style-type: none"> ● Undertake awareness and sensitisation campaigns on public health and safety (especially issues to do with HIV/AIDS, water and sanitation management); ● Engage the local governments (especially at district and sub-county level) to prepare community members for any influx of in-migrants (for example, by developing by-laws and community policing systems for effective control of large numbers of in-migrants); ● Avoid or at least minimise displacement, wherever feasible, by using brown field/already existing commercial sites) and avoid any cause of physical and economic displacement; ● Where large construction activities are to be carried out, establish workers' camps mainly to accommodate employees from outside the location of the identified secondary cities. These camps should be fitted with the necessary social service amenities like health, water and sanitation facilities; ● Give the local community members the first priority in terms of employment opportunities to minimise the number of migrant workers;

Environmental / social aspect	Mitigation measures
	<ul style="list-style-type: none"> ● Undertake an Environment, Health and Safety (EHS) induction for all workers, including sub-contractors and casual labourers before commencing work, which should include a full briefing on site safety and rules in order to minimise the occurrence of occupational health and safety related incidents, accidents and occupational diseases; and ● Develop and implement waste management plans for all interventions
Impacts related to disruption of livelihoods (fishing activities on Lake Victoria)	<ul style="list-style-type: none"> ● Avoid locating landing sites/ ports and vessel routes in main fishing grounds and fish breeding locations; ● Monitor the fish catchment rates especially for the main commercial fishes caught from Lake Victoria. If a decline is noticed, investigate further to identify the potential causes and mitigate them; ● In liaison with the Directorate of Fisheries Resources, support fish farming especially in the fishing communities around Lake Victoria; ● Incorporate the plans of the Beach Management Units, the interests of the three countries that share Lake Victoria: Kenya, Uganda and Tanzania; interests of the bodies established to protect the Lake Victoria such as the Nile Basin Initiative, Lake Victoria Basin Commission; interests of Local authorities and institutions in the design and implementation of all developments on Lake Victoria; and ● Monitor the fishing effort and fishing gear used by the fishermen. If it is noticed that the fishing effort is increasing or different fishing gear needs to be used to catch the fish; then an investigation into the cause should be undertaken.
Impacts on Public health and safety	<ul style="list-style-type: none"> ● Undertake awareness and sensitisation campaigns on public health and safety (especially issues to do with HIV/AIDS, water and sanitation management); ● Engage the local governments (especially at district and sub-county level paying particular attention to the fishing communities) to prepare community members for any influx of in-migrants (for example, by developing by-laws and community policing systems for effective control of large numbers of in-migrants); ● Where large construction activities are to be carried out, establish workers' camps mainly to accommodate employees from outside the location of the identified ports for rehabilitation. These camps should be fitted with the necessary social service amenities such as health, water and sanitation facilities. Give the local community members the first priority in terms of employment opportunities to minimise the number of migrant workers; ● Undertake an Environment, Health and Safety (EHS) induction for all workers, including sub-contractors and casual labourers before commencing work, which should include a full briefing on site safety and rules in order to minimise the occurrence of occupational health and safety incidents, accidents and occupational diseases; ● Develop and implement waste management plans for each of the ports; ● Establish a community health programme including providing support to existing or new local programmes such as mother and child nutrition, community health awareness, HIV/AIDS awareness, hygiene and immunisation, malaria control measures (indoor spraying of insecticides, personal protection measures, and control of mosquito larvae), and local Voluntary Counselling and Testing (VCT) programmes and ● Prepare and implement an emergency preparedness and response plans especially tailored to spill contingency measures..
Industrial strategy monitoring programme	
Impacts on soils and geology	<ul style="list-style-type: none"> ● Demarcate the extent of each logistic hub and limit the construction and operation activities within it. ● Implement good soil conservation practices such as excavating and separately storing the top soil which can be used for other purpose e.g. re-vegetation.
Impacts on the integrity of water bodies	<ul style="list-style-type: none"> ● Agrochemicals that are categorised as World Health Organisation Class 1A or 1B, or that are listed by the Stockholm or Rotterdam Convention, should not be used except in specific situations identified in national best practice guidelines. ● All agrochemicals should be approved by the Agricultural Chemicals Board of Uganda prior to being used in accordance with the Control of Agricultural Chemicals Act, Cap 29 (1989). ● Undertake regular water quality monitoring for key parameters depending on project related impacts and ensure that the water quality parameters are within national potable water standards limit
Impacts on soils and geology	<ul style="list-style-type: none"> ● Develop programmes to advise farmers on the best farming practices to enable sustainable utilisation of soils. ● Put in place measures to ensure that the quality of the soil is maintained and that the soil quality parameters are within the United States Environmental Protection Agency (USEPA) regulatory limits.
Biodiversity within protected areas	<ul style="list-style-type: none"> ● Obtain the relevant permits for any activity that may be implemented and has the potential to undermine the integrity of such protected areas; ● Ensure all proposed projects are subject to appropriate planning controls including EIA, and enforce any environmental conditionality attached to each development project; ● Map out and establish the location of sensitive habitats such as fauna corridors within the protected areas; ● All project planning should be in line with Protected Area Management Plans;

Environmental / social aspect	Mitigation measures
	<ul style="list-style-type: none"> ● Exploitation of resources within Protected Areas should be undertaken in accordance with all the legal instruments governing each Protected Area. These include the National Environment Act, 1995 and the National Forestry and Tree Planting Act, 8/2003. ● Strengthen institutional cooperation to eliminate illegal activities associated with exploitation of such resources taking into account sustainable customary resource use; ● Develop biodiversity offsets to enhance, restore and support habitats that may be degraded during project implementation ; ● Sign a memorandum of understanding with the Protected Area Management to guide the sustainable exploitation of any resources identified within the Protected Area, where possible; ● Employ the latest available mining technology at all times, consistent with the objectives of the Protected Area; ● Develop an action plan for biodiversity conservation, including a detailed list of strategies for abating key threats, a timeline, responsible actors, costs, and indicators for success; ● Have in place hazardous materials spill contingency plan which should be adhered to in the event of accidental large spillages; ● Have in place sector specific emergency response plans to be adhered to in the event of major emergencies; and ● All project planning should be in line with district physical and sub-county development plans. ● Put in place measures to avoid introduction of invasive species.
Impact related to Land take and disruption of livelihoods	<ul style="list-style-type: none"> ● Maximise the utilisation of the area within each logistic hub to minimise the size of land required; ● Avoid heavily settled areas when identifying the potential locations for logistic hubs to minimise physical displacement; ● Where physical and/or economic displacement is necessary, agree on compensation with the affected person(s) and in accordance with district rates and guidance from the Office of the Chief Government Valuer prior to the construction phase of the logistic hubs; ● Involve stakeholders at all levels such as local council committees, Sub-county committees, and the District committees, CAO, RDC, politicians, and ministries to sensitise the community on the intentions of acquiring the for the establishment of the logistic hubs; ● Consider the interests of vulnerable groups in the communities that are likely to be affected by the proposed activities. The groups considered vulnerable include households with very old persons, disabled persons, the poor, female headship and child headship; ● Develop and implement livelihood enhancement programmes to help economically and physically displaced persons re-establish their livelihoods or create new ones. Some of the livelihood enhancement programmes include; Financial Management Training Programmes, Agricultural Assistance Programmes, Skills Training and Employment Programmes and Business Development Support Programmes; ● Develop a grievance mechanism plan to address grievances from local communities around proposed logistic hubs; ● Monitor the livelihoods of the affected persons and in case the desired outcomes are not being realised, develop other appropriate interventions to restore their livelihoods; and ● In designing the plans for the logistic hubs, put into consideration other existing plans in the areas of interests and these include sub-county and district plans.
Impacts on Public Health and Safety	<ul style="list-style-type: none"> ● Undertake awareness and sensitisation campaigns on public health and safety (especially issues to do with HIV/AIDS, water and sanitation); ● Engage the local governments (especially at district and sub-county level) to prepare community members for any influx of in-migrants (for example, by developing by-laws and community policing systems for effective control of large numbers of in-migrants); ● Avoid or at least minimise displacement, wherever feasible, by using brown field/already existing commercial sites) and avoid any cause of physical and economic displacement; ● Where large construction activities are to be carried out, establish workers' camps mainly to accommodate employees from outside the location of the identified logistic hubs. These camps should be fitted with the necessary social service amenities such as health, water and sanitation facilities; ● Give the local community members the first priority in terms of employment opportunities to minimise the number of migrant workers; ● Undertake an Environment, Health and Safety (EHS) induction for all workers, including sub-contractors and casual labourers before commencing work, which should include a full briefing on site safety and rules in order to minimise the occurrence of occupational health and safety related incidents, accidents and l diseases; ● Develop and implement waste management plans for each of the logistic hubs; ● Isolate hazardous materials such as fuel, explosives and hazardous chemicals and appropriate safeguards in place for dealing with any eventualities related to them; ● Undertake community awareness and sensitisation about the logistic hubs prior to the establishment so that community members become more vigilant and are aware of what to expect in terms of potential nuisances;

Environmental / social aspect	Mitigation measures
	<ul style="list-style-type: none"> ● Develop a grievance mechanism plan to address grievances from local communities around proposed logistic hubs.
Transport strategy monitoring programme	
Impacts on the integrity of water bodies	<ul style="list-style-type: none"> ● Design and implement good construction management practices including, but not limited to; erosion and sediment control measures, proper drainage system and waste management practices. ● Undertake regular water quality monitoring for key parameters depending on project related impacts and ensure that the water quality parameters are within national potable water standards limit.
Impact on air quality (Greenhouse gas emissions)	<ul style="list-style-type: none"> ● Encourage planting of trees along the highways to act as carbon sinks; ● Encourage use of fuel-efficient vehicles to reduce emissions of greenhouse gases; ● Put in place measures to ensure that greenhouse gas emissions from any machinery and vehicles are minimised and that gas emissions are within limits as stipulated in National Environment (Draft Air Quality) Standards 2006; ● Undertake regular air quality monitoring of key air pollutants along busy routes/any identified air pollution hotspot with an aim to reverse any negative trends as per the National Environment (Draft Air Quality) Standards 2006; ● Limiting vehicle fleet age i.e. put in place controls to stop importation of very old vehicles which are the major contributors to greenhouse gases; ● Carry out periodic health checks on groups that are at risk to the effects of air pollution particularly the young, the elderly for respiratory and eye diseases such as asthma, lung cancer and conjunctivitis that have been associated with air pollution; ● Encourage use of rail for freight movement of goods instead of vehicles which are one of the main contributors to GHG emissions from road transport; and. ● Develop programmes to sensitise truck drivers about efficient use of fuel e.g. switching off engines when stationary.
Impact on air quality (dust emissions)	<ul style="list-style-type: none"> ● Ensure that dust abatement techniques are included in each projects planning for example spraying of water on the excavated area, wetting the soil and materials stock piles, minimise height at which materials are dropped to control dust emission, and covering the load carried by the vehicles to ensure that dusty materials do not leak from vehicles etc.; ● Establish and enforce speed limits to reduce airborne fugitive dust; ● Where possible (e.g. along the road side) encourage re-vegetation of the disturbed areas to control fugitive dust; and ● Ensure that the road construction activities are limited within the project foot print to minimise the extent of disturbed area.
Noise and vibrations	<ul style="list-style-type: none"> ● Put in place measures to minimise noise and ensure that the noise levels generated are within limits as stipulated in the National Environment (Noise Standard and Control) Regulations, 2003. ● Ensure that sound acoustics is factored into infrastructure design.
Biodiversity within protected areas	<ul style="list-style-type: none"> ● All potential project activities should be consistent with Protected Area Management Plans; ● Apply, as appropriate, timely environmental impact assessments to any project with the potential to have effects on protected areas, and ensure timely information flow among all concerned parties to this end ● Assess key threats to protected areas and develop and implement strategies to prevent and/or mitigate such threats ● Incorporate the polluter pays principle or other appropriate mechanisms in relation to damages to protected areas; ● Establish IUCN protected species that are likely to be affected by the modal shift and map out their location in relation to intended projects; ● Establish and implement measures for the rehabilitation and restoration of the ecological integrity of protected areas; ● Have in place sector specific emergency response plans to be adhered to in the event of major emergencies; ● Have in place hazardous materials spill contingency plan which should be adhered to in the event of accidental large spillages; and ● Take measures to control risks associated with the introduction and/or spread of invasive alien species in protected areas. <hr/> <ul style="list-style-type: none"> ● Obtain the relevant permits for any activity that may be implemented and has the potential to undermine the integrity of such protected areas; ● All potential project activities should be consistent with Protected Area Management Plans; ● Apply, as appropriate, timely environmental impact assessments to any project with the potential to have effects on protected areas, and ensure timely information flow among all concerned parties to this end; ● Map out and establish the location of sensitive and valuable ecosystems such as fauna corridors and watering areas; ● Assess the baseline status of key biodiversity features, including the distribution and viability of IUCN Red listed species, natural communities and ecological systems;

Environmental / social aspect	Mitigation measures
	<ul style="list-style-type: none"> ● Develop an action plan for biodiversity conservation, including a detailed list of strategies for abating key threats, a timeline, responsible actors, costs, and indicators for success; ● Limit the extent of project infrastructure to the required footprint; ● Standard controls should be adhered to when setting up infrastructure to minimise the risk of accidents; and ● Position infrastructure/development, away from identified sensitive and valuable ecosystems.
	<ul style="list-style-type: none"> ● Obtain the relevant permits for any activity that may be implemented and has the potential to undermine the integrity of such protected areas; ● All potential project activities should be consistent with Lake Victoria Environment Management Plan; ● Apply, as appropriate, timely environmental impact assessments to any project with the potential to have effects on protected areas such as Ramsar sites, and ensure timely information flow among all concerned parties to this end; ● Assess key threats to the protected areas and develop and implement strategies to prevent and/or mitigate such threats; ● Map out sensitive habitats such as Ramsar sites, Important Bird Areas and potential breeding grounds; ● Establish and implement measures for the rehabilitation and restoration of the ecological integrity of the protected areas; ● Position infrastructure/development away from identified and potential sensitive ecosystems such as Ramsar sites; ● Take measures to control risks associated with the introduction and/or spread of invasive alien species in protected areas; ● Incorporate the polluter pays principle or other appropriate mechanisms in relation to damages to protected areas; ● Standard controls should be adhered to when setting up infrastructure to minimise the risk of accidents; and ● Have in place a hazardous material spill contingency plan which should be adhered to in the event of accidental large spillages.
Impacts on Public Health and Safety	<ul style="list-style-type: none"> ● Undertake awareness and sensitisation campaigns on public health and safety (especially to do with issues of HIV/AIDS, water and sanitation); ● Engage the local governments (especially at district and sub-county level) to prepare community members for any influx of in-migrants (for example, by developing by-laws and community policing systems for effective control of large numbers of in-migrants); ● Where large construction activities are to be carried out, establish workers' camps mainly to accommodate employees from outside the location of the identified roads. These camps should be fitted with the necessary social service amenities like health, water and sanitation facilities; ● Give the local community members the first priority in terms of employment opportunities to minimise the number of migrant workers; ● Undertake Environment, Health and Safety (EHS) induction for all workers, including sub-contractors and casual labourers before commencing work, which should include a full briefing on site safety and rules in order to minimise the occurrence of occupational health and safety related accidents and diseases; ● Develop and implement waste management plans for each of the proposed infrastructure under this strategy; and ● Install clear and visible signage on all roads especially in community areas, around schools and hospitals to minimise the risk of accidents. ● Undertake an Environment, Health and Safety (EHS) induction for all workers, including sub-contractors and casual labourers before commencing work, which should include a full briefing on site safety and rules in order to minimise the occurrence of accidents and occupational diseases. ● Develop and implement waste management plans for each of the proposed road. ● Install clear and visible signage to all roads especially in community areas, around schools and hospitals to minimise the risk of accidents. ● Monitor and direct traffic flow by installing traffic controller or signal person.

Source: JICA Study Team (from SEA Report)

10.2.10 Issue of Land Acquisition

Generally, land acquisition issue is unavoidable for infrastructure development.

In Uganda, “The Land Act” (Commencement in 1998, and final amendment in 2010), and the act regulates the issues of procedure for acquisition and compensation. However, as given by participants of stakeholder meetings, it might be facing difficulty of implementation of land

acquisition. In many infrastructure development projects and other project under public sector, this kind of issues is pointed out. The major reasons are shown below:

- Price of Land (Amount of Compensation)
- Availability of Alternative Land
- Identification of Right Recipient (including Issues within Family)

And also, the land acquisition means the loss of job for the road side business. For the implementation of the land acquisition and the project, alternative job opportunity to getting income shall be considered.

In this master plan study, detailed impact caused by this issue is assessed at the stage of Detailed SEA Study, which is currently going on, as a part of social impact. And also, such issues will be taken into account for industry development as a part of employment issue and consideration of implementation schedule. For smooth land acquisition and compensation, benefits of this master plan and each project as a component of the master plan shall be disseminated, and it is necessary to show how the value of the region is improved through development and redevelopment.

10.2.11 Reduction of Greenhouse Gas Emission

The Uganda National Climate Change Policy (2013) identifies key sectors for climate change mitigation action: agriculture, forestry, energy, transport, waste, and industry. It is being implemented through sectoral development plans. The Climate Change Department (CCD), under MOWE is responsible organization for climate change issue. In November 2015, it launched the process to formulate the “Uganda Green Growth Development Strategy²” (UGGDS).

For each sector of this master plan, both negative and positive impact of the emission of GHG should be examined. For example, for transport sector, optimization of logistic (e.g. reduction of idling vehicle and engine idling time for waiting clearance), modal shift and energy saving caused by the improved infrastructure (e.g. better road condition) are to be positive impact to reduction of GHG. On the other hand, more GHG emission might be expected because of more traffic movement because of much economic activity.

Evaluation of the emission per certain unit is necessary, and getting consensus among stakeholders for this kind of evaluation, both the total amount of emission and the emission per unit are essential.

² “The strategy will describe how the country can promote the use of natural resources in a sustainable manner to achieve economic growth, and development, while at the same time combating climate change.” (Source: Press Release by UNDP)

10.2.12 Consideration of Green Facilities

Planning of new development plan or project is good opportunity to establish “Green Facility” by considering energy conservation and impact to environment. Following points have a possibility as approach:

- Building design for energy conservation and less impact to environment
- Installation of solar/wind power generation system for own use energy
- Replacement of old facility to new facility with better energy consumption
- Opportunity to raise awareness of ecology and energy conservation

Not only for transport itself, but also energy conservation for air conditioning, lighting and refrigerator in each logistic process has a potential for consideration. Giving incentive to investor who will build building or install facility is one of option to promote “Green Facility”.

In Uganda, not like Kenya, no building seems to obtain certification of Leadership in Energy & Environmental Design³ (LEED) according to the website of U.S. Green Building Council (USGBC). However, encouraging obtaining such certification is good to promote “Green Facility” and reduce the environment impact as a part of Corporate Social Responsibility (CSR) of investor or project owner.

10.2.13 Way Forward for the Approval of the SEA in Uganda

Based on comments at the validation workshops held in January, 2017 and submitted comments, the SEA Consultant modified and finalized the SEA Report. The SEA Final Report was submitted in February 2017 to MOWT/ JST.

³ A green building certification program that recognizes best-in-class building strategies and practices (Source: the website of USGBC)

CHAPTER 11 CONCLUSION AND RECOMMENDATIONS

11.1 Conclusion

The Comprehensive Master Plan on Logistics with regional and industry development plans was prepared by incorporating opinions from the Working Group, Steering Committee, and Joint Steering Committee meetings, as well as Stakeholders Meetings in both Kenya and Uganda with professional input from the JICA Study Team and Working Groups. Considered were the Team and Group findings on actual goods movement and vehicle traffic volume, and value chains of potential commodities through surveys, freight traffic demand forecasting as well as various analysis of visions, regional and physical plans, and sector strategic and master plans. The JICA Study Team and Working Groups therefore recommends that the suggested projects proposed as key schemes in the Comprehensive Master Plan on Logistics be immediately examined for implementation. This is premised on the view that the suggested projects will ensure the efficiency and reliability of Northern Economic Corridor with an integrated transport and logistics system as well as regional economic development in the area along the corridor and promote regional integration.

11.2 Recommendations

(1) Authorization of the Master Plan

The Comprehensive Master Plan will not be functioned if the plan is not officially approved by both the Kenya and Uganda Governments. As discussed in the Steering Committee meetings, the following actions should be taken for adoption of the Master Plan.

- In Kenya, the Master Plan should be aligned to VISION 2030, since the vision is highest development plan in Kenya. Ministries and agencies concerned should apply the Master Plan to inform their strategic plans, and medium term plans etc.
- In Uganda, MOWT the with support of other ministries shall develop a cabinet memo and submit to State House as a way of seeking cabinet consensus and approval of the master plan.

(2) Upgrading of the Master Plan

The suggested projects proposed in the Comprehensive Master Plan are, at most, in skeleton form. Therefore, further detailed studies and design works are required for their implementation. Both governments should immediately commission necessary studies or design works especially for some projects to be implemented in the short term so as to ensure early completion and benefits realized. In addition, implementation schedule such as short, medium, and long terms

should also be reviewed and revised from time to time to consider the actual development of activities.

(3) Establishment of Task Force at National Level

The Comprehensive Master Plan covers various sectors such as transport, logistic, industry, urban & regional development, agriculture, mining, water, power, and environment sectors. Therefore, a single ministry such as MOTI in Kenya or MOWT in Uganda cannot implement and monitor the Master Plan. Based on the members of Working Groups and Steering Committees, a task force for the Master Plan at National Level should be established to: i) support of the approval process of the Master Plan, ii) solve cross cutting issues for realization of the Master Plan, and iii) monitor the overall progress of the suggested projects. It should be noted that regional coordination mechanism and private sector involvement are being developed through Northern Corridor Integration Project (NCIP).

(4) Service Level of SGR

For the transportation and logistics system along the Northern Economic Corridor, development of SGR is the most key factor from viewpoints of: i) rapid expansion of import freight at Mombasa port, ii) accretion of freight modal shift from road to rail, iii) minimization of cost for new road development. As emphasized in the freight traffic demand forecast, the future service level of SGR is important. Specifically, the transit cost of SGR should be 50% of the truck. If this cost is not realized, more investment on expansion of road capacity in addition to the SGR development will be required since the target share of 33% for SGR in the freight at Mombasa port may not be achieved. In addition, completion of the section between Nairobi and Malaba in Kenya is also important, since the full benefit of SGR from Mombasa to Kampala will not be realized.

(5) Early Establishment of Logistic Hubs

The establishment of seven (7) logistic hubs proposed in the Master Plan is important in terms of cargo distribution between rail, track, and customers, reduction of transportation cost for export as well as regional development along the Northern Economic Corridor. The cities with logistic hubs will be key centres between Northern Economic Corridor and production canter as well as contribute to dramatic reduction of container transportation cost for export through empty container depot function. Moreover, those cities will be regional core for diversification of current function in two (2) capitals and as a result realize balanced development.

(6) Further Development of Road Sector

Road development along the Northern Economic Corridor has been carried out in past and as a result, the road surface condition along the corridor is generally good. It is however expected

that the current road capacity based on 2 lanes will not be adequate by 2030 even though the SGR line from Mombasa to Kampala would have been completed as shown in the freight traffic demand forecast. As such therefore, further road development will be required in addition to the maintenance of existing ones. It is proposed that new road development should utilize PPP scheme with proper toll system in order to increase cost recovery from road users.

(7) Industrial Development in Kenya

In Kenya, the primary commodities have already established a track record of export (coffee, flower and planting and tea): some started or have been playing critical roles in the region, for example, by providing upstream inputs or trading centers. The connectivity advantage also gives Kenya opportunities for accessing increasing demand from domestic and regional markets. Therefore, Kenya's industrial development should expand production not only of currently available products but also more technology-intensive and value-added products.

(8) Industrial Development in Uganda

Uganda's industries are mainly agro- and livestock-based. As observed in the VC analysis, Uganda's value addition activities are still at infancy stage. However, 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 most probable 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.

(9) Involvement of Stakeholders

A mechanism to promote community participation in the development activities for Northern Economic Corridor will be important especially when it comes to the implementation stage. Mechanisms such as stakeholder consultations held parallel to the Study as a part of SEA will be an option. Information on Northern Economic Corridor should be provided for at county/district level as shown in the comments from the stakeholder meetings. MOTI / MOWT should discuss information designations with Ministry of Devolution and Planning and Ministry of Local Government in Kenya and Uganda respectively. The feedbacks from county/district should be reported in the meetings of taskforces for further consideration by the responsible ministry/agency.