



NILE BASIN INITIATIVE

NILE EQUATORIAL LAKES SUBSIDIARY ACTION PROGRAM KAGERA TRANSBOUNDARY INTEGRATED WATER RESOURCES MANAGEMENT AND DEVELOPMENT PROJECT

CONSULTANCY FOR THE REVIEW OF THE EXISTING DOCUMENTS FOR THE NAVIGABILITY OF THE KAGERA RIVER



FINAL REPORT

Benon Zaake - Individual Consultant -Water Resources Engineer
Jeremy Bassy Aguma- Individual Consultant -Transport Economist

February 2009

LIST OF ACRONYMS

ADB	African Development Bank
CEPGL	Economic Community of Great Lakes States
COMESA	Common Market for Eastern and Southern Africa
DTIS	Diagnostic Trade Integration Study
ECA	United Nations Economic Commission for Africa
EAC	East African Community
IDC	International Development Consultants
IWRM	Integrated Water Resources Management
KBMP	Kagera Basin Management Programme
KBO	Kagera Basin Organization
LVBC	Lake Victoria Basin Commission
MULPOC	Multinational Programming and Operational Centre
MOWTC	Ministry of Works, Transport and Communications
NBI	Nile Basin Initiative
NEL	Nile Equatorial Lakes Region
NELSAP	Nile Equatorial Lakes Subsidiary Action Programme
NEL-CU	NELSAP Coordination Unit
Nile-SEC	Nile Basin Initiative secretariat
PAMEASA	Ports Management Association of Eastern and Southern Africa
PMU	Project Management Unit
RPSC	Regional Project Steering Committee
TTCA	Transit Transport Coordination Authority
TTCA-NC	Transit Transport Coordination Authority of Northern Corridor
TAC	Technical advisory committee
ToR	Terms of Reference
UNDP	United Nations Development Programme

TABLE OF CONTENTS

0	EXECUTIVE SUMMARY	6
1	INTRODUCTION	8
2.1	Description of existing corridor routes	11
2.2	Preliminary review of policy & institutional frameworks for IWT	11
2.3	Literature review of documents related to navigability of the Kagera River	11
2.4	Key stakeholder consultations & Field visits	12
2.5	Identification of key project components and potential funding opportunities	13
2.6	Preparation of TORs for detailed feasibility studies	13
3	CORRIDOR ROUTES & TRANSPORTATION LINKS	14
3.1	Northern Corridor	15
3.2	The Central Corridor	15
3.3	Lake Victoria Crossing	16
3.4	Issues associated with the corridor routes	16
4	EXISTING POLICY & INSTITUTIONAL FRAMEWORKS FOR INLAND WATER TRANSPORT	18
4.1	Policy Environment	18
4.1.1	Regional Agreements	18
4.1.2	National Policies	19
4.2	Institutional arrangements	19
4.2.1	Regional Organs & other Economic Entities	19
4.2.2	Corridor Management Authorities	20
4.2.3	National Institutions	21
4.3	The need to strengthen inland water transport management mechanisms	22
5	REVIEW OF EXISTING DOCUMENTS RELATING TO THE NAVIGABILITY OF THE KAGERA	25
5.1	Climate & Hydrological studies	25

5.2	Sediment loads	31
5.3	Visibility & Wind effects	31
5.4	Projects likely to have a bearing on Navigation Transport	32
5.4.1	Kakono Dam Hydropower Project & Kyaka Irrigation Project	32
5.4.2	Kishanda Valley Hydropower Project	32
5.4.3	Rusumo Falls Hydroelectric Project	33
5.4.4	Dam at Nyagatare	33
5.4.5	Kikagati Hydropower Plant	33
5.4.6	Nsungyezi Hydropower Plant	34
5.4.7	Observations	34
5.5	Areas that may require intervention	35
5.6	Navigation issues on Lake Victoria & existing port facilities	40
5.6.1	Lake Ports	40
5.6.2	Navigation charts & aids	40
5.7	Foreseeable inter-basin traffic & competing transportation options	41
5.8	Review of TOR for a Feasibility Study for Navigability of Kagera River	45
6	PROPOSED AMENDMENTS TO EXISTING TOR & WAY FORWARD	47
6.1	Policy & Institutional framework study	47
6.2	Hydrographic & other supplemental surveys	48
6.3	Preparation of preliminary engineering designs	49
6.4	Assessment of technical & economic viability	50
6.5	Environmental Impact Assessment (EIA) studies	50
6.6	Social Impact Assessment (SIA) studies	52
6.7	Institutional support & strengthening	55
6.8	Amendments to staff requirements	56
6.9	Man Month Requirements	56
7	FUNDING MODALITIES	57
7.1	International Agencies	57
7.2	Bilateral & Individual Government Funding	58
7.3	Public-private partnerships	58
ANNEXES	LIX

LIST OF FIGURES

Figure 1:	Map of the Project Area	9
Figure 2:	Corridor routes and related road and rail links in East Africa (Chowdhury and Erdenebileg, 2006)	14
Figure 3:	The Lake Victoria Crossing	16
Figure 4:	Kagera River Basin Profile (BRL, 2007)	26
Figure 5:	Flow distribution in the Kagera (BRL, 2007)	27
Figure 6:	Variation of river levels along the Kagera at Kagitumba	28
Figure 7:	Variation of river levels along the mouth of R. Kagera at Kasensero	28
Figure 8:	Plot of daily flows in R. Kagera at Kyaka Ferry & at Kasensero.	29
Figure 9:	Kagera measured and modelled discharges at Kyaka Ferry (COWI, 2005).	30
Figure 10:	Total estimated discharge for the Kagera Basin (COWI, 2005).	30
Figure 11:	Ruins of the Power plant at Kikagati	34
Figure 12:	Hippopotamus habitat adjacent to Kagera National Park	36
Figure 13:	Bridge crossing at Murongo	36
Figure 14:	Wetlands and bends at Kikagati	37
Figure 15:	Rapids at Kikagati & ruins of power house on left bank	37
Figure 16:	Nsongezi rapids and bifurcation	38
Figure 17:	Kyaka Bridge.....	39
Figure 18:	Water Hyacinth removal operations from the mouth at Kasensero	39
Figure 19:	Competing transportation options	43

O EXECUTIVE SUMMARY

The Kagera Transboundary Integrated Water Resources Management and Development project contracted two Independent Consultants to work jointly to review proposals for navigability of the Kagera River. The project had been identified under the now defunct Kagera Basin Organisation (KBO) as one of the options of disenclaving the countries of Rwanda, Uganda, Burundi and the Eastern part of the Democratic republic of Congo. The Terms of Reference (TOR) for the assignment required the consultants to review all the documentation related to the navigability of the Kagera River Project with a view to assess the present status; determine the next steps in preparing the project; develop TOR for comprehensive feasibility studies and also propose innovative project financing options. The Consultants were also required to determine whether previous studies commissioned by KBO with respect to the project are still valid or need to be updated.

Having analyzed the comprehensiveness of the existing information and from the review of all compiled studies, additional information needs and constraints have been identified and the gaps and additional information required undertake detailed feasibility study of the navigability of the river are discussed. In particular we have established that to-date there are no environmental or socio-economic impact assessments that have been prepared for the Navigability of the Kagera River and have therefore identified the issues that need to be addressed and highlighted them for inclusion in a detailed TOR.

Form our review of the existing policy and legal framework with respect to inland water transport; we have established that member states of the EAC have ratified a Tripartite Inland Waterways Agreement to facilitate cooperation in infrastructure services for inland waterway transport. A draft Lake Victoria Transport Bill has also been prepared to provide for registration and licensing of all vessels used on Lake Victoria. The Bill addresses a number of issues e.g. safety of passengers and cargo and standards for competency of crew. In each of the Kagera basin riparian countries a number of policies and legal instruments exist to manage inland water transport. However, we find that there is need to review, rationalize and harmonize the existing water transport legislation and policies so as to promote consistency in the sector. Our findings indicate that it may be necessary to enact a specific Agreement on Navigation on the Kagera River or review the Lake Victoria Tripartite Agreement and Transport Bill to ensure that they include specific provisions for freedom of navigation on the Kagera; equal multilateral treatment of cargo, same inland customs procedures; regulation of navigational and inland port services; and specific protocols on navigational river safety and environmental protection. We note that presently there is no recognized regional body or authority mandated to manage inland water transport in the Kagera Region. Therefore institutional structures are required to support the proposed arrangements and their relationships with the framework of the existing corridor management agencies. Under the detailed feasibility study, we have recommended that a number of various options need to be analyzed.

During stakeholder consultations with the Ministry of Infrastructure (MINIFRA) of the Republic of Rwanda, it was established that a similar initiative to this assignment is in advanced stages of implementation with funding from the East Africa Trade & Facilitation Project (EATTP). MINIFRA has issued a call for Expression of Interest (EOI) to eligible consultants interested in

carrying out a feasibility study for navigation along the Kagera and is in the process of evaluating the applications. The TOR prepared by MINIFRA for their undertaking have therefore been reviewed as part of our assignment. We find that these TOR are appropriate but having had the benefit of reviewing all the existing baseline information and after compiling and addressing the comments from a consultative stakeholder meeting that took place on 27th November 2008 in Burjumbura, we have prepared a comprehensive addenda that improves and focuses these TOR to ensure that they address the unique challenges of this undertaking.

Our review of the technical information has illustrated that existing hydro-meteorological data required for engineering designs is limited and very fragmented. More specifically, lack of a spatial variation of water levels along the river has been identified as one of the constraints that must be addressed by carrying out detailed hydrographic surveys as one of the key components of the detailed feasibility studies. A number of other technical aspects that merit attention have been presented and it is suggested that supplementary surveys be undertaken before commencement of feasibility studies. After analyzing the planned agricultural and hydropower projects whose characteristics or projected works may lead to hindrances to establishment of navigation transport along the lower Kagera, it is clear that there is need to appraise them in further detail in order to quantify the impacts that they are likely to impose on navigation transport along the river and finally design appropriate mitigation measures.

Based on studies that were conducted by the now defunct KBO, the total projected traffic that is likely to be diverted along the river can be estimated to be about 1,084,000 tons per year by the year 2020. The accuracy of these projections and validity of assumptions made needs to be updated at the detailed feasibility study stage. In our addenda to the TOR prepared by MINIFRA, we have underscored the importance of determining the annual benefits derived from cost savings, reduction of transport costs and enhanced revenues from freight transport arising out of realizing the Navigability Project. Once the investment requirements have been specified, we recommend that the detailed feasibility studies must include a comprehensive cost benefit analysis designed to evaluate the project for economic and financial viability. This analysis should include a comparison of the project against other competing road and rail projects that were identified under the KBO and the East African Transport Master plan. This can be accomplished by updating the comparison of the operating costs for rail, lake ferry and road transport in the economic evaluation presented under the Kagera Railway Basin Study. It will be critical to establish the extent of competitiveness of navigation transport on the River against the alternative road and rail options. In our opinion, if all the competing projects are completed ahead of schedule of the navigation project, the proposed program is likely to be overtaken by other initiatives in the rail, road sector and may be difficult to justify.

The proposed way forward is to initiate synergy with MINIFRA and integrate the proposed amendments to their TOR based on the findings of this study. Once the TOR and key project components have been agreed upon by all, the PMU of the Kagera Project & MINIFRA, should create a pool of resource information for prospective bidders to refer to during preparation of their proposals. This information should include all the documents compiled and reviewed under this assignment. It is also important to note that due to the trans-boundary issues associated with the nature of the project, its implementation should be consultative.

1 INTRODUCTION

The Kagera Transboundary Integrated Water Resources Management and Development project contracted two Independent Consultants to work jointly to review proposals for navigability of the Kagera River. The project was identified under the now defunct Kagera Basin Organisation (KBO) as one of the options of disenclaving the countries of Rwanda, Uganda, Burundi and the Eastern part of the Democratic republic of Congo. These countries are landlocked and therefore very dependent on reliable transport routes to seaports for their trade. The lower course of the River from Kagitumba, through Kikagati, Nsongezi, Kishambi, Kyaka and Mizinda near its mouth is generally navigable although there are some rapids (Figure 1).

This section of the river provides a potential opening to the ports of Mombasa and Dar es Salaam through the Lake ports on Lake Victoria namely Kisumu, Jinja, Portbell, Mwanza and Bukoba. It is envisaged that the project will establish water transport links between Lake Victoria and Kagitumba in Rwanda and also include the construction of an inland port and link Rwanda, Burundi, and the eastern part of the DRC to the Mombasa and Dar es Salaam.

The Terms of Reference (TOR) for the assignment required the consultants to review all the documentation related to the navigability of the Kagera River Project with a view to assess the present status and to determine the next steps in preparing the project, develop TOR for comprehensive feasibility studies and also propose innovative project financing options. The Consultants were also required to determine whether previous studies commissioned by KBO with respect to the project are still valid or need to be updated. The TOR indicated that the scope of work will include:

- Compile all relevant documents related to the Navigability of the Kagera River. The documents to be compiled include transport master plans of the Kagera River Basin riparian countries.
- Review documentation related to existing transport infrastructure e.g. road and railway transport in order to assess potential capacity of the Kagera waterway.
- Discuss advantages and disadvantages of navigation on the Kagera and issues related to environmental implications
- Identify missing information required to undertake fresh policy, legal and institutional framework.
- Identify gaps and additional information required undertake detailed technical, economic and financial feasibility studies related to navigability of the river.
- Review assessments of traffic load forecasts on the water way, market assessment and determine aspects that need to be updated.
- Determine whether environmental socio and economic impact assessments have been prepared for the Navigability of the Kagera River and identify additional issues that need to be addressed.
- Document participatory processes to be followed during project design
- Propose next steps in preparing the Project, including key components of those steps

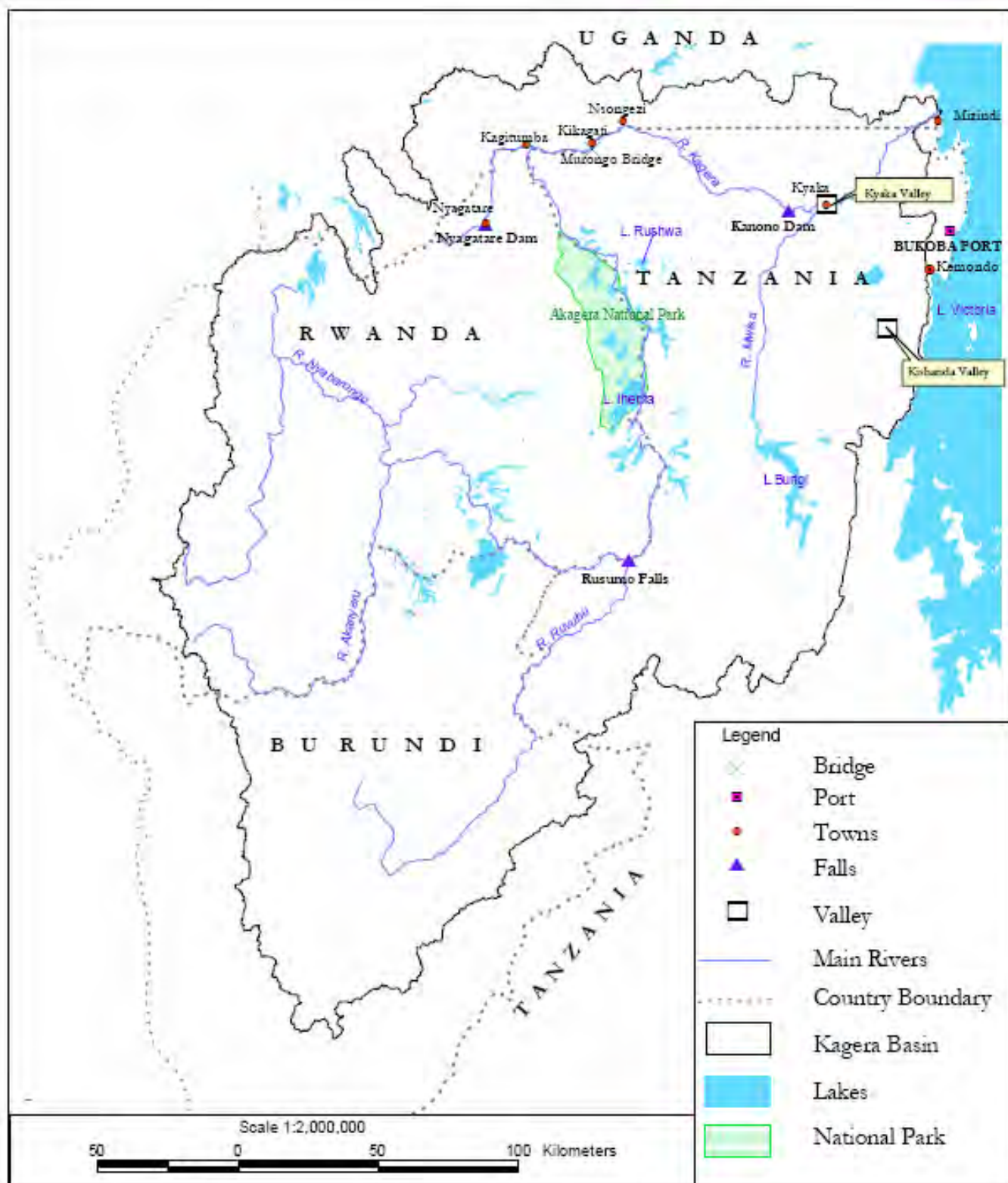


Figure 1: Map of the Project Area

Other aspects of the TOR were:-

- Consult key officials involved with the project e.g. project steering committee members, Transport specialists etc.
- Identify development opportunities associated with improved navigability of the Kagera or interventions to improve navigability
- Identify sections along the river at which various interventions may be required

Prepare draft TORs for subsequent studies to pursue improved navigability of the Kagera.

An inception report describing the envisaged assignment in detail was submitted to the client in the month of June 2008. It included a detailed work-plan and methodology for performing the assignment. It contained a summary of findings from initial key stakeholder consultations and a list of all documents that had been obtained from various agencies.

This report constitutes the final report for this assignment. It has been prepared in such a manner as to cover all aspects of the TOR outlined above. The report is organized as follows:

It begins with an executive summary which outlines the key findings. The executive summary is followed by chapter one which is essentially a short section that presents the background, outlines the TOR and provides the reader with the document map. Chapter two presents the methodology that was followed and describes each of the tasks that was involved and how they were tackled. Chapter three describes salient issues related to this assignment within the wider context of the transport sector in East Africa. Consequently the focus is towards describing the existing corridor routes, associated rail links, share of volume of traffic and other issues associated with them in relation to the assignment.

Chapter four introduces the reader to the existing policy and institutional frameworks within the Kagera region and underscores the need to strengthen inland water transport management mechanisms. Chapter five sets out to review all relevant documentation and past specific studies on that have a bearing on the navigability of River Kagera. The information gleaned from all such studies is presented in such a manner as to inform the detailed feasibility investigations and also illustrate the constraints and data gaps. Chapter six provides the amendments to the TOR that have been prepared by MINIFRA and recommendations for the way forward. The compendium of appendices is presented under the annexes.

2 APPROACH & METHODOLOGY

The methodology that was adopted for the assignment involved the accomplishment of five major key tasks that are outlined below:

2.1 Description of existing corridor routes

Information concerning transport infrastructure was analyzed with a view to outline the existing and planned transport options for Rwanda, Burundi, Uganda and Tanzania, identify the main existing routes that are being used to get goods to the main destination points of Kampala, Kigali & Bujumbura through the port of Dar es salaam, Mombasa and lake ports at Kisumu, Mwanza Bukoba & Portbell.

2.2 Preliminary review of policy & institutional frameworks for IWT

A brief discussion on the different water and inland waterways transport policies in force in Uganda, Tanzania, Rwanda and Burundi and mention of the agencies responsible for management and maintenance of inland water transport infrastructure and other associated transport facilities has been presented. The analysis focused on the existing policies defined in Treaties, Agreements and Conventions that led to the establishment of the Transit Transport Coordination Authority (TTCA), Economic Community of Great Lakes States (CEPGL), East African Community (EAC) & Common Market for Eastern and Southern Africa (COMESA). Thereafter, the issues that merit attention in order to strengthen the existing arrangements are highlighted for inclusion into the TOR for the feasibility studies.

2.3 Literature review of documents related to navigability of the Kagera River

Key documents that have been compiled and reviewed relate to transport infrastructure, and other development projects in the Kagera basin. Most of the documents acquired were published by the now defunct KBO, the Northern Corridor Transit Transport Co-ordination Authority (TTCA), CEPGL, Economic Commission for Africa (ECA), EAC and Ministry of Infrastructure in Rwanda. A comprehensive list of documents that have been reviewed is presented under annex1.

In order to identify the development opportunities associated with improved navigability of the Kagera, we have discussed the merits of improving the navigability of River and have provided evidence of substantial reduction in distance and transport costs to Kigali and Bujumbura through implementation of the project. We have attempted to demonstrate how transportation time will be minimized and how the amount of supplementary railway infrastructure to connect to other major towns is likely to be minimized by effective use of lake and river transport facilities by tabulating relevant transport statistics. We also attempt to illustrate qualitatively how the development of the inland port at Kagitumba is likely to stimulate growth and trade in the within Kagera Basin.

Based on documentation compiled, other specific technical issues that have a direct impact of the river navigability have been examined. These include bathymetry, flow regimes, sediment loads, meteorology, hydraulic conditions, variation of seasonal flow, bridges, water hyacinth, nautical information, harbour facilities on Lake Victoria and navigation aids.

Baseline information about potential traffic that is likely to be transported along the river has been forecasted based on various Railway studies in the region that have been ongoing since 1991. Additional statistics have also been compiled from other supplementary sources such as COMESA and the EAC for cargo moving through the ports of Dar-esSalaam and Mombasa to Uganda, Burundi, Rwanda, Congo. Baseline information about the capacity of Lake ports and projected traffic through them is specifically highlighted. This information is presented in order to highlight areas that will need to be updated in the detailed feasibility studies.

Studies related to the integrated development of the Kagera Basin (KBO, 1982) which identified agricultural projects intended to increase surface area under irrigation have been reviewed with a view to concisely summarise the key findings and water use requirements. These water demands may impact adversely on water availability in the river in dry seasons and negatively affect river navigability. Recent proposals by the Government of Rwanda to construct a multipurpose a dam at Nyagatare and the proposal to rehabilitate the power station at Kikagati are also discussed since they have a bearing on the feasibility of the project.

Having analyzed the comprehensiveness of the existing information and from the review of all compiled studies additional information needs and constraints have been identified and the gaps and additional information required undertake detailed feasibility study of the navigability of the river have been noted. In particular we have established that there are no environmental or socio and economic impact assessments that have been prepared for the Navigability of the Kagera River and therefore have identified the issues that need to be addressed as a precursor to preparing detailed TOR.

2.4 Key stakeholder consultations & Field visits

Key stakeholder representatives including staff of the Project Management Unit (PMU) of the Kagera Transboundary Integrated Water Resources Management and Development Project, steering committee members in each of the basin countries, national liaison officers, some members of the Technical Advisory Committee (TAC), technical staff from the Lake Victoria Basin Commission (LVBC) and staff from the Directorate of Water Resources Management Department at Entebbe, Ministry of Works Transport & Communications in Uganda & Ministry of Transport & Infrastructure in Rwanda have been consulted. This pool of resource persons provided useful supplementary information. Annex 2 lists the persons consulted. A summary of issues raised during the individual consultations is included under Annex 3 of this report. A field visit was also been undertaken to visualize areas where interventions may be required. These areas are depicted through various photographs taken in the field and included within the main body of the report. A stakeholder consultation workshop was held in the month of November 2008. The list of participants to this workshop is included as annex 4. The record of comments that were raised during this workshop and a summary of how they have been addressed is included Annex 5.

2.5 Identification of key project components and potential funding opportunities

Key project components have been proposed based on the identified gaps or lack of comprehensiveness of detailed data required to undertake certain specific studies. In areas where little or no information is available, we have proposed specific studies to provide knowledge and the relevant information required for planning the subsequent activities. These studies are proposed either as stand-alone or as part of the pre-feasibility studies. Budget estimates for implementation of such studies and potential funding opportunities have been identified.

2.6 Preparation of TORs for detailed feasibility studies

We have proposed detailed complementary TOR for a comprehensive feasibility study based on our findings. It takes on the form of an addendum to the TOR initially proposed by MINIFRA. The addendum also makes some proposals towards revision of the key staff requirements and project components.

3 CORRIDOR ROUTES & TRANSPORTATION LINKS

Landlocked countries, by definition, are those that do not possess any seacoast. They are also among the most disadvantaged and underachieving countries in the world. Lack of access to the sea and remoteness and isolation from major international markets results in prohibitive transit costs for land locked countries. Such countries have to bear formidable obstacles in importing essential items and exporting goods. For instance, for the three landlocked countries in East Africa the percentage of transport cost to export value represented 62% for Rwanda, 43% for Burundi, and 37% for Uganda in the year 2004 (ADF, 2006). Burundi, Rwanda and Uganda have access to the sea through two main corridors known as the Northern and Central Corridor and through the Lake Victoria Crossing (Figure 2). Table 1 presents the share of traffic between the two corridors.



Figure 2: Corridor routes and related road and rail links in East Africa (Chowdhury and Erdenebileg, 2006)

Table 1: Share of Great Lakes Transit Traffic between Northern Corridor & Central Corridor for in tons (ECA, 1997)

	Central Corridor (Dar es Salaam)			Northern Corridor (Mombasa)			Grand Total
	Exports	Imports	Total	Exports	Imports	Total	
Burundi	29,239	78,197	107,436	538	1,783	2,321	109,757
D.R.Congo	5,392	65,566	70,958	49,418	26,875	76,293	147,251
Rwanda	9,189	76,997	86,186	20,584	51,130	71,714	157,900
Sub-Total	43,820	220,760	264,580	70,540	79,788	150,328	414,908
Uganda	22,108	115,735	137,843	215,736	898,850	1,114,586	1,252,429
Total	65,928	336,495	402,423	286,276	978,637	1,264,914	1,667,337

3.1 Northern Corridor

The Northern Corridor is 2,000 km long. It is a network of rail, lake port and road routes from the port of Mombasa in Kenya up to Kampala in Uganda. Other road links further extend southward to Burundi and Rwanda and westward to the eastern hinterland of the Democratic Republic of the Congo (DRC). Kampala-Malaba-Nairobi-Mombasa is the main railway line. The rail/lake route links Port Bell or Jinja and Kisumu (lake) with Nakuru (rail). The Malaba route is the main road linking Bujumbura and Kigali with Mombasa.

Another road from Isebania at the border between Kenya and Tanzania also links the port of Mombasa to Rwanda and Burundi through Musoma and Mwanza on Lake Victoria. There is also a 1,000 km pipeline which links the port of Mombasa with the Kenyan lake port of Kisumu and Eldoret. The Governments of Kenya and Uganda are currently carrying out a study of continuing the pipeline from Eldoret to Kampala. The World Bank has also indicated a willingness to fund a feasibility study of extending the pipeline from Kampala to Kigali under the East Africa Trade and Transport Facilitation Project (EATTP).

It is estimated that Rwanda uses the Northern Corridor to ferry more than 80% of its international traffic of Goods while Burundi uses this corridor to transport 20% of its traffic.

3.2 The Central Corridor

The Central Corridor is 1,500 km long. It crosses the middle of the United Republic of Tanzania and terminates at the port of Dar es Salaam. It comprises road and rail/lake routes to Burundi through Lake Tanganyika, rail/road routes to Rwanda, and a rail/lake route to Uganda via Lake Victoria. The central corridor is the main transit corridor for the exports and imports of Burundi. It is constituted by a central railway line which links Dar es Salaam to Kigoma port on Lake Tanganyika and trans-shipment to barges transport goods to Bujumbura to Kalemie in the DRC. Mwanza rail/lake route consists of a 1,229 km railway linking Dar es Salaam to Mwanza. Another road link from Dodoma passes through Rusumo Falls (United Republic of Tanzania–Rwanda border) and connects Kobero (Republic of Tanzania–Burundi border) initially to Bujumbura and finally to Rwanda. A rail-road route at Isaka also links Kobero to Tabora and Dar es Salaam.

Burundi, utilizes the Central Corridor for 75 per cent of its international traffic. Most of it i.e. approximately 65% per is transported along the TRC rail/lake link through Kigoma on Lake

Tanganyika. The all-road route to Dar es Salaam from Bujumbura is mainly used for coffee exports by truck, tea exports and imports, including petroleum products.

3.3 Lake Victoria Crossing

This route involves crossing from Kemondo Bay at Bukoba to Mwanza and is capable of linking the ports of Kisumu and Portbell. Rail links exist from Kisumu to Mombasa and from Mwanza to Dar-es-salaam. The Lake Victoria Crossing is of particular significance for the feasibility study for navigation of the Kagera as it has the potential to link traffic on the river to the ocean ports through various road and railway links. A number of ships, barges, tugboats, tanker oil transporters and wagon ferries ply the various routes linking the lake ports around Lake Victoria.



Figure 3: The Lake Victoria Crossing

3.4 Issues associated with the corridor routes

A feature of the region from the transit transport point of view has been the developing competition between northern and central corridor and between the two ports of Mombasa and Dar es Salaam. Uganda, for example, has reduced its transit dependency on Kenya by developing the lake/rail route through the United Republic of Tanzania, hence the Central Corridor's share of transit traffic has been increasing in recent years. As a result, there are now quite a range of routes and modal combinations in East Africa. Simultaneously, there is competition between road and rail. Road haulage is presently the dominant mode of transport for transit cargo, accounting for an estimated 70 per cent of the total along the Northern Corridor and 60 per cent in the Central. The rapid growth of the road haulage industry from the late 1960s was related to the substantial decline in efficiency and service standards within the rail transport system. The long-distance road transport route: - Bujumbura-Kigali-Kampala-Malaba-Mombasa is now the main artery of the Northern Corridor.

Rwanda and Burundi are not linked with the regional rail network. This significantly reduces their choice of transit modes. In addition, different gauges of the rail network there produce major bottlenecks for the smooth and efficient movement of goods in transit. Railway operations in Kenya, the United Republic of Tanzania and Uganda continue to face persistent problems of locomotive and wagon availability due to lack of spare parts, poor maintenance practices, failure to earmark funds for repairs and poor planning of equipment acquisition. However, the establishment of Inland Container Depots (ICDs) or dry ports has helped to attract a substantial volume of traffic back to rail and reduced transport costs. The main roads used by transit traffic along the Northern Corridor have deteriorated in condition due to inadequate maintenance and heavy, uncontrolled use by overloaded trucks.

Border posts throughout the region, particularly those with heavy traffic such as Busia, Malaba, Isebania, Rusumo and Isaka, suffer from organizational problems and lack of facilities such as offices and parking areas for trucks. Repetition of the same formalities at each side of the border adds to waiting time.

4 EXISTING POLICY & INSTITUTIONAL FRAMEWORKS FOR INLAND WATER TRANSPORT

Effective national and intergovernmental arrangements are required to manage transport facilitation programs along the Kagera River and deal effectively with the cross-sectoral issues involved in harmonization, simplification and standardization of rules and documentation. Within the Kagera region, the mandate for facilitating the navigation sector is the prerogative of national and regional institutions. The existing policy and institutional frameworks for managing water transport are discussed below.

4.1 Policy Environment

4.1.1 Regional Agreements

Transit policies governing inland water transport in the sub-region are largely defined in the Treaties, Agreements and Conventions that led to the establishment of the TTCA, CEPGL, EAC & COMESA. There has been an increasing trend towards regional and multilateral agreements which attempt to produce comprehensive and multimodal facilitation solutions. For example in late 1993 COMESA was established. Under COMESA, in the area of inland waterway transport, members states with common navigable inland water ways resolved to adopt, harmonize and simplify rules, regulations and administrative procedures governing their inter-state water way transport. The also agreed to cooperate to ensure the safety of inland waterway transport services.

In East Africa, the basic policy and institutional framework for transit transport cooperation is enshrined in the East African Community Treaty and the Second East African Community Development Strategy (2001-2005) which have provisions intended to improve transit transport. In March 2004, EAC member states signed a Customs Union (CU) Protocol to speed up regional economic integration and cooperation; and approved a Customs Management Law on December 31, 2004, for a common external tariff and reduced internal tariffs to be applied starting from January 1, 2005. The modernization of regional transport infrastructure and the removal of non tariff barriers to trade are among the key priorities of the EAC. Member states of the EAC also ratified a Tripartite Inland Waterways Agreement that was signed on 29 April 1998 between Kenya, Uganda & Tanzania. Its subject is cooperation in infrastructure services for inland waterway transport. Its purpose is to facilitate inland waterways transport.

A draft Lake Victoria Transport Bill has also been prepared and is currently awaiting consideration by the partner states. The bill has provisions for construction, surveying, registration and licensing of all vessels used on Lake Victoria, for ensuring the safety of passengers and cargo, and standards for competency of crew. At the 11th meeting of the council of Ministers of the EAC held in Arusha on 3rd April 2006, Partner States were urged to :

- introduce and observe a Safety of Navigation on Inland Waterways Awareness Week, preferably May of each calendar year;
- review the proposed Oil Spill and Toxic Chemicals Contingency Plan for Lake Victoria for implementation;

- develop a clear framework for coordination of public and private sector initiatives in Search and Rescue (SAR);
- consider becoming members of International Hydrographic Organisation (IHO)
- Uganda was urged to become a member of International Association of Lighthouses Authority (IALA).

The EAC and COMESA have therefore played an important role in developing the legal framework and procedures for transit traffic. Transit traffic is traditionally high on the priority lists of regional integration efforts, and major issues have been considered at summit level in the sub-region.

4.1.2 National Policies

According to the Uganda National Transport Master Plan (2004), the legal instruments for inland water transport in Uganda, which date back to 1994, are:

- The Ferries Act.
- The Vessels (Registration) Act.
- The Inland Water Transport (Control) Act.

The Ferries Act determined that ferry operations may only be carried out by MoWHC or a body authorized by it to set fines in the event of law infringement. It also established the rules for the use of a special flag, forfeiture of license, fees, and auctioning of rights to run a ferry. The Inland Water Transport Act sets the regulations for licensing of ships while the Vessels Act established the obligation to register all classes of vessels. Similarly, a number of bilateral policies and agreements exist to manage inland water transport on Lake Tanganyika. However, specific legal instruments for inland water transport that are relevant to navigability of the Kagera in Tanzania, Rwanda & Burundi are not available.

4.2 Institutional arrangements

4.2.1 Regional Organs & other Economic Entities

Efforts to set up relevant management institutions for inland water transport have largely been initiated by regional entities e.g. KBO, ECA, CEPGL, NBI-NELSAP, SADC and COMESA. Within the Kagera Basin seed efforts began with CEPGL & ECA who commissioned a number of studies to assist the land locked region, harmonise and coordinate different modes of transport, prepare preliminary feasibility studies for navigation of the Kagera and initiate development of lake transport between Kisumu and Kemono bay through Lake Victoria (ECA, 1996). In particular, the EAC has registered significant achievements in the following areas:

- Removal of all non-tariff barriers on cross border trade
- Adoption of a standardized single entry custom document.
- Identification of project on the construction of the Tanga-Arusha-Musoma-Port Bell/Jinja Railway, which would substantially impact on the viability of the Kagera Navigation Project
- EAC with the assistance of UNECA has completed a study on the status of Lake Victoria Ports with a view to evaluating the investment needs for the Ports

- Implementation of Regional Strategy and Action Plan for the Control of the Water Hyacinth and other invasive weeds.
- Enacting a Search and Rescue Agreement on Lake Victoria

In January 2002 a Protocol was signed with the French Government to assist the EAC to implement an institutional framework and thus enable stakeholders make necessary investment in the infrastructure for improvement of navigation safety on Lake Victoria. To this end a Lake Victoria Safety of Navigation Project was formulated. It has three components namely; Hydrography, Aids to Navigation and Maritime Legislation. This initiative is reviewed in detail under subsequent sections of this report. The International Maritime Organization (IMO) has completed Model Safety regulations for inland waterways and vessels operating in Africa. It is intended that these model regulations will be adopted for use by the East African states during the process of developing their own regional regulations.

In spite of these initiatives, a lot work still needs to be done. For example at the Eastern Africa Ministerial Conference on the New Partnership for Africa's Development (NEPAD) held in Kampala in March 2002, that attracted representatives of Uganda, Kenya, Tanzania, Ethiopia, Eritrea and Sudan and other organizations including; EAC, COMESA, UNECA, ADB etc., regional priorities in the road and water transport that are relevant to this study were identified as follows:

- Reducing the average age of Merchant ships. Safety standards for search and rescue are in most cases either inadequate or non-existent
- The need to review, rationalize and harmonize the existing Water Transport legislation and policies.

4.2.2 Corridor Management Authorities

The governments of Burundi, Kenya, Rwanda, Uganda and DRC signed the Northern Corridor Transit Agreement (NCTA) in Bujumbura on 19 February 1985 and renewed it in 1996. The objective of the NCTA is to simplify and harmonize procedures for transit traffic. It covers issues such as right of transit; maritime port facilities; transit routes and facilities; customs control; documentation and procedures; means of transport; rates, charges and payment arrangements; facilities for transit employees; and establishment of the Transit Transport Co-ordination Authority (TTCA) of the Northern Corridor to assist implementation. Separate protocols set out more detailed provisions concerning maritime port facilities; transit routes and facilities; customs control; documentation and procedures; transport of goods by rail; transport of goods by road; handling of dangerous goods; facilities for transit agencies and employees; and third-party motor vehicle insurance.

The Transit Transport Coordination Authority of the Northern Corridor (TTCA) has a permanent secretariat in Mombasa, whose function is to facilitate a smooth flow of transit traffic along the Northern Corridor. Bilateral working agreements governing rail and lake services are also in effect between the Uganda Railway Corporation (URC) and the Tanzania Railway Corporation (TRC). Similar working agreements also exist between URC and Kenya Railways Corporation (KRC).

Whereas the basic policy and institutional framework for transit transport facilitation already exists for the Northern Corridor, such is not the case for the Central Corridor which links the port of Dar-es-Salaam to Uganda, Rwanda, Burundi and DRC. Transit traffic to Rwanda and Burundi, in particular stand to gain considerably because of a shorter distance to the sea and the crossing of only one transit country as opposed to two or three countries with the northern corridor. Realizing this potential, Tanzania, Uganda, Rwanda, Burundi, and DRC have undertaken to establish the necessary policy and institutional framework for the utilization of this corridor. The five countries, with the assistance of the World Bank, signed in September 2006 a multilateral transit transport agreement (the Central Corridor Transit Transport Facilitation Agreement) to replace the existing multiple bilateral agreements. They also established a permanent secretariat that will monitor the implementation of the agreement. At the request of the five member countries, the Bank is providing institutional support for the initial set-up of the Agency. The Agency will provide an appropriate multilateral management and coordination structure to ensure the effective implementation of the provisions of the multilateral transit transport facilitation agreement, and develop effective monitoring and compliance mechanisms for the central corridor transit route.

The Directorate of Transport under the Tanzania Ministry of Infrastructure Development (MID) is currently the Project Implementation Unit (PIU) for the establishing of the Central Corridor Transit Facilitation Agency (TTFA).

4.2.3 National Institutions

The following institutions are relevant within the framework of proposed improvement of the navigability of the Kagera River. They are, Tanzania Railways Corporation (TRC) based in Mwanza, Uganda Railways Corporation (URC), Ministry of Works, Housing and Communications in Uganda, Kenya Railway Corporation (KRC) at Kisumu and the Safety and Maritime Transport Regulatory Authority (SUMATRA) in Tanzania. TRC has created an autonomous subsidiary company, Marine Service Ltd., which is responsible for the operations of maritime services.

SUMATRA in Tanzania was established by an act of Parliament in 2001 to deal with all economic and safety regulation issues in surface and marine transport. In Uganda, the Transport Licensing Board (TLB), a body within the MoWHC, is mandated to license all vessels, including passenger and cargo boats, used for inland water transport. Although TLB is also supposed to inspect landing sites periodically, this activity has been limited by budgetary restrictions. TLB does not have a system of electronic registration for all boats and its services are restricted due to the lack of resources and personnel. Presently there are no organized training programs for ferry or inland water transport operators, mechanics and deck hands, including training in lifesaving procedures, which is of critical importance.

Uganda Railway Corporation (URC) operates three wagon ferries on Lake Victoria which link Port Bell to Kisumu and Mwanza. The ferries were acquired between 1983 and 1984. According to various literature, each vessel is capable of carrying 22 wagons with 40 tons of cargo, giving a total payload of 880 tons. During the year 2001, traffic statistics issued by URC's Marine Department showed monthly traffic rates for the three Ugandan and two Kenyan wagon ferries, which handled a net total of 338,000 and 200,000 tonnes, respectively. However, vessels do not ply according to a predetermined schedule, as loading can only

commence after wagons (and cargo) have been released by customs. In addition, the complex revenue collection procedures and the frequent breakdowns in the system are considered to be leading factors in the slow pace of operations.

MoWHC/URC also owns and manages the lake ports at Port Bell and Jinja. Maintenance of the infrastructure of both ports, as well as land and floating equipment, has been neglected over the years to the extent that both ports require substantial rehabilitation of their infrastructure, facilities and equipment. This includes, inter-alia, ferry guide-in and berthing facilities, fender systems, berthing quay walls, mooring dolphins, railway spurs, road and parking areas, sheds, buildings and workshops, electricity, radio links to vessels, phones, and water supply and sewage systems. The floating dry dock at Port Bell is in need of maintenance and repairs. In addition both ports require water hyacinth vegetation to be cleared periodically from the vessels' approach lanes and berthing areas. The re-instatement of all navigation aids in Lake Victoria is a pre-requisite for effective movement of goods across Lake Victoria.

Effective re-routing of existing traffic to inland water ways is still captive to weaknesses in the operations of URC, KRC and TRC. For example, Rwanda has no control over how their cargo is handled by all of the rail and lake ports. Custom services are also very bureaucratic, and the shortage of cargo handling equipment in yards and foreign controlled ports worsens the delays. Kisumu, Mwanza and Port Bell, do not work at night. The resulting layovers in all these three ports are above the time required strictly for the unloading and loading of railway wagons.

4.3 The need to strengthen inland water transport management mechanisms

Presently there is no recognized regional body or authority mandated to manage inland water transport in the Kagera Region. Whereas a Tripartite Agreement and Transport Bill are available, considerable gaps still remain. The provisions of and directives concerning inland shipping that have been enacted by the EAC must be adopted by member states or be reflected in their own national legislations. It is envisaged that there will be need to regulate the contractual relationship between carriers and goods shippers specifically for water transport along the Kagera which not only apply to waterway journeys but also to hybrid journeys by road-rail where other maritime regulations apply. There may be need therefore to enact an Agreement on Navigation on the Kagera Rivers specifically providing for freedom of navigation; equal treatment; multilateral treatment of cargo; regulation of navigational and port services; and specific protocols on navigational river safety, environmental protection and inland customs procedures. Such an agreement or protocol would enjoin the beneficiary countries to cooperate in the operation of inland port services, adoption of a uniform system of navigational charts and aids, and sharing of information on pollution.

Institutional structures required to support these arrangements and their relationships with the existing corridor management agencies would also need to be defined. Under the detailed feasibility study the various options would need to be analyzed. For example, the need for a Permanent High Level Standing Committee vis a vis a Lake & River Navigation Commission to oversee the implementation of Kagera Navigation Project under the EAC need to be examined in detail. The role of the Infrastructure Directorate of the EAC Secretariat in such an undertaking would also need to be classified so as to ensure responsibility for implementation and coordination of these efforts. According to the study on harmonization of National Transport Policies of KBO and TTCA (ECA, 1986), it was proposed that a consultative organ similar to the CEPGL, a Standing Committee of National Officials responsible for Lake

Transport (COPTRALAC) be established in Kenya, Uganda and Tanzania to harmonize their inland waterway transport policies on Lake Victoria. Progress made towards harmonizing the policies since then and prospects for having a similar committee between Uganda, Tanzania & Rwanda need to be examined in detail as part of a wider feasibility study.

Most transport services, including Inland Water Transport (IWT), are most efficiently provided by the private sector. But the private sector cannot work effectively without a partnership with the public sector. Governments control public resources, such as natural waterways. They create and enforce regulations to ensure fair competition and accountability. They collect and provide information necessary to smooth operations. And they can be quite helpful in stimulating markets. Suitable and sustainable ways need to be designed where the governmental manages the waterways and major infrastructure facilities. Ecological, agricultural, water supply, recreational, and transport ends all compete for use of the waterways, and governments must be responsible for supervision and enforcement, must take an integrated approach to managing the multi-user waterways, balancing the needs of all stakeholders. Governments, in their largest, though perhaps most mundane IWT role, are supposed to make the rules necessary for smooth sailing.

Presently, in the case of the Kagera, is not clear how the waterways would be classified, who would register the barges, who would be responsible for certifying operators and crew, regulate work and rest hours, standardize navigational aids, set speed limits, and even direct up- and downstream traffic along the river if deemed navigable. For all of these tasks, international standards would need to be followed. Riparian governments of the Kagera would be obliged to ensure fair competition by clearly defining the rights and obligations of various nautical users. When a waterway use is subject to limitations, such as pollution control measures and safety requirements, there is need to have mechanisms that enforce them equally across the board. The collection and dissemination of information is another gap that is that needs to urgently be addressed. Such information is required for purposes of making wise policy decisions. There is need to work out modalities of sharing information with the entire IWT sector to help it compete against other modes of transport. After completion, infrastructure needs to be managed and maintained long-term. This is a continuous process of learning, adjusting, and refining, all done with the aim of continuing functionality while minimizing costs. Performance parameters need to be defined e.g. speed and traveling time. Management and maintenance should be defined in network plans, which should consist of such elements as logical and functional network classification of the waterways and facilities, the translation of policies into operational goals, maintenance strategies, the planning of measures needed to manage the network, and an operational plan including the costs.

Along the Kagera River and indeed within Lake Victoria, a large proportion of dangerous goods, mostly chemicals and fuels, are likely to be transported on the waterways. Insufficient safety standards can have disastrous effects on human health and the ecosystem. IWT's safety record needs to be strengthened for transporting these goods by barge through licensing only specialized barges with double hulls. The double hull is a feature that enhances the safety of tankers carrying chemical fluids that pose a serious environmental threat in case of tank rupture. A further development in the IWT sector has been the development of a Y-shaped hull, a variation of the double hull in which the space between the inner and outer hulls is reduced to while enhancing the vessel's collision resistance. It is also envisaged that there will be need to investing in sophisticated monitoring systems and professional safety training programmes.

Rules and regulations for transporting hazardous cargoes need also to be formulated and adopted. Professional certification in IWT is another area that merits attention. By confirming professional competence on different levels, these certifications help guarantee that the sector continues to work efficiently, safely, and economically. A nucleus Inland Waterway Transport Cluster needs to be created to help train and retrain the human capital necessary to a successful, competitive IWT sector.

5 REVIEW OF EXISTING DOCUMENTS RELATING TO THE NAVIGABILITY OF THE KAGERA

There are a number of specific studies that have a bearing on the navigability of the Kagera or contain useful background information about the socio-economic characteristics of the basin, river profile, basin climate, some limited hydrological data, transport forecast data and some discussion of the navigation opportunities that existed along the Kagera River. The relevant technical aspects related to the navigation project are presented in this chapter under the following topical areas since some information is often discussed in more than one document.

5.1 Climate & Hydrological studies

According to the Basin Monograph (BRL, 2007), Kagera River is the largest of the 23 rivers that drain into Lake Victoria. The river basin covers some 60,500 km² and was estimated in the year 2007 to have a population of nearly 15 million people. The river is fed by three main tributaries: the Nyabarongo River, the Akanyaru River, and the Ruvubu River (see Figure 1.).

Figure 4 below, illustrates the longitudinal profiles of the main tributaries. The area of interest with regard to navigability studies lies in the west-lake region where altitude ranges between 1,134 – 1300 m.a.s.l and rainfall varies between 800mm to 1000mm to about 1200mm on the plateau and around the lake shores of Lake Victoria.

BRL (2007) report that there are two rainfall seasons, with the longer south-easterly monsoon bringing rain between about February and May, and the shorter north-easterly monsoon from about September to November. The months of June, July, and August are generally dry. A map of the spatial distribution of rainfall stations within the basins has been published in the basin monograph. In Rwanda, before 1994, it is stated that rainfall was recorded at a total of 190 meteorological stations, with a good distribution over the country. Currently, only 7 rain gauges are properly operational, of which 3 are in the basin. In Burundi, the situation is similar: There were over 150 rainfall stations up to 1992, with currently only 16% being operational. Average annual temperatures are lower in the westernmost and north-western mountain range at 15^o to 18^oC, and up to an average of 22^oC in the central part. The mean minimum temperature reaches 14.5^oC and a mean maximum reaches 27.5^oC. The average evapo-transpiration is estimated to be about 1,200 mm per year. Extensive wetlands are a prominent feature at the mouth of the river, fringing Lake Victoria at Sango Bay.

Figure 5 illustrates the flow distribution in various reaches of the Kagera. The key stations of emphasis for the navigability study are Kagitumba, Nyakanysai, Kyaka Ferry and Kasensero at the mouth. On an annual basis, the flow recorded at the mouth reported to be is approximately 7.5 km³/year (BRL, 2007).

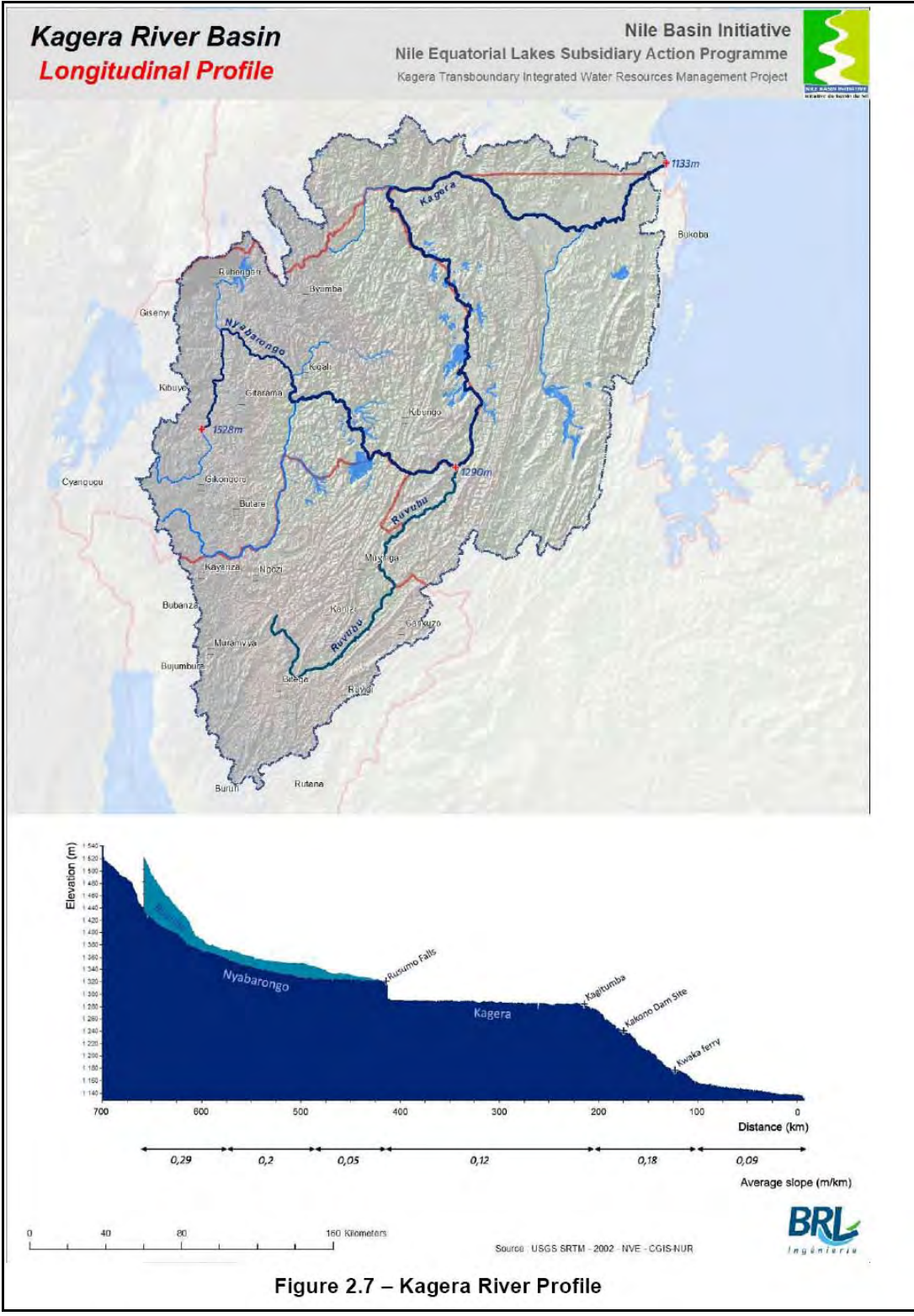


Figure 4: Kagera River Basin Profile (BRL, 2007)

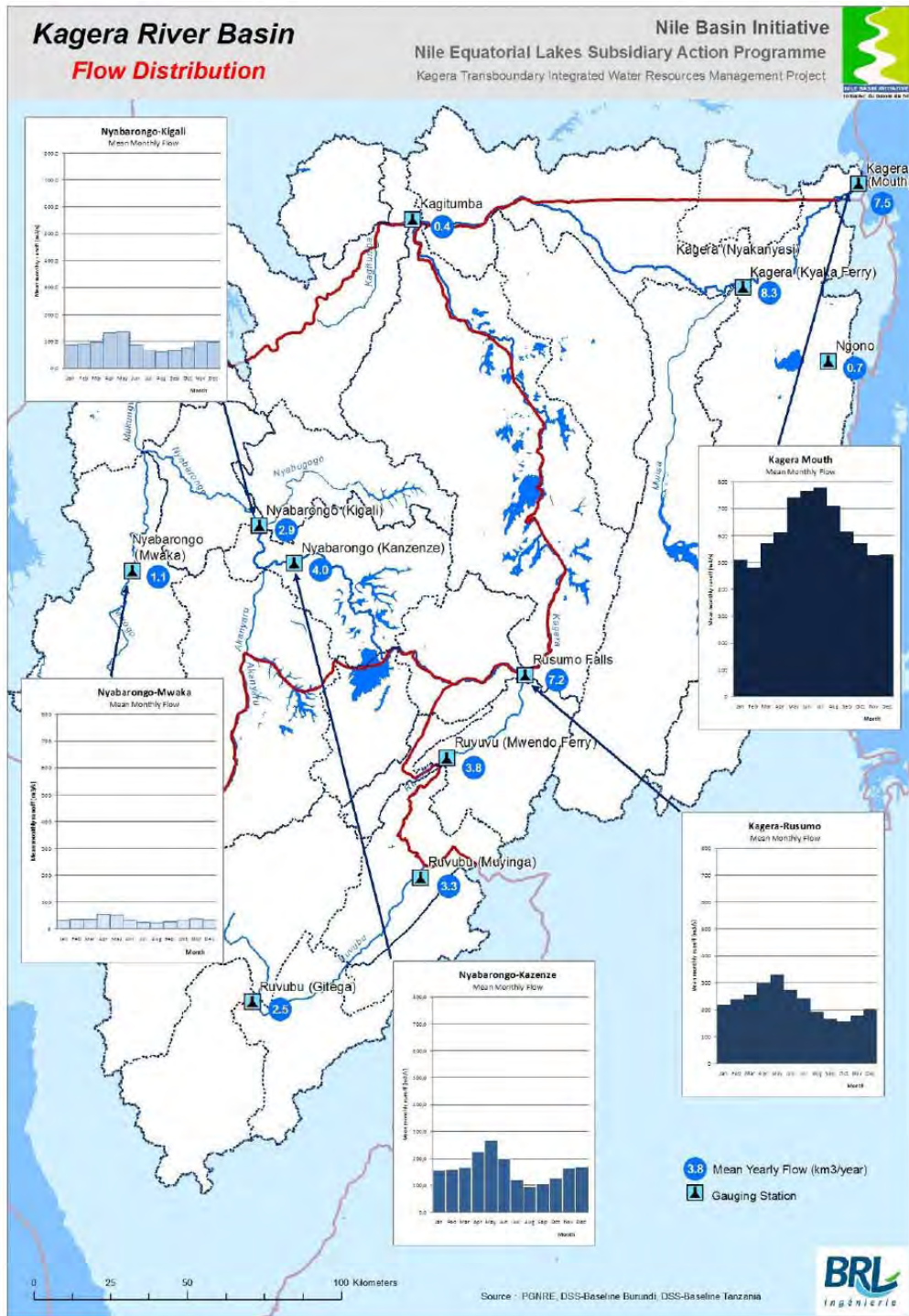


Figure 5: Flow distribution in the Kagera (BRL, 2007)

Figures 6, 7 & 8 illustrate the variation of the time series data from at key gauging stations from the archives of the FAO databases and the Directorate of Water Development at Entebbe in Uganda.

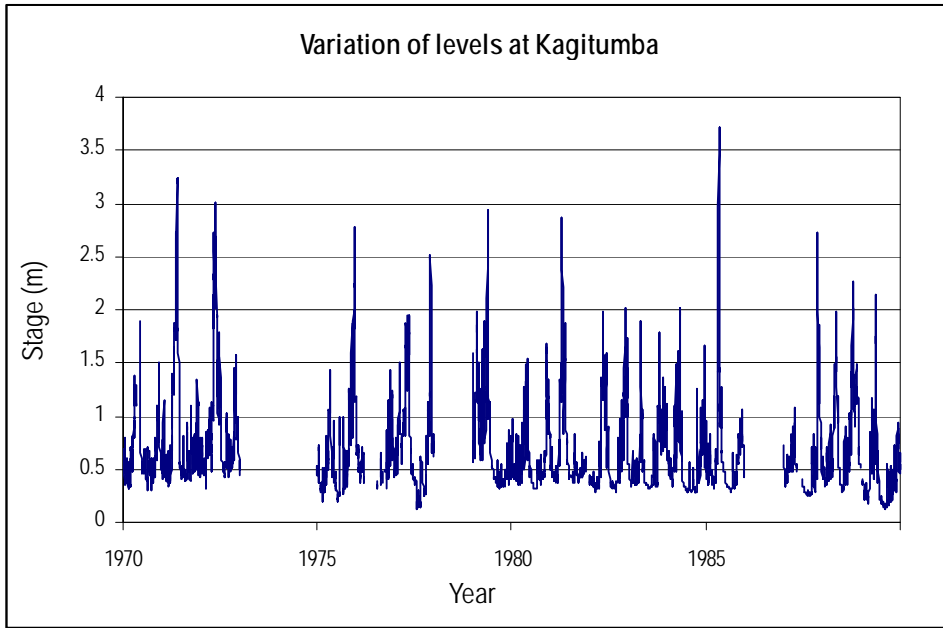


Figure 6: Variation of river levels along the Kagera at Kagitumba

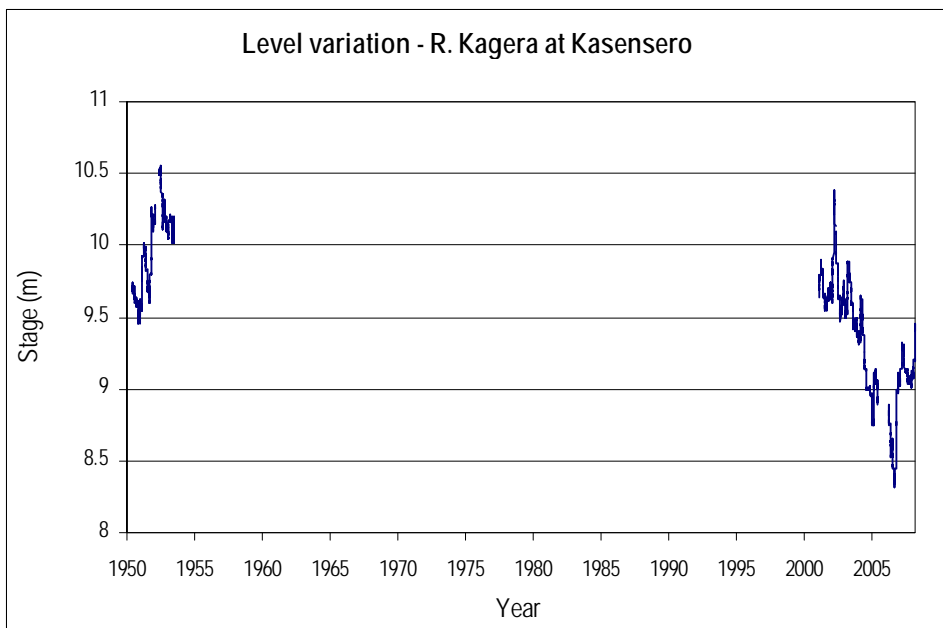


Figure 7: Variation of river levels along the mouth of R. Kagera at Kasensero

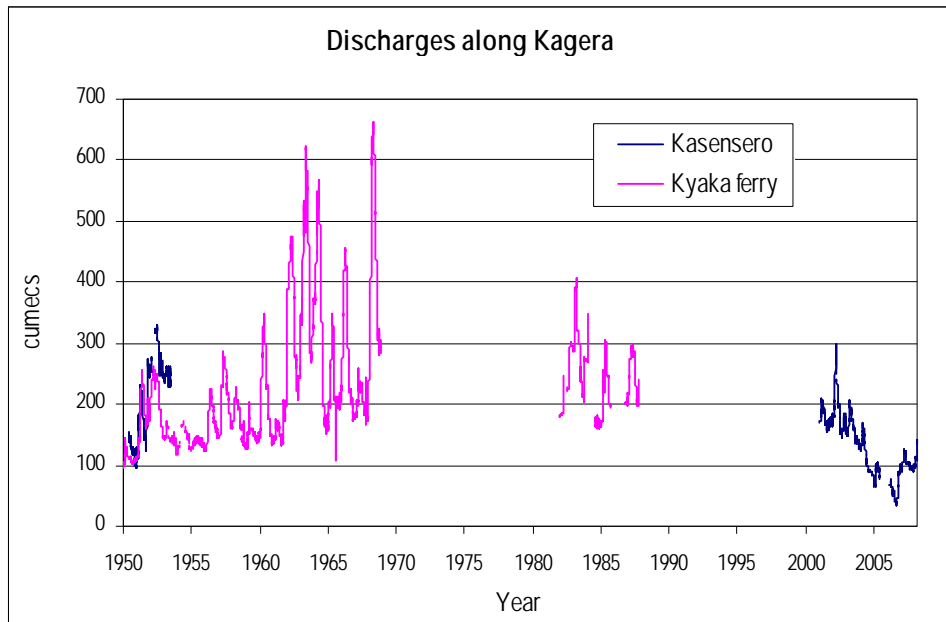


Figure 8: Plot of daily flows in R. Kagera at Kyaka Ferry & at Kasensero.

Data collected and recorded from the station at Nyakanyasi and Kyaka ferry is also reported in ECA (1987). The figures confirm that there frequent gaps in the level and discharge records with most of the key stations not operational. From the short record available, it is possible to discern that discharges and water levels are actually very variable. The lack of a spatial variation of water levels along the river is one of the constraints that must be addressed by carrying out detailed hydrographic surveys as a key component of the detailed feasibility studies.

The monograph document reviewed a study by Norconsult & Electrowatt (1975), where maximum daily, maximum monthly and annual floods based on the data series at Kagera at Kyaka Ferry were analyzed. Statistical analysis was used to analyze the minimum monthly flows of Kagera River at Kyaka Ferry for the period 1940-1973, in order to establish drought flows. The results showed that minimum monthly flow would be about 97m³/s every 10 years while over a 200 year return period the minimum flow of would be 108 m³/s.

Haguma (2007) attempted to set up a hydrological model for the Kagera basin using the Soil and Water Assessment Tool (SWAT). The SWAT model performance was low, due to the poor quality of the precipitation data. COWI (2005) derived a longer record of runoff time series at Kyaka ferry from 1950 onwards based on rainfall runoff modeling with a SMAP model (Figure 9.) The calibration period adopted was 1971-74, a dry spell with no significant peaks in the flow. This means that the SMAP model could only be calibrated to reproduce the base flow accurately, but not the peaks. Consequently, there can be some doubt about the overall accuracy of the model and the total runoff from the catchment, which is most unfortunate since the Kagera contributes 33% of the runoff to Lake Victoria.

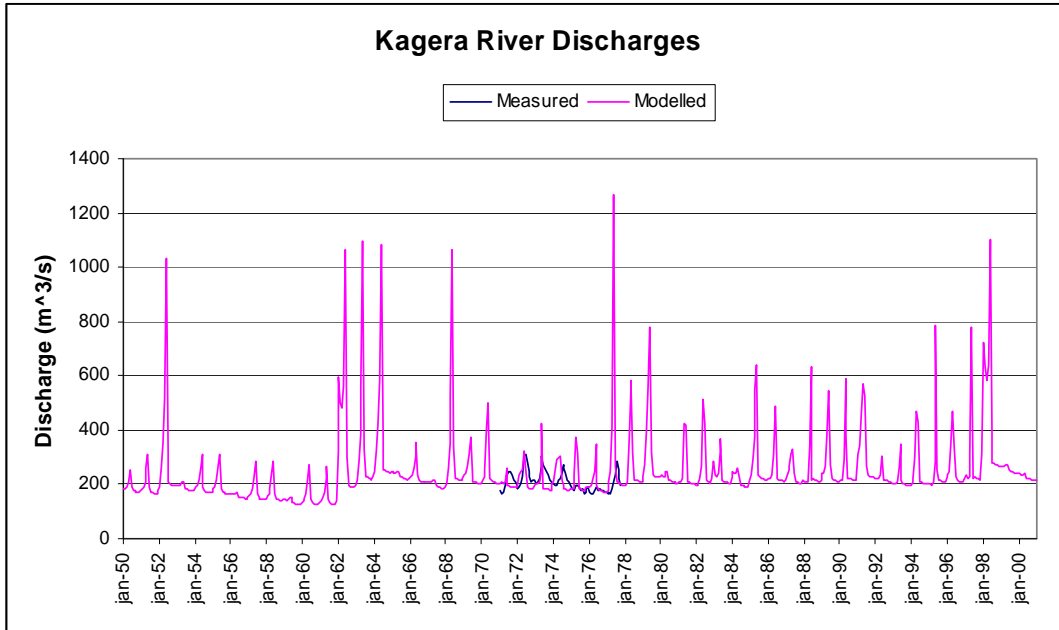


Figure 9: Kagera measured and modelled discharges at Kyaka Ferry (COWI, 2005).

COWI (2005) also provide an estimate of the discharge from the entire river basin based on the station at Kyaka Ferry and the station on the Ngonu River which joins the Kagera near Kyaka given that the two gauging stations are just upstream of the confluence. Between Kyaka and the river mouth is an un-gauged area which is 2% of the total river basin area. Hence the discharge from the total basin was calculated as the sum of the Kyaka and Ngonu discharges increased by a factor 1.02 (figure 10).

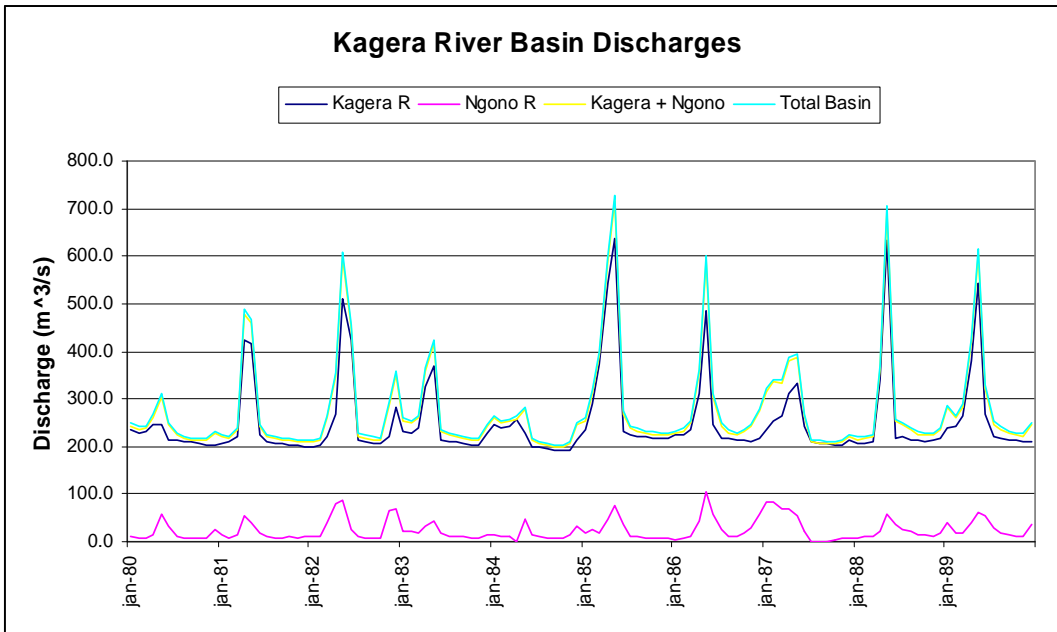


Figure 10: Total estimated discharge for the Kagera Basin (COWI, 2005).

Other studies of interest with respect to navigation that are discussed in the monograph document include the assessment of power development options in the Nile Equatorial Lakes Region (SNC-Lavalin, 2007) where the impact of climate change on runoff characteristics in the Kagera basin was assessed using a conceptual rainfall-runoff model known as WATBAL. This analysis illustrated that a 25% increase in precipitation is likely to lead to a 75% increase in runoff. One possible negative outcome from such increased runoff was identified to be increased soil erosion.

5.2 Sediment loads

Sediments in rivers affect navigation in several ways. Sediment deposits tend to build up in certain slow flowing sections where they are deposited along the banks. On the other hand within fast flowing sections of the river, river banks are likely to be eroded or destabilized. ECA (1987) recognized the likely occurrence of bed deposition or river bank erosion along the Kagera but noted that the frequent occurrence of dense papyrus thickets, reservoirs created by the proposed dam at Rusumo and the upstream lakes on the Nyabarongo and Ruvuvu are likely to trap sediments upstream and reduce the sediment loads within the main section of the river that is likely to be utilized for inland transport.

However, it is widely acknowledged that there is insufficient knowledge about sediment loads in the Kagera although from anecdotal evidence the loads are considered to be appreciably very high. 16 samples taken from Kyaka ferry showed the sediment load to be lying between 924 and 1,866 tons per day for discharge values lying between 141 and 301 m³/s. Similarly 12 samples from Ngonu near Kyaka road showed sediment load to be lying between 9.0 and 243 tons/day for discharge values varying between 5.35 and 80.2 m³/s. Detailed datasets for the two sites are available from the publication HYDROMET (1982). Values of these test results of suspended loads were plotted against river discharge and a general trend emerged at Ngonu road depicting sediment load as a function of river discharge. A correlation was derived ($C = KQ^n$) in which C = sediment discharge in weight per unit time; Q = discharge per unit time; and K & n are coefficients. For the data collected at Ngonu the values of K and n were determined to be 2.11 and 1.12 respectively. No meaningful relationship was derived at Kyaka Ferry.

5.3 Visibility & Wind effects

Poor visibility due to occurrence of fog in dense valleys can be a constraint to navigation. Remedial measures usually entail investment in efficient signaling systems and installation of navigation aids. However, there is insufficient data concerning formation of fog in the lower course of the Kagera. ECA (1987) contains some limited tabulated information about temperature, wind and humidity and states that formations of fog are frequently encountered downstream of the river after Kakono during the months of October, November and January to March as these are the periods when low intensity winds prevail, humidity is high and temperatures are low. Supplementary temperature, wind, humidity and solar radiation data for Bukoba is available in the publication HYDROMET (1974).

5.4 Projects likely to have a bearing on Navigation Transport

The Monograph document identifies the Kakono Dam Hydropower Project, Kishanda Valley Hydropower Project and the Kikagati small scale hydropower project as some of the development projects in the Basin that are likely to have an impact on the development of the Kagera River for Navigation (refer to figure 1). ECA (1986) also contains a table in an appendix listing the various agricultural projects proposed by the KBO within the lower basin. Other projects include the proposed rehabilitation of the Power Plant at Kikagati and another proposed small scale power station at Nsongezi. Each of these projects is discussed in detail below:

5.4.1 Kakono Dam Hydropower Project & Kyaka Irrigation Project

Kakono Dam is the furthest downstream potential hydropower site on the Kagera River which offers multi-purpose development opportunities to the West Lake Region of Tanzania¹. The project is designed to generate 53 MW of power and also irrigate about 16,100 ha (KBO, 1982) in the Kyaka valley near river Kakono. Average water demand was projected to be between 5.2 and 6.5 m³/sec. The proposed dam is to be located in Tanzania, on the Kagera River near the Uganda border, approximately 90 km from the mouth of the Kagera River. The resulting reservoir is expected to extend to a distance of 40 km; however it would only be about 15 km² in area. The planned Kakono dam is not compatible with plans to utilize the Kagera River for navigation unless a lock is incorporated into its design.

5.4.2 Kishanda Valley Hydropower Project

The Kishanda Project is to be designed in such a way as to divert the water of the Kagera River downstream of Lake Rushwa. The water would pass successively through an arm of Lake Rushwa, then into a reservoir along the valley of the Kishanda River created by a dam built at Murongo. This reservoir would extend 60 km up the Kishanda River. Flow would be used at a powerhouse located close to Bugara and returned to the Kagera River. The Kishanda project is expected to improve regulated flows for possible additional irrigation in the Kyaka area. There is a potential for 160 km² of irrigation at Kyaka, and further opportunities farther downstream. These are outlined in Norconsult/Electrowatt (1976) and in KBO (1982). The Norconsult/Electrowatt study proposed an installed capacity of 180 MW and corresponding annual energy of 1,087 GWh. Later KBO revised the installed capacity to 207 MW and firm energy to 500 GWh.

This project was deemed to have a high environmental/social risk, and was accordingly screened out under the SSEA by Lavalin-SNC in 2007. The primary reason given was that the diversion of significant flows out of the Kagera River over an extended distance, and flooding from the reservoir in the Kishanda River were associated with high environmental risk due to the proximity of the Akagera National Park and the presence of extensive wetlands that are of ecological importance to Tanzania and Rwanda. With respect to navigation, the planned diversion of water out of the River Kagera to Lake Rushwa is likely to alter the natural flow variability of the section between Kagitumba and Kakono. This is not beneficial to navigability conditions in this stretch.

¹ Norconsult (1976). Kyaka Irrigation Project, Technical Report Vol. II.

5.4.3 Rusumo Falls Hydroelectric Project

This project is currently under advanced stages of implementation under the NELSAP. A dam is to be built at a site 2km upstream of the confluence between the Ruvubu and Akagera Rivers to ensure a diversion discharge of 200 – 300 m³/s designed to generate 279 Gwh (ECA, 1986). This is expected to have 1) a regulating effect on downstream levels and flow rates in the lower Kagera and 2) the entrapment of significant amounts of sediment. These two effects are beneficial to river navigation.

5.4.4 Dam at Nyagatare

This project involves construction of a dam on river Kagera at Nyagatare just upstream of Kagitumba. The Government of Rwanda has commissioned a team of consultants to undertake a feasibility study for the project which was conceived as one of several irrigation projects identified under KBO. The total cultivatable area to be irrigated under this project was estimated to be 7,604 hectares. However the water requirements to be abstracted out of the river have not yet been determined. Whereas the dam and planned reservoir are likely to even out the rather erratic flows and stage heights observed from the hydrological station at Kagitumba, excessive losses of water from evaporation and significant water use could adversely affect the low flows in this stretch of the river and negatively affect planned river transport infrastructure. It is therefore important to confirm the water use requirements of this scheme at detailed feasibility stage.

5.4.5 Kikagati Hydropower Plant

A Chinese company known as China Shan Sheng Industry (U) Ltd is proposing to rehabilitate the mini hydropower plant at Kikagati and upgrade its hydropower capacity from 2 to 12 MW. The former plant which was built in the 1940s, but was destroyed by the war in the 1970s, consisted of a gravity dam, a diversion canal on the left bank river and power house (Figure 11).

According to the feasibility study report, the new scheme entails construction of a dam across the river at a design flood level corresponding to a discharge of 516 m³/s. Data from the archives of the DWRM indicate that this flood magnitude is only exceeded 5% of the time hence in-stream flow requirements of the riverbed section between the barrage and tail-water canal are likely to be adversely impacted. The dam/barrage (7m high and 100m long) will create a reservoir whose volume is estimated to be 228,000 m³. In order to release floods and silt, a spillway sluice (6m high and 7.8m wide) is to be provided for on the left side of the barrage. Construction of this dam across the Kagera is not compatible with the proposed project to enhance the navigability of the Kagera River particularly as most of the water will be diverted out of the main river to the power plant and will be returned much further downstream of the power plant.



Figure 11: Ruins of the Power plant at Kikagati

Hence the project needs to be subjected to the provisions of public participation under Article 12 & 13 of the EAC Protocol. These articles require that the EIA for such projects that are likely to have significant trans-boundary effects on water resources should be available to all partner states and forwarded to the EAC Secretariat for comments and that prior notification should be followed in the form of consultation among Partner States. During our consultations with the Directorate of Water Resources Management at Entebbe on this subject, it was established that consultations revolving around the conditions for granting the developer a water use and hydraulic works permit have been ongoing between Uganda and Tanzania. However the subject of discussions has not been extended to take into account the interest to maintain navigability of the river. Ultimately the design of the project would need to be modified in order not to restrict navigation.

5.4.6 Nsungyezi Hydropower Plant

According to the Uganda Ministry of Energy & Mineral Development Energy Development Master Plans, there is potential to develop 20 MW of power further downstream from Kikagati at Nsungyezi. However, no permit has been issued to any prospective developer.

5.4.7 Observations

Having discussed the inventory of agricultural and hydropower projects whose characteristics or projected works may lead to hindrances to establishment of navigation transport along the lower Kagera, it is clear that there is need to appraise them in further detail in order to quantify

the impacts they would impose on navigation transport along the river or design mitigation measures e.g. locks or appropriate regulation curves for the dams. Although most of the large agricultural schemes require a substantial amount of water, many are located in the lower section of the Kagera River and are not expected to disrupt navigation transport in any significant way. However this needs to be confirmed as part of the up-coming Kagera Basin Decision Support System which should analyze all basin development projects within an appropriate framework.

5.5 Areas that may require intervention

This section describes existing conditions on the lower Kagera between Kagitumba and Kasensero at the mouth and highlights areas that may necessitate intervention in the form of remedial works to enhance river transport. It includes descriptions and illustration of the location of tight bends, bridges, meanders, wetland areas, hippo sanctuaries and rapids based on field observations by the independent consultants for this assignment, and review of ECA (1986).

The first interventions are required in the area near Kagitumba where stage records of the river are highly variable (refer to Figure 6). Due attention must be given to inherent seasonally varying navigation conditions. In the dry season, the water depth may be too low, while in the flood season the water level and the velocity of the current may make navigation too dangerous. Since it is envisaged to construct an inland water port here as well, it is essential that the flow and levels are regulated at this critical point to ensure adequate depths to support berthing and landing & offloading of barges. This may require construction of a regulating dam further upstream or to utilize the proposed dam at Nyagatare. In other downstream sections of the Kagera, the regulating effect can be provided by the upstream satellite lakes and reservoir at Rusumo. Suitable provisions for cargo handling, storage, and interfaces with land-based transport will need to be considered at Kagitumba. Quays and jetties that allow safe berthing of vessels at any water level will also need to be designed. Other associated facilities such as lifting gear e.g. mobile or rail-mounted gantry cranes will also need to be provided.

The river also flows through several bends that may require re-alignment, e.g., in the section between Kakigitumba and Kakono. The interventions in such instances may take on the form of groynes, or special civil works to stabilize banks. In the some tight sections the river narrows considerably and in some cases a bifurcations are created especially near rapids. The first rapids are encountered at Amarum near Akagera National Park about 5 kms from the bridge at Murongo (Refer to figure12 & 13 respectively below).



Figure 12: Hippopotamus habitat adjacent to Kagera National Park



Figure 13: Bridge crossing at Murongo

The first rapids occur at Charliet about 10 kms below Kagitumba, at Kikagati and at Nsongezi (Figure 14, 15 & 16).



Figure 14: Wetlands and bends at Kikagati



Figure 15: Rapids at Kikagati & ruins of power house on left bank



Figure 16: Nsongezi rapids and bifurcation

There is some anecdotal evidence suggesting that these rapids can be crossed using light speedboats. The existence of what appears to be the ruins of a harbour facility at Nyakansi which was once known as Kyaka port is sufficient evidence to show that vessels once sailed along the river up to this point. However, navigation across the existing rapids with heavy barges is likely to necessitate extensive dredging works or construction of specially designed locks. Alternatively, various sections of the river may need to be classified differently i.e. based on cross section profiles of channels, bend radius, minimum depth, vertical and horizontal clearance so as to determine the required vessel sizes and permitted tonnage so as to ensure that river traffic conforms to the limitations imposed by the river. Between Kakono & Kyaka, the gradient reduces drastically as the river flows through Kishambi. The first meanders and extensive papyrus wetland are observed in the vicinity of Nyakanyasi up to the mouth near Kasensero. Cross-sectional profiles taken at Nyakanyasi indicate that the river width is approximately 100m while the depth ranges between 2-3m. Similarly, profiles taken at Kyaka show that the river width decreases to 50-70m while depths vary between 4-5m (ECA,1986).

The old bridge at Kyaka was destroyed during the war and all the debris was sunk in the river. It is important to ensure that this debris is removed as it is presently an impediment to navigation. A new bridge was constructed (Figure 17). The dimensions of all cross structures and variation of head-clearance with water level must be determined during detailed feasibility studies to ascertain whether modifications may be required.

The mouth of the river at Kasensero where it empties into lake Victoria also requires particular attention since it is prone to clogging by water hyacinth. Presently, the Aquatic Weed Control Project -Ministry of Agriculture Animal Industry & Fisheries (MAIIF) in Uganda has deployed weed harvesters to ensure that the waterway is periodically maintained (Figure18).



Figure 17: Kyaka Bridge



Figure 18: Water Hyacinth removal operations from the mouth at Kasensero

The effects of negative hydrodynamic conditions at the river mouth, on navigation are presently not clear. According to ECA (1986), the issues that need to be addressed include backwater effects, wave action at the mouth, flow conditions during flood, sediment transport and deposit

mechanisms. Once detailed studies at the mouth have been undertaken it may be necessary to construct specialized infrastructure to mitigate negative effects e.g. submerged barrage.

5.6 Navigation issues on Lake Victoria & existing port facilities

5.6.1 Lake Ports

Inland waterways are becoming increasingly important as major transit transport links in East Africa hence under the auspices of the EAC, Uganda, Kenya & Tanzania intend to invest in the improvement of the ports of Mwanza, Kisumu, Port Bell and Jinja on Lake Victoria. Detailed baseline information about the existing lake transport facilities, port installations and capacities of the lake ports of Lake Victoria is documented under KBO (1984). The facilities at Kisumu, Mwanza, Kemonondo Bay and Bukoba are of particular interest as potential traffic along the Kagera is likely to be channeled through these ports.

According to KBO (1984), the ferry terminal and ferry at Kisumu are well maintained. The water depth at Kisumu is between 2.5 and 3 meters. The terminal has the capacity to handle 3 million tons/day. Nautical chart No. 3252 illustrating the Lake Victoria approach to Kisumu through Kavirondo Gulf is also included in KBO (1984).

Mwanza has two lake ports that are separate and functionally different known as North Mwanza and South Mwanza respectively. A nautical chart illustrating their layout is included as an exhibit in KBO (1984). The port has a capacity to cope with freight traffic of around 120,000 -150,000 tons/year. Increase in transport volumes associated with the navigation project are likely to lead to a situation where the port is quickly saturated in which case a second ferry terminal might be required.

According to an illustration of the nautical chart for Kemonondo Bay in KBO (1984), the two ports of Bukoba and Kemonondo bay in the Kagera region of Tanzania are only 20 km apart. The Kemonondo Bay port fulfills the requirements for development of lake transport better than the port of Bukoba. Both ports can be compared to Mwanza in terms of capacity but their level of utilization is very low.

5.6.2 Navigation charts & aids

According to the project documents of the Project on Enhancement of the Safety of Navigation on Lake Victoria which are available from the offices of the EAC Secretariat at Kisumu, it is stated that in the past there were approximately 30 navigation aids in the form of visual marks with lights on Lake Victoria. Today there are virtually no aids to navigation on the lake as they have either disappeared or fallen into disuse due to poor maintenance or have been vandalized. The sailing directions (revised in 1972) are still being used but are rather outdated, so are the available navigation charts of the lake (last updated in 1956). In collaboration with the International maritime Organisation (IMO) and the International Hydrography Organisation (IHO), the EAC intends to implement a project to enhance safety on Lake Victoria. Under the hydrography component of this project, a total of USD 1.3 million has been budgeted for to carry out a number of intervention measures. Implementation of this project is still at early stages as funds are yet to be secured.

The Aids to Navigation component will seek to rehabilitate existing aids to navigation structures and establish new ones so as to enhance the safety of ships operating on the Lake. The

project will also update hydrography information i.e. nautical surveys and charts last created between 1900 -1906. This will involve comprehensive hydraulic surveys and charting of Lake Victoria, with a view to issue a complete folio of nautical charts and initiate training for hydrographers.

5.7 Foreseeable inter-basin traffic & competing transportation options

The preliminary navigability study of the Akagera (ECA, 1986) indicates that the project is likely to benefit 4 million people living around the hydrographical network of the river particularly along the Uganda-Tanzania border areas of Kagitumba, Nshongezi, Kishambi and the two Rwandan Prefectures of Byumba and Kibungo. However this estimate was largely based on 1978 census data from Rwanda and rough figures from Uganda and Tanzania. According to this study, foreseeable inter-basin traffic is likely to be influenced by implementation of KBO identified projects (KBO, 1982), and trade in agricultural & livestock products, fishing, manufactured products, agricultural inputs, fuel, spare parts and minerals e.g. tin and limestone. Agricultural statistics for food and cash crop production are relevant for purposes of assessing the value of goods likely to be transported. Some data was extracted from Agricultural Surveys undertaken in Rwanda in 1984 and included as an appendix to ECA (1986) but it is now considered to be obsolete and will need to be updated. Quantified estimates of the potential traffic that can be generated from development of navigation transport are provided under appendix 2 of ECA (1986) and also need to be reviewed as part of a detailed feasibility study.

Various statistics on goods transit, freight volumes and flows by Road/Rail from the ports of Dar es Salaam and Mombasa to Tanzania, Rwanda, Burundi, DR Congo and Uganda is available from various sources e.g. Tanzania Ports Authority, Kenya Railways Corporation and other publications e.g. ECA (1996), KBO (1991) and Hoffmann (2004). ECA (1986) also includes estimates of transit traffic between 1998-1993 for all the EAC members states and makes comparisons of transit times for various alternatives (road, rail ,lake) for the northern corridor. This information is useful as it has a bearing on the potential volume of traffic that can be diverted to the Kagera.

Having reviewed all the existing statistics, and publications, we find that the most recent studies that have indirectly addressed potential traffic on the Kagera River to-date are the Kagera Railway Basin Studies (KBO, 1991). Although these studies conducted an exhaustive feasibility study for development of a railway system for the Kagera basin, the cost effectiveness of the inland water transport option along the Kagera was not evaluated as one of the competing transportation options. However, the study particularly assessed the potential volume of traffic between Kemondo Bay – Mwanza and the rail/roalink from Mwanza via Tabora to the port of Dar-e-salaam (refer to Figure 19 below). It estimated that 26,300 tons and 16,500 tons of imports and exports could be transported along this route respectively in 1989. Future traffic volume for the years 2000 & 2020 was projected based on projected socio-economic development of the region, agricultural production, potential mining production within all the Kagera basin constituent countries, road surveys, statistical bulletins and year books published by railway and port authorities and from various agencies concerned with transport on the lakes. If we assume that the traffic along the proposed railway linking Kemondo bay to Rusumo Falls and road link to Kigali can potentially be diverted to the Kagera then the following figures derived from traffic density charts are applicable according to KBO (1991).

Table 2: Projected Lake Traffic volumes (KBO, 1991)

Route	Year 2000		Year 2020	
	Imports (tons)	Exports (tons)	Imports (tons)	Exports (tons)
Kemondo Bay - Kisumu	313,000	36	390,000	52,000
Kemondo Bay - Mwanza	178,000	94	339,000	303,000
	491,000	130,000	729,000	355,000

These projections indicate that a total foreseeable traffic of about 1,084,000 tons can potentially be diverted to water transport along River Kagera by the year 2020. The validity of assumptions made and accuracy of these projections needs to be confirmed at the detailed feasibility study stage. The annual benefits derived from cost savings and reduction of transport costs and revenues from freight transport arising out of realizing the Navigability Project will also require to be demonstrated. A cost benefit analysis will also be useful after determination of the investment requirements with a view to evaluate the project for economic and financial viability. The analysis should also include a comparison against the following competing projects. These are:

- a) Road-Rail link between Kemondo bay - Rusumo Falls – Kigali – the rail link has not been constructed up to today but is a principal competitor to the navigation project. Detailed feasibility studies, (KBO, 1991) illustrates that the recovery of the capital expenditures associated with this project cannot be recovered within 20 years of line of commissioning. If the funds required to construct this project were to be borrowed, then the debt burden would be far greater than the net income for operating the railway. However the study demonstrated that the project would contribute significantly to the economy of the basin and that it was justifiable to solicit the funds. The project involves expensive tunneling on some sections of its alignment.
- b) Proposed Kampala Kigali Pipeline
- c) Kyaka – Bukoba (Kemondo Bay) – Biharamulo Lushanga Road. The present status is that this road is not yet paved. The national plans indicate that the road will be paved from 2009-2011.
- d) Kagitumba – Nsongezi- Kyaka - Bukoba Road – The section between Mutulula-Kyaka-Bukoba has already been paved. The second section linking Kyaka to Kagitumba is graveled but poor in some stretches. This road is so important. When completed, it will be a key competitor to the navigation project. The feasibility study should determine whether road traffic can coexist with river transport or whether the two are mutually exclusive.
- e) Rulenge Bugene – Kyaka - Bukoba highway. The section Bugene- Kyaka potentially links the rich agricultural areas of the right bank of the Kagera but it is not paved.
- f) Murongo-Bugene highway
- g) Kayonza Kagitumba Highway

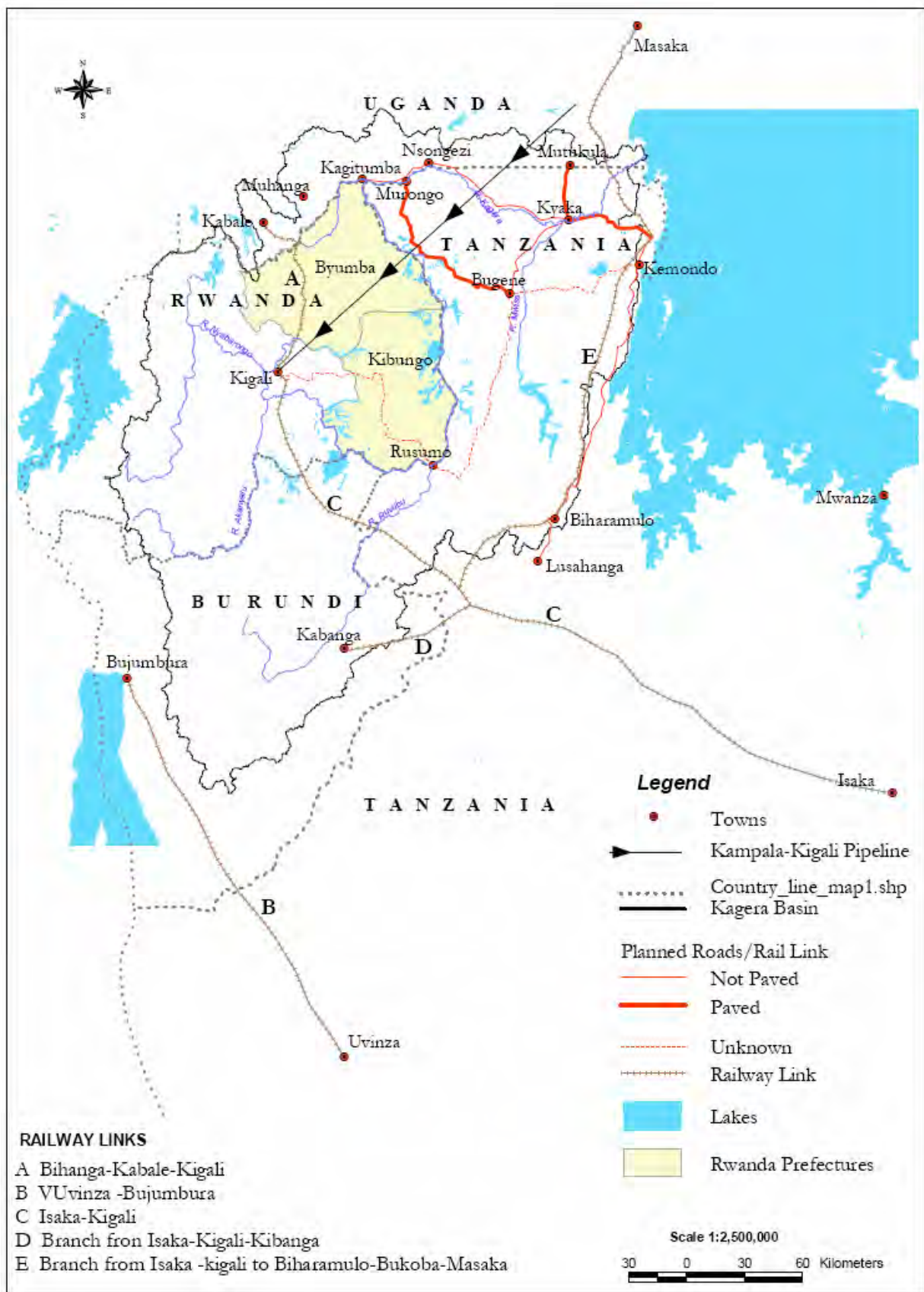


Figure 19: Competing transportation options

- h) Under the auspices of NEPAD, some new additional projects have been identified that may have a bearing on the navigation project. Member countries identified the need to undertake a Pre-feasibility study of TAZARA/TRC-Burundi-Rwanda-DRC-Uganda railway and also construct a road from Dar-es-Salaam-Dodoma-Isaka-Mutukula-Masaka to linking Tanzania and Uganda.
- i) According to the interim Report of the EA Railways Master Plan Study (EAC, 2008) to the following railway sections have been proposed in the Interim East African Railways Master Plan (Table 3).

Table 3: Proposed railways sections (EAC, 2008)

Country	Name of Railway Section	Length (km)
Uganda/Rwanda	Bihanga-Kabale-Kigali	300
Tanzania/Burundi	Uvinza-Bujumbura	300
	Isaka-Kigali	450
	Branch from Isaka-Kigali- Kabanga	100
	Branch from Isaka-Kigali to Biharamulo-Bukoba- Masaka	300
Total- KM		1,450

Source: Interim East African Railways Master Plan (EAC/CPCS Transcom Int. Ltd, Jan. 2008)

A comparison of the operating costs for rail, lake ferry and road transport is included in the economic evaluation presented under the Kagera Railway Basin Study and will need to be updated as part of detailed feasibility studies. The analysis at the time illustrated that the operating costs (cost per ton-km) of lake ferries between Kemono Bay and Mwanza and Kemono Bay and Kisumu are very low when compared to the other options. Similar operating costs for river transport along the Kagera between Kemono Bay and Kagitumba need to be determined. The main benefits accruing out of making the necessary investment for the economies of the countries involved can be regarded as

- savings in transport cost
- Distance savings and related physical and non physical Barriers: For traffic destined for Rwanda and Burundi from Kisumu, by use of Kagera River, the traffic will avoid about 700km of road transport with its associated physical and non-physical transit transportation barriers. The road network can benefit in terms of avoiding the damage that would be made by the traffic that is diverted to the lake/river transport network up to Kagitumba.
- stimulation of the economic development as a consequence of introducing a new transport route
- opening up of new opportunities for marketing products, stimulation of growth of market-oriented agriculture, greater exchange of products within the basin
- generation of employment as a result of project realization
- higher transport reliability for the landlocked Kagera Basin on account of alternative outlets to the ports on the Indian Ocean, being created by the new link along the Kagera River region

During the detailed feasibility studies, it will be critical to establish the extent of competitiveness of navigation transport on the River against the alternative road and rail options. However we

are of the opinion that if all the competing projects are completed ahead of schedule of the navigation project, it may be overtaken by other initiatives in the rail & road sector and may be difficult to justify.

5.8 Review of TOR for a Feasibility Study for Navigability of Kagera River

During stakeholder consultations with the Ministry of Infrastructure of the Republic of Rwanda (MINIFRA), it was established that a similar initiative to this assignment is in advanced stages of implementation with funding from the East Africa Trade & Facilitation Project (EATTP). On 25th July 2008, MINIFRA issued a call for Expression of Interest (EOI) to eligible consultants interested in carrying out a feasibility study for navigation along the Kagera. The deadline for submission of expressions of interest was stated as 28th August 2008. According to the EOI documents, the main objectives of the consultancy services are:

1. To assess the techno-economic feasibility for developing the inland water transport system;
2. To determine environmental and social impacts of the inland water transport
3. To determine the legal, multinational and institutional constraints and operational modalities for developing the navigability on the River Akagera to make an interface with other modes of transport directly linked to Lake Victoria.

In line with the objectives listed above, the proposed study is to be undertaken under four work packages (WP) defined as follows over a period of one year:

- I. Assessment of legal, multinational agreements and institutional framework for transport operations on the River Akagera;
- II. Preliminary Engineering Designs for the navigability of the River Akagera;
- III. Assessment of the Techno-economic feasibility for the transport initiative;
- IV. Determination of environmental and other social Impacts of the project.

The TOR proposed by the Ministry of Infrastructure of the Republic of Rwanda (Annex 6) are comprehensive and cover most of the tasks required to accomplish the four work packages but having reviewed all the existing baseline information it is clear that they could be improved or focused so as to be more responsive to existing information gaps identified under the preceding sections of this report.

For example, under work package (I) prospective consultants will be required to review all existing IWT policies and institutional frameworks, assess feasibility of private sector involvement. The consultant will not be specifically required to prepare proposals on rationalizing and harmonizing the existing Water Transport legislation and policies yet this is key gap that has been identified in our literature review. Recognizing that there are no multilateral agreements dealing with navigation on the Kagera River that specifically provide for freedom of navigation; equal treatment; multilateral treatment of cargo; regulation of navigational and port services; and specific protocols on navigational river safety, environmental protection and inland customs procedures; our own assessment indicates that it would be preferable to execute work package (I) as a separate stand alone component of a much larger undertaking that would address many other gaps such as the structure, human resources and training needs, functions of the required regulatory organ for IWT along the

Kagera & Lake Victoria, e.g. Permanent High Level Standing Committee viz a viz a Lake & River Navigation Commission, role of the Infrastructure Directorate of the EAC Secretariat etc.

Work Package (II) – Preparation of engineering designs is likely to be constrained by the lack of hydrographic data and paucity of hydrological information. Our findings indicate that it would be advantageous if this task is delayed pending the execution of another component designed to generate hydrographic information, longitudinal profiles and characteristic levels and flow velocities along the river between Kagitumba and the mouth of the River at Kasensero. The TOR for work-package (II) assume that this information is readily available and that it will be obtained from various government agencies at the prospective consultant's cost yet this is not the case.

The TOR prepared by the Ministry of Infrastructure of the Republic of Rwanda are completely oblivious to the projects likely to have a bearing on Navigation Transport that are discussed under section 5.4 of this report. Consequently prospective consultants may not be required to evaluate the regulating effect of proposed projects for construction of dams or the disruptive effect of large scale withdrawals of water for agricultural use. Whereas the analysis of development scenarios within a basin DSS framework will be undertaken at a later stage by the Kagera Integrated Water Resources and Management Project, it would be a useful output for prospective consultants to consider in terms of implications to engineering design.

Under work package (III), assessment of the techno-economic viability of the project will be incomplete unless issues associated with safety of navigation of Lake Victoria and refurbishment of lake ports are taken into account within the analysis. We are of the view that the TOR should be broadened such that assessment of viability of the navigation project includes analysis of the competing projects identified under section 5.7 of this report. It is critical to demonstrate the annual benefits, cost savings and reduction of transport costs and superior revenues from freight transport arising out of realizing the Navigability Project as opposed to the other competing projects. Such analysis will help decision makers in the transport sector to prioritize and harmonize the competing transportation interventions and possibly demonstrate that that the operating costs (cost per ton-km) of lake transport and the associated investment costs are superior to other competing alternatives.

6 PROPOSED AMENDMENTS TO EXISTING TOR & WAY FORWARD

The ongoing initiatives concerning studies to investigate the navigability of the Kagera within the Ministry of Infrastructure and Transport (MINIFRA) of the Government of Rwanda and NELSAP must be harmonized to avoid duplication. One method of initiating synergy is to propose amendments to the TOR prepared by MINIFRA based on the findings of this study. Once the TOR and key project components have been harmonized and agreed upon by the PMU of the Kagera Project & MINIFRA, then all parties should create a pool of resource information for prospective consultants to refer to during preparation of proposals. This information should include all the documents compiled and reviewed under this assignment.

It is also important to note that due to the trans-boundary issues associated with the nature of the project, its implementation should be consultative within the existing EAC & NELSAP framework. Uni-lateral implementation is likely to be constrained by other conflicting basin projects and riparian country interests. We are of the view that it is more appropriate to change the conceptualization of the initiative for development of river transport on the Kagera to a development program with a number of overlapping constituent projects as follows:

- Policy & Institutional framework study
- Hydrography and supplemental surveys study
- Preparation of engineering designs
- Assessment of technical and economic viability
- Environmental; and socio-economic assessments
- Institutional support and strengthening component

Each of these components and associated TOR are discussed below:

6.1 Policy & Institutional framework study

We propose that TOR proposed by Ministry of Infrastructure be supplemented as follows:

The study will review the national policies of Kagera basin countries Tanzania, Uganda, Burundi and make appropriate recommendations with regard to issues that need to be harmonized. Recognizing that there are no multilateral agreements dealing with navigation on the Kagera River that specifically provide for freedom of navigation; equal treatment; multilateral treatment of cargo; regulation of navigational and port services; and specific protocols on navigational river safety, environmental protection and inland customs procedures: - the consultants shall propose an appropriate regulatory framework and draft an appropriate transit agreement which is consistent with other existing arrangements e.g. corridor management agencies and infrastructure directorate of the EAC. Such an agreement or protocol would enjoin the

beneficiary countries to cooperate in the operation of lake and port services, facilitate adoption of a uniform system of navigational charts and aids, and sharing of information on pollution.

Other issues to be addressed include the structure, human resources and training needs, of a regulatory organ for IWT along the Kagera & Lake Victoria.

6.2 Hydrographic & other supplemental surveys

We propose that TOR for preliminary investigations for a) field surveys and investigations, b) climate topology and land-use, etc. be adopted in their entirety but also be strengthened to dedicate time and effort towards generation of key data that is presently not available. The objective of this new undertaking is to carry out the necessary supplemental hydrographical surveys and investigations required prior to execution of feasibility studies for development of the Kagera waterways. This will involve generating data related to sediment, water quality, river levels at un-gauged locations etc. This data will be consolidated with other existing climatological, land-use, topographical and geological information. The expected outputs are:

- Drawings of longitudinal profile with characteristic water levels of the waterway at a scale of 1:100,000 and sounding information showing depth at several locations; accurately determining the existing channel widths; inclusive of the type of waterway bed material.
- Nautical charts
- Extent of water hyacinths narrowing or blocking the waterway and the volume of plants being transported in respective stretches of the waterway and advise on possible mitigating measures
- River flow data and water level (including peaks, annual and seasonal variations), along un-gauged sections of the river. River levels should be generated by applying a suitable hydrologic and hydraulic model. This will also involve simulation of hydrodynamic conditions at the mouth (backwater effects, wave action, impact of Lake Victoria Water levels, flow conditions during floods, sediment transport and deposit mechanisms).
- Identification and assessment of existing navigational constraints e.g. bridges, rapids, bends including limitations as a result of natural variation of water depth over the year

Studies on climate change and Inland Water Transport on the Kagera should also be integrated at this stage. The impact of long extended droughts on water levels should be quantitatively estimated with a view to

analyzing navigable depths of at all reaches. Such evidence may support the need to adjust barge draught dimensions and design to the river conditions and not vice-versa.

Based on the findings the consultant will be required to prepare detailed technical planning parameters on the basis of the results of the field surveys and modeling works conducted. It would be desirable to synergize the hydrographic surveys with the proposed initiative under the EAC that is intended to update the nautical charts and sailing directions for Lake Victoria.

6.3 Preparation of preliminary engineering designs

We propose that the TOR proposed by the Ministry of Infrastructure (MINIFRA), pertaining to production of engineering designs be adopted in their entirety. We propose to include the following paragraphs to strengthen the scope:

The preparation of engineering designs should also include assessment of volumes and costs for deepening or widening the waterway in accordance to the design and determination of the frequency and level of future interventions required to maintain the river channels in a navigable state especially at the mouth. Preparation of preliminary engineering designs will also include other cost estimates covering the following additional items:

- a) capital and maintenance cost of river development (protection works for strengthening of river banks, improvement of structures and removal of obstacles that hinder navigation)
- b) capital and operating cost of terminals and vessels
- c) design of the cargo and passenger handling facilities
- d) specification of appropriate vessel characteristics that suit the peculiarities of the river systems .

Prior to preparation of engineering designs the consultant will take into account other potential basin projects that can have an impact on the river water levels. These include proposed dams at Nyagatare, Kikagati, Nsungyezi, Kakono, Kishanda and any other large disruptive large scale withdrawals of water from the main river. The consultant will be required

to quantify the impacts of these projects and incorporate mitigation measures into the design.

6.4 Assessment of technical & economic viability

The TOR proposed by MINIFRA under work package III are comprehensive and should be adopted as they are. However, we propose to widen their scope as follows:

The consultant should include analysis of the competing projects in order to demonstrate the annual benefits, cost savings, reduction of transport costs and superior revenues from freight transport arising out of realizing the Navigability Project. Some of the competing projects are:

- Proposed road-Rail link between Kemondo bay - Rusumo
- Proposed Kampala-Kigali pipeline
- Kyaka - Bukoba (Kemondo Bay) - Biharamulo Lushanga Road.
- Kagitumba - Nsongezi- Kyaka - Bukoba Road
- Rulenge Bugene - Kyaka - Bukoba highway.
- Murongo-Bugene highway
- Kayonza Kagitumba Highway
- Air transport

The analysis should be able to demonstrate that that the operating costs (cost per ton-km) of river/lake transport and the associated investment costs are superior to the competing alternatives.

6.5 Environmental Impact Assessment (EIA) studies

During the stakeholder consultation workshop, many participants felt that the TOR proposed by MINIFRA were not comprehensive enough with regard to the need to carry out a comprehensive EIA. In line with the comments received, during that workshop, we propose to complement the TOR proposed by MINIFRA under work-package 4 by appending the following paragraphs:

Supplemental Environmental Impact Assessment: the purpose of the work is to determine the environmental consequences of the proposed navigability project based on the findings of the detailed feasibility studies and proposed design. Prospective consultants will be required to discuss the policy, legal and administrative framework within which the EIA is to be carried out and take into account requirements to be met by potential financiers and any relevant international agreements to which each riparian country of the Kagera basin is a party. The key components

of the EIA will be scoping, describing the affected environment, determination of environmental consequences and formulation of an Environmental Action Plan. Other key tasks will include determination of the geographical area of influence of the project and consultations with local authorities and communities.

Baseline description of existing environment: A baseline description of the existing environment in the assessment area will be required. The information to be generated will include:

- terrestrial physical environment, watershed hydrology, terrestrial biological environment, species at risk and their habitats (flora and fauna), species migratory patterns, ecologically sensitive or significant areas e.g. Hippopotamus breeding areas, and protected areas or important habitat features. Migratory bird descriptions will include discussion of areas that species typically use for nesting, foraging, and/or staging; characterization of wetlands; aquatic physical environment (freshwater, estuarine, and marine), including bathymetry/geomorphology, hydrodynamics, water quality, sediment and riverine limnology, including fish habitat, fishery resources, and seasonal variations of fishing activities.
- Characterization of the ecosystems in terms of their response to change and capacity to withstand stress

Cumulative Impact Assessment: Over time, the incorporation of hydraulic structures designed to improve navigability of the River has the potential to cause changes in river hydrology and modification of physical processes such as sediment transport and biological processes such as changes in fish habitat, hindrance to fish passage. Hydro-morphological alterations to the river e.g. removal of rapids, construction of locks and estuary structures, and construction of river training structures is likely to be a source of controversy. Predictions will therefore be required to be made about the nature, magnitude, duration, frequency, geographic extent and reversibility of the effects of such large scale civil engineering works. During the scoping stage, future projects and activities that can potentially be implemented in combination with the navigability project will be identified and characterized for consideration in the analysis of the contribution of the project to cumulative environmental effects.

Analysis of alternatives: systematically compare feasible alternatives to project designs for enhancement of river transport, technologies, and operation-including the "without project" scenario - in terms of their potential environmental impacts; the feasibility of mitigating these impacts; their capital and recurrent costs; their suitability under local conditions and their institutional training and monitoring requirements. For each of the alternatives, quantify the environmental impacts to the extent possible and attach economic values where possible.

Environmental Action Plan (EAP): The EAP document will consist of the set of mitigation, monitoring, and institutional measures to be taken during implementation and operation of the project to eliminate adverse environmental impacts, offset them, or reduce them to acceptable levels. Proposals for monitoring and evaluation should specifically incorporate Telemetric systems and information services for inland navigation - known as River Information Services (RIS) - to increase the safety and efficiency of navigation transport.

6.6 Social Impact Assessment (SIA) studies

During the stakeholder consultation workshop that was held in Bujumbura on 27th November 2008, the Social Development Officer from NELSAP, noted that the TOR proposed by MINIFRA do not adequately define the scope of work, tasks and activities required to carry out an appropriate Social Impact Assessment study for the proposed navigability project. We concur with this observation and therefore propose the following addenda to be included in order to address this gap;

Supplemental Social Impact Assessment - the purpose of the work is to assess the cumulative impact of the proposed navigability project on the communities located within its area of influence, including plant sites, transportation routes, and raw material sourcing areas.

- **Baseline information**: - Using available secondary data sources as well as standard representative sampling and rapid assessment methodologies for collection of primary data, establish a social baseline that includes the following components:
 - Projects area of influence. Determine and justify the specified area of influence of the proposed navigability project. The area of influence will encompass the areas that are envisaged to be directly affected by the study i.e. Kagitumba, Kyaka, Murongo,

Kikagati, Kasensero Byumba and any neighboring areas in which populations are settled or on which populations are depended for their livelihoods.

- Community profiles. Describe the characteristics of each community/settlement located within the project's area of influence including: name and location of community, size, housing and landownership patterns, ethnic composition, education levels, socio-economic status, age and sex distribution, local and traditional decision making structures. Include maps of the salient features of the project area of influence.
- Livelihood systems. Describe the patterns of employment and productions systems of communities in the project area. How do people (both men and women) in these communities make a living? What are their various sources of income and employment during the year? What are the average wage levels in the area for these activities and the average income levels of these households? To what degree are households dependent on access to communal land or activities related to natural resources such as wetland utilization, fishing, grazing, gathering of forest and national parks products etc.
- Social Services and Infrastructure. Describe the existing social services and infrastructure available to communities within the project area including access to: health care, education, water supply and sanitation, waste treatment and disposal, housing, electricity, markets, transport and roads, communication and credit facilities.
- Public Health. Provide baseline information on community health within the project area of influence. Survey information should include a description of the general health and well being of local population; information on endemic diseases and incidence levels; birth rates; rates of morbidity and mortality; infant and maternal health; nutritional status; and prevalence of sexually transmitted diseases, AIDS and alcoholism among the local population.

- Generate health profile with prevalent diseases in the project affected zone through secondary sources
- categorize all the above data under various vulnerability classes present in the affected population
- Assessment of Impacts. Provide a description of the activities to be undertaken based on the detailed feasibility studies and engineering designs; that are likely to have an impact (positive or negative) on the social baseline conditions described above. For example, describe the impacts of the acquisition, of land for project facilities, construction of inland ports, disposal of wastes, increase of river transport, influx of foreign workers, increase in formal and non-informal trade etc. Provide maps that indicate the location of the proposed facilities in relation to communities and land areas/natural resources used by them. Particular attention should be given to the following:
 - Impacts on public health related to possible spills, emissions and wastes generated by facilities related to inland water transport
 - Impacts on public health and safety related to influx of construction workers and increased river traffic on the river and other adjoining road networks
 - Impacts on employment patterns as a result of direct and indirect job creation by the construction and operations of the project or potential job losses resulting from realization of the project(e.g. tourism)
 - Impacts on the livelihood of people living in the projects area of influence who are dependent on natural resources for their livelihoods (e.g., fishermen, farmers, ranchers)
 - Impacts of projected demand for goods, agricultural produce, minerals, and other goods arising out of realizing the navigability project.
 - Impacts of removal of bridges deemed to be a hindrance to navigation
 - Quantification of potential benefits to communities in monetary terms
 - To assess the type, nature, extent, degree of impact of the proposed project components on various sections of the society

In addition, the opinions and attitudes towards the project held by the communities that make up the sample for the SIA should be recorded.

- Identification of Mitigation measures: For each of the social impacts identified, describe what actions will be taken to minimize negative impacts on communities in the project area and to minimize disruption in their daily lives. Describe the linkages with other social or community development programs currently operating in or around the project's area of influence. Explore the possibilities of support for new programs or expansion of existing ones to meet the development priorities of the communities. Finally a Social Economic Action Plan will be prepared.
- Public Consultation : Public consultation is an essential aspect of the assignment. The following are indicative methods and tools which can be used for undertaking the surveys : expert and key informant interviews, Focus groups discussions, beneficiary assessments, rapid and participatory rural appraisal, gender analysis, interviews, questionnaires, field survey instruments and checklist for data collection and discussions. Discussions with relevant government officials, local elected representatives, other institutions and organizations in the civil society, should be participatory and broad-based.
- Applicable policies and guidelines: the entire SIA study has to be carried out within the applicable guidelines of the riparian countries of the Kagera basin or the EAC. The consultant will be required to discuss the policy, legal and administrative framework within which the SIA will be conducted.

6.7 Institutional support & strengthening

The component for institutional strengthening will target the inland navigation institutional framework and structures that will be recommended after the completion of Component 6.1. The issues to be addressed in this component will include the following

- support required to set up of training and naval accreditation systems,
- support required to maintain the navigation infrastructure,
- establishment of navigation aids
- Implementation of a River Information System designed to monitor and enhance safety and efficiency of navigation transport.

- Support towards review and implementation of an oils spill and toxic chemical contingency plan

6.8 Amendments to staff requirements

We propose that in addition to the Key personnel proposed under the TOR commissioned by MINIFRA, the following disciplines be included:

- Wetland Ecologist/Senior Environmental Scientist with extensive experience in conducting In Land Transport EIA assessments
- Sediment modeling and hydrodynamic modeling expert
- Hydrographer - The Hydrographer shall have at least 15 years experience in the field relevant to the assignment. The Hydrographer shall have a University Degree and experience in planning and execution of field surveys and the evaluation of survey data towards the formulation of design criteria, in particular for training works, of waterways for commercial navigation in the confines of river systems.
- Naval Architect -The Naval Architect shall have at least 15 years experience in the field relevant to the assignment: The Naval Architect shall have a minimum of an MSc in Architecture, and experience in design and construction supervision of commercial cargo vessels for the navigation in coastal waters and for river transport. The expert shall have particular experience in the planning of shallow draft vessel systems optimised for commercial river navigation.
- Fisheries Experts -The Fisheries Expert shall have at least 15 years experience in the field relevant to the assignment. He/she shall have a minimum of an MSc in Biological Sciences and experience in planning and execution of fisheries management for commercial and subsistence fisheries in the confines of river systems and/ or any other water bodies.

6.9 Man Month Requirements

From the above, it is evident that the 12 man-month estimate for the assignment envisaged by MINIFRA is on the lower side. An 18-24 man-month effort appears to be more realistic based on the proposed amendments to the TOR.

7 FUNDING MODALITIES

7.1 International Agencies

Within the East Africa sub-region, the World Bank is currently implementing the Northern Corridor Transport Improvement Project aimed at facilitating international transport operation in the Kenyan section of the corridor, which provides access to Uganda, Rwanda, Burundi and the eastern Democratic Republic of the Congo. The project includes infrastructure rehabilitation as well as support to streamline transit procedures and transport regulations, and a component to address HIV/AIDS transmission along the corridor. Most recently, on 2 March 2004 the three member States of the East African Community signed a customs union protocol and are now working with the World Bank to implement the agreement. The EU and several individual countries are also assisting.

EAC member countries, and the other landlocked countries of the great Lakes region have also approached the World Bank and the African Development Bank to solicit their financial assistance for a trade and transport facilitation project. Hence the Institutional Support for East Africa Trade & Transport Facilitation Project which is co-financed by ADF & World Bank was conceived to support trade growth in the region. The grant is specifically financing the institutional support for the establishment of the EAC customs union, the strengthening of the Northern Corridor Transit Transport Coordination Authority, and the establishment of the Central Corridor Transit Transport Facilitation Agency. The project could be financed within this existing framework.

According to the project documents for this project, substantial investment has been allocated for improvement of inland water transport within the region. Funds have been earmarked for the improvement of inland ports, such as Bujumbura, as well as Inland Dry Ports and Container Depots in Nairobi, Kisumu, Eldoret, Kampala and Kigali. In the case of Kampala, a need to develop an inland port as a common user facility to which goods can be consigned from overseas and from which goods can be shipped to overseas destination is mentioned as one of the priorities. A total of US\$ 2.5 million will be allocated for improvement of Inland Container Depots, while the Kampala Inland Port will require approximately US\$ 15 million for its development.

The project documents for the program for improving transport infrastructure and facilities for the Northern Corridor (Aug. 2006) explicitly indicate that the navigability of Akagera River is one of the options that will be explored. Funds to the tune of US\$ 250,000 have been budgeted to purposes of undertaking the necessary studies.

The contribution from Regional Economic Communities e.g. NEPAD, CEPGL, EAC and SADC (RECs) are also equally possible. The SADC transport investment forum held in Windhoek, Namibia, in April 2001 and more recently the donors conference organized by the East African Community (EAC) in April 2003 are a clear testimony of their resolve to support new strategies for mobilizing investment for transit transport infrastructure maintenance, rehabilitation and upgrading.

7.2 Bilateral & Individual Government Funding

Individual riparian Governments have the capacity to contribute towards the implementation of this project through their own budget support mechanisms within the Ministries of Infrastructure or Roads Transport & Communications. However whereas the Government of Rwanda has placed a high priority to the project and is capable of providing matching funds to donor support, Uganda and Tanzania accord a very low priority to the project.

7.3 Public-private partnerships

The latest trend in transit transport infrastructure financing and management is characterized by emerging new partnerships between the public and private sectors resulting in increased private sector participation in policy dialogue, system design and programme implementation. For example, TTCA has the Northern Corridor Stakeholders Forum, which brings together port authorities, customs, freight clearing and forwarding companies, railway corporations, road carriers, shipping companies and shippers, as well as government agencies. Such partnerships present opportunities for in mobilizing investments and technical capacity to develop and maintain road, railway, port and inland waterway infrastructure.

Possible types of Public private sector partnerships include:

(i) Build Operate and Transfer (BOT): This is an example of where the private sector builds the infrastructure such as a road bridge, operates it in order to recoup the funding through tolling or shadow tolling and transfers it to Government as soon as the invested funds are recouped. BOT works best when the volume of traffic is high enough to guarantee sufficient returns to the private investor in the shortest possible time. The extent to which high volumes of traffic will be diverted to the navigable river to enable faster recouping of funds by the private sector needs to be established when traffic studies are carried out at the feasibility study phase.

III) Concessions, Management and Lease Contracts - The Public-Private Partnership (PPP) envisaged could take the form of either Management and Lease Contracts or Concessions or a combination of both depending on whichever will be found most feasible at the feasibility study phase. The two types of PPPs are briefly described:

(ii) Concessions: Take place when a private entity or a public-private joint venture builds and operates an infrastructure project for the period specified in the contract. The ownership of the infrastructure project usually returns to the public sector at the end of the concession period.

(iii) Management and Lease Contracts: In this type of contracts a private entity takes over the management of a state-owned project for a given period. The project is owned by the public sector and investment decisions and financial responsibilities also remain public.

ANNEXES

A.1 LIST OF DOCUMENTS REVIEWED

- African Development Fund. (2006). East Africa Trade and Transport Facilitation Project. Appraisal Report.
- BRL Ingenierie (2007). Kagera River Basin Monograph Report
- Chowdhury, A.K. and Erdenebileg. (2006). Geography for development. A case for land locked countries. United Nations Office of the High Representative for the Least Developed Countries, Land Locked Developing Countries and Small Island Developing States (UN-OHRLS).
- COMESA, 2000. The Great Lakes Railway- Alternative Transportation options for the Great Lakes Countries of Rwanda, Burundi and Uganda.
- COWI (2005). Lake Victoria Water Quality & Limnological Study
- COWI Uganda, 2007. Development of Kagera River Basin Transboundary Cooperative Framework and Management Strategy in four Riparian countries of Burundi, Rwanda, Tanzania and Uganda- Final Report: Draft – December 2007.
- East African Community/CPCS Transcom Int. Ltd, 2008. East African Railways Master Plan – Interim Report, January 2008.
- East African Economic Community. (July 2006). Protocols and other Tripartite Instruments.
- Economic Commission for Africa, 1986. Navigability of River Kagera Study: Multinational Centre for Project Planning Implementation (MULPOC- Gisenyi).
- Economic Commission for Africa, 1997. Study on harmonization of transport policies of the CEPGL states.
- Final Report of the Eastern Africa Ministerial Conference on the New Partnership for Africa's Development (NEPAD). March 2002.
- Haguma, D. 2007. Development of hydrologic model of Kagera River basin. MSc Thesis WSEHI. 07-01, UNESCO-IHE Institute for Water Education, Delft, the Netherlands.
- Hoffman (2004), Integrated Framework- Rwanda Diagnostic Trade Integration Study (DTIS) – December 2004.
- MOWTC/IDC, 1997. Uganda-Inland Water Transport Study (Oct.1997)
- MOWTC. 2005. Uganda's National Transport Master Plan Study Report: March 2005

- Nile Basin Initiative, 2001. Nile Equatorial Lakes Subsidiary Action Program (NELSAP) – May 2001.
- Nile Basin Initiative, 2004. Kagera River Basin Transboundary Integrated Water Resources Management and Development Project (KRBTIWRMDP) – Sept.2004
- Nzeyimana, L. 2003. Rusumo Dam Social Challenge in Kagera River Basin – Participation of affected people- M.Sc. Dissertation in Water Resources and Livelihood Security- Linkoping University, Sweden.
- Norconsult A.S. and Electrowatt. April 1976. General Agriculture. Kagera River Basin Development Phase II. Burundi – Rwanda – United Republic of Tanzania. Sectoral Studies. Technical Report, Volume 4. Report prepared for the United Nations acting as executing agency for UNDP.
- Norconsult A.S. and Electrowatt. April 1976. Kagera River Basin Development, Phase II – Prefeasibility Studies, Kagera River Hydropower Developments, Rusumo Falls Hydropower Project, Kishanda Valley Hydropower Project, Kakono Dam Hydropower Project.
- Norconsult A.S. and Electrowatt. December 1975. Hydrology. Kagera River Basin Development Phase II, Burundi – Rwanda – United Republic of Tanzania. Sectoral Studies. Technical Report, Volume 6. Report prepared for the United Nations acting as executing agency for UNDP.
- National Transport Master Plans for: Burundi, Rwanda and Tanzania and Feasibility Study Reports for Railways, Roads and Inland Water (Lakes & Rivers) Projects for improving transport in the River Kagera Basin (Burundi, Rwanda, Tanzania and Uganda).1990-2007
- SNC-Lavalin International Inc. February 2007. Strategic/sectoral, social and environmental assessment of power development options in the Nile equatorial lakes region. Nile Basin Initiative, Nile Equatorial Lakes Subsidiary Action Programme.
- Tahal, 2005. Uganda's National Transport Master Plan Study Final Report: March 2005
- UNDP/Kagera Basin Organisation, 1982. Development Programme of the Kagera Basin Final Report – Executive Summary.
- UNDP/KBO, 1982. Development Programme of the Kagera Basin Final Report Volume 4- Transport – 1982
- UNDP/Kagera Basin Organisation, 1991. Development Programme of the Kagera Basin Final Report – Railways Studies.
- WMO, 1974. Hydrometeorological Survey of the Catchments of Lakes Victoria, Kyoga & Albert – Meteorology and Hydrology of the Basin
- WMO, 1982. Hydrometeorological Survey of the Catchments of Lakes Victoria, Kyoga & Albert – Part II. Meteorology and Hydrology of the Basin

A.2 LIST OF PERSONS CONSULTED

Name	Designation
Mr. Nabide Isa Kiti	Project Manager -PMU-KTIWRMP
Dr. Nicholas Aza	National Liaison Officer – Uganda
Mr. John Ogwang	Regional M&E Specialist - NBI
Mr. Jackson Kitamirike	NBI Focal Point Officer – Uganda
Mr. Jackson Twinomujuni	Assistant Comm. Water Resources - Regulation, Directorate of Water Development, Uganda
Mr. Fred Kyosingira	Member of Regional Project Steering Committee – Uganda
Eng. Henry Bidasala Igaga	Member of Regional Project Steering Committee – Uganda
Dr. Callist Tindimugaya	TAC Member - Uganda
Eng. Dominique Kavutse	Member of Regional Project Steering Committee – Uganda
Antonie Sendama	Regional Coordinator, NELSAP. Kigali
Jean Marie Mushinzimana	Water and Sanitation Policy Lead Ministry of Natural Resources, Kigali, Rwanda.
Yusuf M. Murangwa	Director Economic Statistics–National Institute of Statistics of Rwanda
Rao Kamavarapu	Transport Economist (International Expert)–MINIFRA, Kigali Rwanda
Eng. Mohammed Badaza	Project Manager, NELSAP/SIO-MALABA-MALAKISI
Phocas Niyoyita	Road Engineer- MINIFRA, Kigali, Rwanda
Eva Paul	External Links and Donor Coordination – MINIFRA, Kigali, Rwanda.
Dr.Muhabul Bari	International Expert on Transport Infrastructure– MINIFRA, Kigali, Rwanda
Meraji O.Y.Msuya	Deputy Executive Secretary, Lake Victoria Basin Commission
Aloysius Mpirirwe	Immigration Officer- Kikagati/Murongo- Tanzania/Uganda Border
Bencolias Tinkaligaire	Transport Economist, TANROADS- Dar es Salaam, Tanzania
Patrick Safari	Director Planning Ministry of Natural Resources, Rwanda
Jacqueline Nyirakamana	NBI National Officer- MINIRENA-Rwanda
Deo Mbeshherabusha	Enviromental Specialist- NELSAP- Kigali
Francoise Kayigamba	Enviromental Advisor- NELSAP- Kigali
Remy Mugunga	NELSAP TAC Member- Rwanda/Economic Advisor to H.E President of the Republic of Rwanda
Bikongoro Novert	Mobile Weigh Bridge Operator- TANROADS, Kyaka, Tanzania
Juma	Elder in Kyaka Town, residing near Kyaka Bridge on River Kagera in Tanzania
Muhammad Ntanda	Driver/Plant Operator, Egypt-Uganda Aquatic Programme - Kansensero Landing Site

A.3 MATTERS ARISING DURING INDIVIDUAL STAKEHOLDER CONSULTATIONS

The purposes of the Consultations were to:

- Notify the stakeholders about the ongoing study.
- Identify existing information on navigability of River Kagera and other activities such as hydro-power generation.
- Seek stakeholders' expectations from the study.
- Seek stakeholders' views on institutional aspects of the Navigability activities.

Stakeholders Concerns and Suggestions:

- River Kagera is seen with very high hydro-power potential on Kikagati and Nsungyezi and specifically on Kikagati; plans are advanced to generate power.
- The preparatory studies for power generation have not given greater attention to possibility of navigability of the river.
- Navigability of the River has not been explored partly due to a relatively shorter section in Uganda.
- The need to consult officials in the transport sector to establish the plans for making River Kagera navigable.
- The need to consult stakeholders in all the four riparian states in order to establish individual state's plans for making the river navigable and encouraging consensus by all the riparian states on all stages of project development were emphasized.
- The following Issues need to be taken into consideration during the feasibility studies and follow-up phases of making the waterway navigable:
 - Water Levels of the River
 - Rusumo Hydro Power
 - Bridges that cross the river at various points such as Kikagati
 - Maritime Safety
 - Surveying of Lake Routes in Lake Victoria should include Kagera River
 - Other activities on the River such as Tourism, Fishing, Agriculture along the banks etc
 - Water Rights by riparian states.
- Natural Resources such as crocodiles, hippos and other environmental concerns should be taken into consideration during the navigability studies for the waterway.
- There are human activities along the River Banks such as crop cultivation that lead to siltation. There is need to resettle the people and turn the area into a forest reserve to minimize siltation.
- Harmonize existing laws and policies in the riparian states on Water Resources Management and Inland Water Transport.
- Introduce Irrigation Projects to compensate for people who would have been resettled from the river banks
- Improve the condition of roads along the river to cater for smooth movement during construction works to improve navigability of the river.
- Consult the districts to establish their interests in the river and cater for their concerns during the development of the waterway to make it navigable
- Ensure that navigability of the river benefits the communities along the river.

- If the river is made navigable, there is a likelihood that traffic is likely to be moving in one direction i.e. bringing imports to the riparian states but going back empty, this is likely to make the transport services on the river very expensive when compared to use of other modes. There is therefore need to encourage the riparian states to double their agricultural production so that traffic on the navigable river can move in both directions.
- The river has many meanders, before the vessels are made; their specifications need to be suitable for the physical condition of the waterway.
- Terminals for loading and offloading need to be strategically located. Appropriate loading and off-loading facilities need to be put in place taking into consideration the nature of goods that will be transported on the navigable waterway.
- There is need for identifying the various activities along the river in order to assess how the activities are likely to be affected when the river is made navigable. Mitigation measures could be put in place for those that are likely to be affected negatively.
- There is need to establish how navigation will affect fishing in Kagera River, Game Parks such as Kagera and Ibanda located in Rwanda and Tanzania.
- The location of the River makes it more for Tourism purposes but not for commercial traffic operations.
- On funding; infrastructure development funding should be provided by riparian states and donors, while vessels should be provided by the private sector.
- The Inland Port to be established at Kagitumba under the navigability project should also include an Inland Container Depot at Kagitumba.
- The navigability study should take into consideration the Marine Transport Initiatives on Lake Victoria under LVBC such those on Navigation and Safety in Lake Victoria.
- Kagera River is a continuation of Lake Victoria; hence developments on River Kagera need to take into consideration what is taking place on Lake Victoria.
- Plans are underway to develop the National Transport Master Plan for Rwanda. Procurement of consultancy services for developing a Master Plan commence in the second half of 2008.
- Rusumo Hydropower Initiative: Feasibility Study ongoing by a Canadian Firm. Other potential sites for developing hydro power include River Rusizi and Nyabarongo for production of 62mw for sharing between 3 countries of Rwanda, Tanzania and Burundi
- Navigability of River Kagera is very high on Government of Rwanda's agenda of providing an alternative route to the Indian Ocean either through Mombasa or Dar es Salaam. The review of documents on navigability of River Kagera would provide background information on the planned feasibility study on navigability of River Kagera with funding from the World Bank funded East African Transit and Trade Facilitation Project.
- Initiatives for developing Navigability of River Kagera have been very high on Rwanda's development agenda since mid 1990s, hence any initiative to explore the navigability will be supported by the Government of Rwanda.
- Navigability offers another alternative route for goods to/from Rwanda to minimise high Transport Costs.
- There is need for a careful Cost Benefit Analysis and cost-effectiveness analysis for navigability of River Kagera before development of the waterway commences. This will assist to quantify the actual costs and benefits of making the river navigable as compared to other modes/routes to the Kagera Basin.
- A comparative Study is essential to arrive at the most cost-effective way of transporting goods by Roads and Lake/River.
- There is need to take into consideration required additional works to make the river navigable such as:
 - Siltation from soil erosion

- Environmental issues
 - Water shade management
 - Water Hyacinth removal/management
- There is need for proper coordination with other similar developments in the region such as Multi- purpose Project on River Nyabarongo in Rwanda which offers good lessons for plans for navigability of River Kagera.
 - There is need to take into consideration other upstream activities such as those on River Nyabarongo and Rusumo Dam Project.
 - Complementary Transport Networks for making River Kagera navigable should be considered as well.
 - There is need to validate what has happened since 1986 in all partner states and justify whether or not there is need for carrying out a Navigability Study.
 - There is need for liaison with the Secretariat of the Northern Corridor Transit Transport Coordination Authority (NC-TTCA) to get information on the past studies carried out on the potential for navigability of River Kagera.
 - The importance of navigability of River Kagera should make it a stand-alone project as opposed to placing it under small projects of Kagera Transboundary Integrated Water Resources Management Project.
 - The Study on navigability of River Kagera requires high quality analysis to generate options on the way-forward with navigability of River Kagera by riparian states.
 - The Terms of Reference for the feasibility study for the navigability of the waterway should be very exhaustive.
 - The navigability project may not be funded by the donors hence the need for the riparian states to prepare to fund the project if found feasible by the feasibility studies.
 - The preparation of the Terms of Reference for the feasibility study should take into consideration high technology investments to make the river navigable.
 - The Terms of Reference for the feasibility study should include socio-economic and wider impacts of the project in addition to economic and financial viability.
 - The issue of accessibility through River Kagera by riparian states should be taken as a human right and hence should be accorded a very high priority by all riparian states.
 - Kagera River navigability's role in saving road damage out of overloading should also be investigated as part of the feasibility study.

Coordination/Institutional Issues

- There is need to avoid duplication such as those that exist between LVEMP and, Kagera Transboundary Water Resources Integrated Management Project.

The EAC/LVBC offer a possible framework on overall coordination of the navigability programme since all the four Kagera Basin riparian states are members of the EAC

**A.4 LIST OF PARTICIPANTS TO THE 8th KAGERA RPSC
MEETING, NOVEMBER 26TH-27TH, 2008, AMAHORO HOTEL,
BUJUMBURA-BURUNDI**

BURUNDI	
<p>1. NDUWAYO EUGENIE z Program Ministry of Environment and Tourism B.P. 631, Bujumbura, Burundi. Dir. Tel/Fax: (257) 22217303 / 220149 Cell: (257)-79921389 E-mail: eugnduwayo@yahoo.fr</p>	<p>2. NKURIKIYE ANICET Advisor to the Minister of Environment, Land Management and Public Works B.P. 631, Bujumbura, Burundi. Dir.Tel:(257)-2404227(Office)/0403381(Hab) Fax : 257) 22402625 / Cell : (257)-79900709 E-mail: nkurianicet@yahoo.fr</p>
RWANDA	
<p>3.NYIRIGIRA BENOIT Urban Water Officer (RPSC) MIRENA Kigali, RWANDA. Cell :08416803 Fax: 00(250)582829 E-mail: benigira@yahoo.fr</p>	<p>4. JEAN MARIE MUSHINZIMANA MIRENA P.O Box 3502, Kigali Tel:+250 08405138 jmushinze@yahoofr</p>
<p>5. SAFARI PATRICK RPSC Member/ RWANDA Ministry of Natural Resources , P. O. Box 3205, KIGALI Tel +25008300126 Email: sapattrick2003@yahoo.fr</p>	
UGANDA	
<p>6. FRED WILSON KYOSINGIRA Asst. Commissioner WRMA Directorate of Water Resources Ministry of Water and Environment Tel: 256-41-321342 / 323552 / 320914 Fax: 256-41-321368/Cell: 256 -772441265 E-mail: kyosingira.wrmd@dwd.co.ug</p>	<p>7. SAJJABBI FREDRICK JOHN Senior Energy Officer Ministry of Energy and Mineral Development P. O Box 7270, Kampala UGANDA Tel: +256 41 4235889 Fax: +256 41 4249243 E-mail: sajjabi@energy.go.ug</p>
<p>Absent With Apology</p> <p>8. ENG. KAVUTSE DOMINIC Assistant Commissioner Ministry of Water and Environment P. O Box 20026, Kampala Tel: 256-414223309, 256-772- 412853 kavutse@dwd.co.ug.</p>	

TANZANIA	
<p>10. RAYSON M. MUHABUKI Kagora RPSC Lake Victoria Basin Water Officer P.O Box 1342, MWANZA Tel:+255-28-2500820 Email: rmuhabuki@nilebasin.org</p>	<p>11. SEGULE SEGULE Senior Hydrologist, Planning and Research, Ministry of Water and Irrigation P.O BOX 35066, TEL +255 713232993 Email: segulesegule@yahoo.com</p>
DEVELOPMENT PARTNERS	
<p>12. NTALINDWA JANVIER Regional Program Officer, Sida P. O. Box 6387, KIGALI Tel: janvier.ntalindwa@sida.se</p>	
NELSAP-CU	
<p>12. PETER KANYI MAINA Senior Economist NELSAP-CU Kigali, RWANDA Tel: 250 - 0830 7334/ Cell: 250 - 03025528 Fax: 250 – 580043 Email : pkanyi@nilebasin.org</p>	<p>13. EMERITA MUGOREWICYEZA Social Development Officer NELSAP-CU P. O. Box 6759, Kigali, RWANDA Tel: 250 - 08429217 Fax: 250 – 580100 Email : emugorewicyeza@nilebasin.org</p>
<p>14. ELIMANSIA MNGUMI Development Communication Officer, NELSAP-CU Kigali, RWANDA Tel: +250580120/ Fax +250580099 emngumi@nilebasin.org</p>	<p>15. FRANCOISE KAYIGAMBA Environment Advisor NELSAP-CU Kigali, RWANDA fkayigamba@nilebasin.org</p>
KAGERA PMU	
<p>16. NABIDE ISAH KITI Project Manager NELSAP/ KAGERA TIWRMP Kigali, RWANDA. Tel: 250 -584424 Cell : 250 – Fax: 250 - 58 4425 Email : inabide@nilebasin.org</p>	<p>17. INNOCENT KABENGA Assistant Project Manager NELSAP/ KAGERA TIWRMP Kigali, RWANDA. Tel: 250 - Fax: 250 - E-mail: ikabenga@nilebasin.org</p>

<p>18. KABANDA NICOLAS Finance Officer NELSAP/ KAGERA TIWRMP Kigali, RWANDA. Tel: 250 -584424 Cell : 250 - 0853 4749 Fax: 250 - 58 4425 E-mail: nkabanda@nilebasin.org</p>	
OBSERVERS/NLOs	
<p>19. DR. NICOLAS AZZA Assistant Commissioner (water quality) Water Resources Management Dpt Ministry of Water and Environment Entebbe, UGANDA Tel: 256-41-323536 Fax: 256-41-321368 Mobile: 077-404513 / 78 2241006 E-mail: azza.wrmd@dwd.co.ug</p>	<p>20. ENG. WILKING SHUMA Managing Director Karagwe Urban water supply Authority P. O. Box 575 Karagwe, Kagera Tel: +255-282222960/926 Fax: +255-282222960/926 Mobile: +255-754873593 E-mail: shumawil@yahoo.co.uk</p>
<p>21. INNOCENT KAGENGA NBI FOCAL POINT OFFICER MIRENA PO.Box 3502 Kigali Tel: +250 08486804/ +250582575 Fax:+250 0587331 kagengainno@yahoo.fr</p>	<p>22. VENANT BARINDOGO NLO, BURUNDI Email: shumawil@yahoo.fr</p>
INTERPRETERS	
<p>23. TOURE FATOUMATA PAN AFRICAN MOVEMENT P.O. Box 24590 +256 77 2 473 995/ +256 75 3 704 211 lolwe2212@gmail.com</p>	<p>24. CHRISTOPHER LUTAAYA INTERPRETER FREELANCE P. O. Box 10622, KAMPALA, clutaaya@yahoo.com</p>

A.5 RECORD OF STAKEHOLDER COMMENTS & WRITTEN RESPONSES - 8th KAGERA RPSC MEETING, NOVEMBER 26TH-27TH, 2008, AMAHORO HOTEL, BUJUMBURA-BURUNDI

Question/comment	Consultant's Response
<p>Lack of detailed maps showing Kemondo Bay and other locations discussed in the text. A map showing areas that are likely to be influenced by the navigation project must be included.</p> <p>Issues related to environment merited a separate chapter.</p> <p>Given the large variability's in flow, sediment load, steep river gradients the feasibility of the project needs to be clarified. Many risky engineering works are envisaged. Adverse impacts to the environment and communities are likely especially in the downstream part of the river. The Government of Rwanda should therefore ensure that the EIA & SIA and put in place mitigation measures. The TOR from MINIFRA for the EIA are shallow and do not reflect these concerns.</p> <p>Other than a Marine ecologist, a wetland specialist with experience in inland water transport is missing from the proposed team.</p>	<p>Three new additional maps i.e. Figures 1, 3, & 19 have been incorporated into the final document.</p> <p>Although issues related to the EIA have not specifically been put in a separate chapter, a two page addendum to the TOR for detailed feasibility studies proposed by MINIFRA with respect to EIA studies is now included to expand the scope of investigations (section 6.5)</p> <p>Amendments to key staff required for the project under section 6.8 now include a wetland ecologist/senior environmental specialist.</p>
<p>Typographic errors must be removed.</p> <p>What is the linkage between the cooperative framework & harmonization of laws and policies for the Kagera and the present proposals to harmonize inland water transport policies.</p>	<p>The final report has been proof read and most of the "typos" have been removed.</p> <p>The cooperative framework for the Kagera Basin specifically addresses water resources and environmental management issues in the basin. It provides for a framework for hydro-meteorological data sharing, gender mainstreaming and stakeholder participation in water resources management and development but does not explicitly address the challenges of inland water transport.</p>
<p>The consultant was required to review all the documents relating to the assignment and propose the next steps. The consultant presented many competing projects that were not analyzed. The consultant needed to provide a preliminary cost-benefit analysis that would have enabled us to take a decision to conclude the investigations or abandon the study at this point.</p>	<p>The transport economist provided a supplementary presentation at this juncture. Consultant was unable to provide preliminary cost benefit analysis. It was noted that economic analysis documented in the literature was out of date and often did not consider water transport. Addenda to the TOR prepared by MINIFRA have been included to cater for this deficiency under section 6.4 of the main report.</p>
<p>Given that the Kagera contributes 35% of inflows to Lake Victoria, a project of this nature could</p>	<p>The issues associated with the EIA have now been refined and a comprehensive addenda</p>

Question/comment	Consultant's Response
<p>have disastrous environmental implications. Many bridges are likely to be removed and must be replaced as part of the engineering works. These costs should be quantified.</p> <p>The Consultant should explain to us where this work began and where it ends. What are the impacts of this project on water quality?</p>	<p>written to complement the TOR proposed by MINIFRA.</p> <p>Issues about making inventory of all existing bridges and costs associated with their replaced are well covered under the TOR proposed by MINIFRA under the tasks for preparation of engineering designs and investigations of technical and economic viability of the project.</p> <p>The consultant has provided a detailed background to the assignment and explained the developments during the assignment that changed the focus from preparing new TOR to reviewing all existing documentation with a view to add value and complement ongoing initiatives elsewhere such as the East African Trade and Transport Facilitation Project.</p> <p>Water quality, particularly impact of sedimentation is one of the key tasks to be addressed under a separate component that we refer to as "Hydrographic and other supplemental surveys". We are of the view that this sub-component should precede the feasibility study and have prepared separate TOR for it in section 6.2.</p>
<p>Photographs of existing bridges indicated very low clearance from bridge decks to surface water levels. This is likely to constrain navigation at high levels. This implies bridges will have to be demolished.</p> <p>Hydrological data to be utilized is too old! Can we base decisions on such outdated data?</p> <p>Although there is generally a lack of water level data. Rating curve and discharge data at Nyakanyasi and Kyaka ferry can be used to design.</p> <p>How is the project likely to be affected by climate change?</p> <p>Feasibility studies should be carried out in a phased manner.</p>	<p>The consultant has recommended the utilization of appropriate hydrodynamic models so as to predict the behavior of the river at all feasible flow conditions and climate scenarios in the amended TOR. This should be the basis for reviewing performance of bottlenecks such as bridge locations.</p> <p>The results from a suitable hydraulic model, calibrated with supplementary hydrographic surveys and historical data will mitigate lack of data.</p>
<p>Sedimentation loads carried by the Kagera are tremendous. Recent research studies indicate that the Kagera has greatly modified the western shoreline of Lake Victoria and led to the creation</p>	<p>The consultant has proposed extensive investigation of river-lake interaction especially at the mouth as part of the addenda to the TOR in section 6.2.</p>

Question/comment	Consultant's Response
of Lake Nabugabo and a massive delta at its outlet. How is the project likely to influence sediment transport mechanisms?	Ideally prospective consultants to be hired at detailed feasibility stage must refer to all relevant scientific publications within this ecosystem.
<p>Must we wait for a detailed feasibility study before deciding whether to proceed with the project or not? Can't the consultant provide a preliminary indication?</p> <p>The TOR proposed by MINIFRA do not cater for the task of carrying out a detailed Socio-economic Impact Study (SIA). An SIA and EIA are two different things yet they are presently mixed up. An SIA tackles issues such as impact on communities due to HIV and other diseases as a result of implementing transport infrastructure development projects. What are the mitigating measures that must be put in place?</p> <p>If some people are to be displaced how will they be compensated? What socio-economic aspects are likely to be improved?</p> <p>A sociologist or anthropologist should be part of the proposed team of consultants for the detailed feasibility study.</p>	<p>We must wait for a detailed feasibility study since there are many diverse and complex issues associated with the project. However, we have indicated that once the many competing projects to this assignment are commissioned ahead of the proposed navigation project, it will be difficult to justify its implementation.</p> <p>We concur with the observation that issues associated with the SIA are not properly addressed. We have therefore prepared a separate addendum to the TOR proposed by MINIFRA that dealt exclusively with the tasks to be carried out under a comprehensive SIA under section 6.6.</p> <p>A sociologist is included as part of the proposed team of consultants.</p>
<p>Amongst all the potential projects that can be implemented, which of them should be the priority projects and which ones should come first? How is navigation likely to affect power production?</p> <p>How valid are the assumptions on volume of traffic to be diverted & other transportation parameters?</p> <p>The opportunity cost analysis of navigation against other competing modes of traffic including air transport is a critical issue that must be addressed.</p> <p>Which countries benefit and to what extent? What are the opportunities and challenges?</p>	<p>These issues will be addressed under the task for setting up a comprehensive Decision Support System (DSS) for the Kagera project that will be utilized as the tool to rank and prioritize the various basin development projects. In our addendum to the TOR proposed by MINIFRA we note the synergies between the navigation project, and the DSS tool and have recommended that the analysis be taken into account during execution of the detailed feasibility studies for navigation.</p> <p>Under section 6.4, we propose that the detailed feasibility studies must demonstrate that the operating costs (cost per ton-km) and benefits of river/lake transport and the associated investment costs are superior to the competing alternatives and also greatly outweigh all negative impacts associated with the project.</p> <p>Assumptions made during derivation of transport volumes and costs are to be updated and validated during detailed feasibility studies.</p>
Only two modes of financing options for the project have been proposed. How promising are	Options for individual government funding and bilateral funding are now included.

Question/comment	Consultant's Response
the opportunities to secure bilateral and individual government funds.	
<p data-bbox="235 294 808 394">We have focused extensively on the MINIFRA TOR. Why not propose a fresh TOR given the trans-boundary nature of the project?</p> <p data-bbox="235 428 808 562">Must we commission a separate study with more focus on the trans-boundary issues or should we strive to incorporate as many comments as possible and inform the MINIFRA initiative?</p> <p data-bbox="235 596 808 697">Provide a chapter on recommendations based on outputs. Give the next steps for project implementation. Is this a bankable project?</p> <p data-bbox="235 730 808 865">Advise on how best the component on hydrographical surveys links with the DSS and other assignments for improvement of hydro-meteorological networks.</p> <p data-bbox="235 974 808 1075">Review the Financing Agreement of the East African Trade & Transport Facilitation Project (EATTFP).</p>	<p data-bbox="815 294 1383 428">Plenary resolved that we already have a project champion; hence MINIFRA should be assisted to improve the ToR and take into account the trans-boundary context.</p> <p data-bbox="815 462 1383 663">A chapter on the way forward has been re-written to reflect this approach hence the next steps are limited to assisting MINIFRA to improve their TOR based on the findings of this assignment. The proposed addendum to the TOR from MNIFRA is one of the key outputs.</p> <p data-bbox="815 697 1383 798">The ToR for the DSS should be amended to reflect the use competing use of water for navigation & other purposes.</p> <p data-bbox="815 831 1383 932">The question of whether the project is bankable can only be resolved after undertaking a detailed economic analysis.</p> <p data-bbox="815 974 1383 1350">The financing agreement of the EATTFP project is not readily available. However, project documents for the program for improving transport infrastructure and facilities for the Northern Corridor (Aug. 2006) explicitly indicate that the navigability of Akagera River is one of the options that will be explored. Funds to the tune of US\$ 250,000 have been budgeted to purposes of undertaking the necessary studies. This information has been incorporated into the final document.</p>

**A.6 MINIFRA - TOR FOR A FEASIBILITY STUDY FOR
NAVIGABILITY OF KAGERA RIVER**

REPUBLIC OF RWANDA



MINISTRY OF INFRASTRUCTURE

TERMS OF REFERENCE

FOR

**THE FEASIBILITY STUDY FOR NAVIGABILITY
ON THE RIVER AKAGERA**

FUNDED UNDER

**EAST AFRICA TRADE AND TRANSPORT
FACILITATION PROJECT (EATTP)**

Kigali: June, 2008

Table of Contents

1.	BACKGROUND	III
2.	CONTEXT	III
3	TRANSPORT SECTOR OBJECTIVE.....	IV
3.1	Sector Objective	IV
4.	THE PROPOSED STUDY	V
4.1	Study Objective	V
4.2	Study Description	V
5.	DETAILS SCOPE OF THE CONSULTANCY SERVICES	VI
5.1	General	VI
5.2	Description of the Study	VI
5.2.1	Legal, inter-regional and Institutional Aspects.....	VI
5.2.2	Preliminary Engineering Design.....	VII
5.2.3	Technical Viability.....	X
5.2.4	Traffic Analysis and Transport Demand Forecasts	XI
5.2.5	Economic and Financial Viability of the Project	XIII
5.2.6	Environmental and Social Impact Assessment	XIV
6.	KEY PERSONNEL.....	XVI
6.2	Key Personnel Input	XIX
7	Study Implementation Modalities	XX
7.2	Study Deliverables	XXI
7.2.1	Work Program	XXI
7.2.2	Reports	XXI
7.2.3	Submission of Reports	XXII
7.2.3	Milestones.....	XXIII
7.2.4	Study Output	XXIII
7.2.5	Study Monitoring and Control	XXIV
7.2.6	Payment Schedule	XXIV

List of Tables

Table 6. 1: Qualification and Experience of Key Professional	XVII
--	------

Table 7. 1 Study Implementation schedule

XX

Table 7. 2: Submission of Reports

XXII

1. BACKGROUND

Availability of adequate, efficient and affordable transportation infrastructure/services is an essential pre-requisite in the economic and social development of a country for providing vital links between centers of production and markets. Such a transportation system facilitates cost effective flow of cargo and movements of people, linking different production, marketing/commercial/distribution and consumption centers thereby promoting socio-economic development. The population's access to employment, health and education facilities and a wide range of other services is ensured through transport infrastructure.

It is in the above background, one of the major thrusts of the Vision 2020, the long-term development strategy for Rwanda, is on the development of the economic infrastructure of the country, and in particular transportation infrastructure. Being a landlocked country, the economic growth and development of the country is very much dependent on the development of an integrated inter-regional transport system. The exceptionally high cost of transport at national as well as regional level in Africa, constitute a major constraint which must be reflected in the sector policy to achieve the short, medium and long term development goals elaborated within the Vision 2020.

2. CONTEXT

The Government of Rwanda has made good strides in her socio-economic development efforts during the last decade. However, two factors – being land-locked and huge distance (about 1400 km) from the nearest sea port of Dar Es Salaam – act as major impediments in the country's accelerated socio-economic development. In its efforts at overcoming the impediments, Rwanda has been making concerted efforts in finding alternate cost effective routes through neighbouring countries to gateway ports on the Indian Ocean.

Being a land-locked country, Rwanda depends mainly on Mombasa port in Kenya and to some extent on Dar Es Salaam Port in Tanzania for its external trade. More than 70% of the total external trade of Rwanda is handled at Mombasa. While the traffic between major economic centers of Rwanda and Mombasa Port moves via Northern Corridor routes transiting through Kenya and Uganda, the traffic between Rwanda and Dar Es Salaam Port follows Central Corridor routes through Tanzania. Irrespective of corridor used, the impact of long distances from the ports has significant adverse impact on the country's external trade in as much

as the transport cost constitutes as high as 40% of import/export value of products. Moreover, administrative formalities of transit are often time-consuming and result in long transit delays. The political instability of Rwanda's neighboring countries, also calls for expeditious search for other economically competitive routes between Rwanda and Mombasa/Dar-Es-Salaam.

One of the possible alternate ways is to transport goods from Mombasa up to the harbour of Kisumu by the Lake Victoria preferably by rail, then to use barges up to the Tanzanian harbor of Kemono-Bay, and to follow the road until Kigali. This alternative was tested at the beginning of the year 1986 and proved to be operational subject to improvement of road network in Tanzania which till date is in poor state. Another alternative is to use barges from Kisumu or another harbor on the lake Victoria in Tanzania (Mwanza - Isaka) or in Uganda (Harbour Bell), up to the West bank of the lake Victoria at mouth of the river Akagera from where barge movement on the River Akagera till Kagitumba; about 191Km east of Kigali. Apart from reduction in route distance, this alternative would provide opportunities for moving higher loads using a potentially environmentally friendly transport mode. Such routing, if proven viable, would offer cost effective transport alternative for regional as well as external trade of Rwanda. Oil importers of Rwanda, traders in Kisumu/Eldoret, etc indicated keen interest on this transport alternative.

In view of the potential advantage of traffic movement on the River Akagera, the Government of Rwanda intend to commission the services of a consulting firm for undertaking a feasibility study for assessing techno-economic viability of transport operations on the River Akagera. The objective of the study and detailed description of scope of the consulting services are given the following sections.

3 TRANSPORT SECTOR OBJECTIVE

In accordance with the socio-economic and strategic visions of the Government of Rwanda for the transportation sector development, sector objective and the study objectives are defined as outlined below:

3.1 Sector Objective

In the context of the EDPRS (2008-2012), the objective of the transport sector in the medium term is to reduce the constraints in order to promote sustainable economic growth and contribute to the poverty reduction. The current assignment, which entails assessment of viability of transport

operations on the River Akagera, is in line with sector objective as this helps in identifying cost effective alternate transportation options. Further, if transport operations on the River Akagera are proven viable, it would be an alternate regional transport facility that is energy efficient, environmental friendly and labour intensive. A transportation mode of this nature would facilitate economic growth and contribute to poverty reduction.

4. THE PROPOSED STUDY

4.1 *Study Objective*

The study objectives are:

- i. To determine the legal, multinational and institutional constraints and operational modalities for developing navigability (i.e. transport operations) on the River Akagera from Kagitumba up to its mouth on the lake Victoria to make an interface with other modes of transport directly linked to the lake or from Kenya (Port of Mombasa), or from Tanzania (Port of Dar-Es-Salam) or of Uganda (Harbour Bell);
- ii. To assess the techno-economic feasibility for developing the inland water transport system; and
- iii. To determine environmental and social impacts of the inland water transport network.

4.2 *Study Description*

In line with the objectives listed above, the proposed study will be undertaken the following work packages (WP) as under:

WP 1: Assessment of legal, multinational agreements and institutional framework for transport operations on the River Akagera;

WP 2: Preliminary Engineering Designs for navigability of the River Akagera;

WP 3: Assessment of the Techno-economic Feasibility for the transport initiative; and

WP 4: Determination of Environmental and other Social Impacts for the project.

5. DETAILS SCOPE OF THE CONSULTANCY SERVICES

5.1 *General*

The consultant shall perform all tasks as described herein with due care and diligence to attain the objectives of the project.

5.2 *Description of the Study*

Work Package 1: Assessment of legal, bilateral/multilateral agreements and institutional framework for transport operations on the River Akagera

5.2.1 **Legal, inter-regional and Institutional Aspects**

In order to assess the legal and institutional aspects of the study, the Consultant shall examine a good range of technically feasible options/alternatives for the development of navigability (transport operations) on the River Akagera and determine potential legal, inter-regional and institution constraints and modalities for each option. In this connection, the Consultant shall pay due attention to legal, institutional complexities (including riparian rights) linked to the fact that a substantial stretch of the Akagera River runs along the Uganda/Tanzania border.

This study will review the existing policy and regulatory framework for inland water transport (IWT) operations, tariff structures and suggest suitable organization for future IWT operations and give recommendations to maximize efficiency and competitiveness of the proposed IWT operations on the River Akagera. The consultant shall also assess feasibility/viability of private sector providing IWT operations/service provision on Lake Victoria, considering the extremely current low level of development of IWT services on Lake Victoria and the sub-region.

Since the transport operations on the river are intended, in the main, to cater to regional and transit cargo, all the relevant bilateral/multilateral agreements between the regional member countries should be reviewed and appropriate institutional and regulatory framework suggested for ensuring smooth and unhindered regional cargo and passenger movements on the river.

Work Package 2: Preliminary Engineering Designs for Navigability of the River Akagera

5.2.2 Preliminary Engineering Design

In order to assess the techno-economic feasibility for the navigability of the River Akagera, the Consultant shall prepare a preliminary engineering design for the project based on preliminary field surveys and investigation. The preliminary engineering design will include, among other key tasks, preliminary project cost estimates covering a) capital and maintenance cost of river development (e.g. deepening of river channel, protection works for strengthening of river banks, improvement of structures and removal of obstacles that hinder in navigation, etc.) and b) capital and operating cost of terminals and vessels. The key tasks under this work package are outlined in the following paragraphs.

a) Field Surveys and Investigations

The consultant shall conduct all topography, area and satellite imagery survey, hydrological studies, sub-surface soil exploration, materials surveys, and other field and laboratory investigations required for the examination of various alternatives for terminal and water channel development, the location of suitable materials and water, and the preliminary engineering design. This shall comprise, inter alia:

- i) survey of water flow characteristics, hydrology, topography, geology and land use, including the preparation of plans, views, cross sections, and profiles of proposed bank protection measures, traffic/operation areas and administration buildings;
- ii) hydrological and hydraulic studies including the potential hydrological impacts of the water level of the Lake Victoria on Akagera River;
- iii) material testing and soil investigations, to identify and test appropriate materials for the construction and refilling of the port area; and the
- iv) terminal configuration, surface pavement, evaluation and preliminary design.
- v) collection of data regarding both vertical and horizontal navigational clearances for all major road bridge(s) and other hydraulic structure(s) crossing the river in Rwanda/Uganda/Tanzania.

b) *Climate, Topography, Geology and Land Use*

The Consultant shall describe the climatic conditions of the project area, providing details of:

- i) water flow characteristics such as currents, waves and erosion conditions;
- ii) rainfall (a monthly distribution and intensity, including rain days per month);
- iii) temperature (minimum, median, and monthly ranges throughout the year);
- iv) other climatic features of importance (e.g. wind, floods, etc effects on the alternative construction designs);

c) For the suggested scenario, the consultant shall provide a detailed description of the short, medium and long-term effects of various above indicated factors on transport operations on the River Akagera.

d) As part of his/her responsibility, during the proposal preparation period, the consultant has to participate in a site inspection and collect details like

- ✓ Information about existing water flow characteristics and traffic conditions;
- ✓ Working conditions at the site during the study preparation period;
- ✓ Existing and additionally required communication facilities, which the consultant and the Government consider necessary.
- ✓ Existing maps and aerial photographs, if available, shall be obtained from the Government at cost to the consultant.

e) The consultant shall compile a catalogue of the relevant geological features of the project area including a description of the soils and rocks encountered in the project's area and their effect and influence on such factors as site location. The influence of geology and the availability of construction materials is of great importance for the project feasibility, hence the consultant should take due cognizance of their importance.

f) The type and scope of the existing and potential land use within the project area shall be described.

Sufficient information shall be obtained by the consultant based on the guidelines provided by the Government and supplemented by other

relevant sources of information, to justify, and provide the basis for the preliminary engineering design for development of river channel and terminals and structures, including initial costing. The consultant shall be fully responsible for obtaining all the data and information necessary to carry out terminal and river channel capacity investigations and subsequent designs. The handling systems at the proposed terminals should conform to acceptable international standards and specifications.

The design of the cargo and passenger handling facilities will have to be compatible with the projected levels of different types of cargo (such as Container, LNG, Crude oil, Break bulk and General cargo) and level and seasonality of passenger traffic. Detailed scope of consultancy for traffic studies is presented in section 5.2.4.

Based on the traffic studies, economic analyses, and geotechnical tests, the consultant shall identify the best option for the preliminary design layout and shall establish technical solutions for the main structures. The design option shall provide all information necessary for allowing reliable cost estimation. The consultant shall provide comparative data for construction and maintenance costs for the different design elements for development of river channel and identified terminals.

The consultant shall prepare preliminary design drawings using the format, titles and logos as required by the Client:

Typical floor plans and cross-sections of the proposed design shall be prepared at scales acceptable to the Government. Original plans shall become the property of the Government.

Based on the above analyses and findings, the consultant shall provide:

- ❖ Preliminary quantity estimates with an accuracy of +/- 20 % for the recommended solution. The principal quantities shall include but not be limited to river channel dredging, improvement of structures, construction of terminals, etc. Preliminary design of major structures shall include determination of the spans and types of foundations.
- ❖ Preliminary cost estimates with an accuracy of +/- 20% for construction of the project. This estimate shall be based on locally derived unit prices appropriate for the previously estimated quantities. The estimate shall give details of foreign and local costs of main work items including taxes and duties levied.

The cost estimates shall include the following components:

- i) Expenditure in foreign currency
 - imported equipment, materials and supplies
 - identifiable foreign components of domestic manufactured equipment, materials and supplies
 - salaries of expatriate personnel
 - profit and overheads of foreign firms where appropriate

- ii) Expenditure in local currency
 - right-of-way acquisition and land acquisition cost
 - local materials, supplies, and services
 - salaries and wages of local employees

In addition, the consultant shall present separately a detailed analysis of the taxes and duties element of the cost estimates.

Work Package 3: *Assessment of the Techno-economic Feasibility for the Transport Initiative*

5.2.3 Technical Viability

The Consultant shall undertake a detailed study to assess the technical viability of the project including an assessment of the maintenance facilities, and overall sustainability in the inland water transport (IWT) sub-sector. The Consultant shall examine a good range of technically feasible options/ alternatives for the development of navigability (transport operations) on the River Akagera. The technical assessment of the project shall include among other important issues, the following key tasks:

- i) Determination of the characteristics of the river: length, medium breadth and minimum, hydrologic regime (unit hydrographs of rainfall for the catchment areas, annual modules, design discharges with at least 100 years of return period, seasonal variation, the maximum, the minimum and the mean water levels for 100 years of return period), solid transport in suspension, strengthening and protection of the banks of the river based on the secondary sources of data supplemented by limited field investigations/surveys

- ii) Broad assessment of the technical possibilities of navigation on the concerned river stretch.
- iii) Identification of types of terminals/harbours and their location on the river and the Lake Victoria and the type of vessels required to transport the projected traffic.

5.2.4 Traffic Analysis and Transport Demand Forecasts

The Consultant shall make an assessment of traffic potential based on a broad review of the traffic on alternate competing modes/routes and projections for the next 30 years

Since the proposed project is a green field project, two types of traffic namely diverted traffic and induced traffic will be relevant. While diverted traffic connotes that traffic stream which is likely to divert to the proposed project from other existing modes and/or routes because of comparative cost advantage, induced traffic refers to new traffic streams that would be generated only if the proposed project materializes mainly because of the consumer surpluses attributable to the new project. In this connection, the consultant shall also explore the suitability of adopting variable demand approach while estimating forecast traffic for the next 30 years. When assessing the impact of changing travel costs on travel (with or without the scheme), the Consultant shall consider the wider effects of proposed inland water transport scheme on travel demand, across all transport modes. The possible responses to changing travel costs, such as those from establishing new inland transport, are:

- change route (reassignment)
- retime journeys to take advantage of the improved conditions
- travel to new destinations
- switch to water transport from other modes
- increase the frequency of some journeys
- make entirely new journeys
- change the patterns of land use in the longer term, and therefore the associated trip patterns

Diverted Traffic

The Consultant shall determine the type and volume of the traffic (cargo as well as passenger) currently moving by various competing modes of transport and/or alternate routes but could be relevant for the proposed project when it becomes operational. To this end, the consultant shall collect details of cargo and passenger traffic moving by the competing mode during the last five years. In order to determine future traffic

demand, the Consultant shall collect future planning data to develop potential futuristic scenarios of integrated development of road, rail and oil pipeline network. In this connection, the Consultant shall assess the impact of the competing transport modes including the proposed Kampala Kigali pipeline and development of the approach road on the Ugandan side to the Kagitumba border post on the viability of Inland Water Transport (IWT) on the Akagera River. In addition, the Consultant shall conduct origin - destination (O-D) surveys. Where considered appropriate, the consultant shall also conduct the traffic/market studies to determine cargo traffic composition (general cargo, containerized volume, liquefied natural gas LNG, crude oil, dry bulk). Separate surveys shall be conducted to assess the traffic cargo volume and pattern for passenger traffic.

Induced Traffic

The consultant shall make an assessment of the level of induced traffic taking due account of the following:

- i) Traffic generating factors, located in the project influence area, that are likely to be influenced by proposed project, shall be identified, described and quantified by the consultant. Such factors among others are:
 - population growth and changes in rural and urban population distribution;
 - regional and national economic growth;
 - development of industry, commerce and containerized goods within the project area;
 - development of social services, medical facilities, and schools; and other factors identified by the Consultant.
- ii) Information collected through market/opinion surveys of major industrial units, business establishments in the project influence area

Based on the above analysis, the Consultant shall provide a detailed annual traffic forecast (comprising diverted and induced traffic) for a period of 30 years separately for cargo and passenger traffic for each identified terminal preferably using variable demand approach. Although greater emphasis is given to accurate forecasting in the earlier part of the project's life, all traffic forecasts shall be given three growth scenarios, namely, low, medium, and high. In developing the final traffic forecasts, the consultant shall pay particular attention to the future containerization

ratio expressed as a percentage of general cargo volume. Due attention should be given to passenger traffic assessment, especially tourist traffic.

5.2.5 Economic and Financial Viability of the Project

The Consultant shall determine both economic and financial viability of the project with respect to key economic/financial appraisal indicators

Economic Viability

Main purpose of economic appraisal is to examine the viability of investment in the development of the proposed navigation facilities from the economy's point of view. In the economic analysis the Consultant shall take into account of the environmental and social impact mitigation costs of the project. This is particularly relevant if dredging, bank protection and river training works are required. The Consultant shall determine the economic viability of investment in terms of Net Present Value (NPV) and Internal Rate of Return (IRR).

The consultant shall also undertake a sensitivity analyses on the result. To assess the possible impact of changes in the economic environment of the project, costs and benefits shall be varied by up to +/- 20 %.

Project Risk Analysis

The consultant shall also conduct a risk analysis to determine the principal risks including technical, environmental and operational risks or any anticipated incidents that could impede the timely completion of the project. Among other risks, the impact of falling water levels in Lake Victoria, which is one of the critical risks of the project, should be given due consideration. The consultant shall recommend ways and means of improving the situation and lessening of the potential risks.

Financial Viability

The consultant shall carry out financial appraisal of the project including broad investigation about the sources for project financing and operations and scope for private sector participation.

Work Package 4: Determination of Environmental and other Social Impacts of the Project

5.2.6 Environmental and Social Impact Assessment

Environmental Impact

Most negative impacts due to significant construction works are those related to clearing, grading, dredging, loss of vegetative cover; foreclosure of other land uses, modification of natural flow patterns, changes in groundwater regime and wave characteristics, erosion, stream and lake sedimentation, flooding, degradation of vistas, destruction of cultural sites, and interference with movements of wildlife, livestock and local residents. Furthermore, the impacts of the inland water transport on irrigation, fishing, etc need to be carefully assessed.

Many of these impacts can arise not only at the construction site but also in neighbouring areas (quarries, transport lanes and material storage areas serving the project). In addition, adverse environmental impacts can cause air, water and soil pollution from concrete plants, dust and noise from construction equipment and blasting, fuel and oil spills, trash and garbage.

The Consultant shall conduct analysis detailing the positive and negative effects of the development of the project on the environment and recommend appropriate solutions to minimize any undesirable effects resulting from the project implementation. The analysis shall include, but not be limited to, the following factors:

- a) description and quantification of the effects of the project on the natural resources and the human environment
- b) assessment of vegetation and agricultural land loss;
- c) assessment of the health and sanitation facilities for the project's construction labour units;
- d) assessment of areas and land use of particular value, including residential and agricultural land, nature conservation areas, forests and other important national resources, cultural historical, archaeological and grave sites, populations of flora and fauna and the encroachment of flora and fauna on construction sites and works;

- e) assessment of indirect impacts on agriculture and forestry, particularly the utilization of fuel, wood and water resources;
- f) assessment of the effects of erosion and sedimentation
- g) assessment of impacts due to construction and maintenance especially the pollution of ground water and drainage;
- h) assessment of effects on land resources;
- i) assessment of hydrologic effects;
- j) assessment of all social issues, including legal implications, for example, compensation for agricultural land lost, housing, grazing land, etc
- k) assessment of the effects on wildlife and the associated clearance requirements from the wild life/environmental management authorities in the three countries;
- l) evaluation of the impacts on other commercial use of the river like irrigation, generation of hydro-power and fishing, etc.
- l) assessment of the impact of demographic factors including the prevention of undesirable developments, and recommendation of regulations and measures to limit negative impact on adjacent communities, existing or identified in the zone of influence of the project;
- m) assessment of the project interference with human settlements (number of houses to be demolished and number of persons to be displaced and the associated cost of compensation/relocation); and
- n) assessment of atmospheric pollution from construction activities.
- o) evaluation of the potential impacts of environmental impacts when the project would become operational.

Mitigating Measures

For the various environmental impacts identified, the consultants shall recommend appropriate mitigating measures and prepare associated cost estimates. To this end, the consultant shall

- adopt a participatory approach involving all stakeholders during the implementation. The participatory approach should include all donors operating within the country. To ensure effective consultations with all stakeholders, the consultant shall hold two workshops. The first workshop, which is aimed at briefing stakeholders on the objectives of the studies, the possible outcome and its implication on the population of the study areas, shall include representatives of farmers, women, opinion leaders, local and central government officials. The second workshop, which

shall be held during the execution of the feasibility study, shall draw participants from the areas covered by the recommended project including Government officials. The objective will be to explain preliminary project design parameters, important assumptions and risks in order to ensure a sustainable development and show the impacts of the future undertaking of poverty alleviation, especially among farmers, fishermen, etc.;

- recommend feasible and cost-effective measures to reduce significant impacts to an acceptable level;
- prepare a social and environmental management plan including proposed work program, budget estimates, staffing and training requirements along with other necessary support to implement the mitigating measures during planning, construction and operational phases; and
- along with the Government of Rwanda prepare a Resettlement Action Plan (RAP) if required.

Monitoring

The Consultant shall: a) prepare a detailed plan to monitor the implementation of the mitigating measures; and b) include in the plan an estimate of capital and operating costs and a description of other needed inputs.

6. KEY PERSONNEL

The type of expertise (i.e. key personnel) required for carrying out the study along with the qualification and experience is elaborated in Table 6.1, separately for each phase.

6.1 Qualification and Experience

Table 6. 1: Qualification and Experience of Key Professional

S.#	Expert	Qualification	Experience
1	Transport Economist (Team Leader)	Post Graduate in Transport Economics/ Transport Planning	At least twenty (20) years experience in carrying out traffic forecasts and economic appraisal in transport sector projects as part of feasibility studies. Involvement of 8-10 transport sector feasibility studies during last 10 years; of which 2-3 projects in water transport sub-sector. Proven track record of leading and managing at least 2 similar major strategic multimodal transport planning and development projects, preferably as Team Leader Project experience in Africa region is preferable.
2	Transport Engineer	Post Graduate in Transport/ Civil Engineering	At least fifteen (15) years experience in planning and design of river/water navigation systems including as team leader for at least 5 feasibility/ detailed design studies during the last 10 years. Of the total experience, 5 years in Africa is preferable.
3	Hydrologist	Post Graduate in Hydrology or related field	At least ten (10) years experience in hydrological investigations in the context of planning and designing navigation systems on rivers. Should have been involved 8-10 water navigation projects. Project experience in Africa region is preferable.
4	Legal & Institutional Expert	Degree in International Law and Trade	At least ten (10)years experience in the area of Legal and Institutional review studies and a good knowledge of the legal environment of the international trade, taking into consideration the regional integration process ongoing in the region covering the transport management. A good knowledge of the legal instruments of the East African Community, COMESA or similar regional organizations in Africa is

			preferable. A good knowledge of the legal systems in Kenya, Uganda and Rwanda would be desirable.
--	--	--	---

Table 6.1: Qualification and Experience of Key Professional (Continued)

S.#	Expert	Qualification	Experience
5	Expert - Hydrology & Hydraulics	Post Graduate in Hydrology/ Hydraulics	At least ten (10) years experience in hydrological/ hydraulic investigations in the context of planning and designing navigation systems on rivers. Should have been involved 5 water navigation projects. Project experience in Africa region is preferable.
6	Environmentalist	Graduate in environmental management or related discipline. Postgraduate courses in environment management issues would be an added advantage.	At least ten (10) years of proven experience in environmental impact assessment of transport sector projects including preparation of Resettlement Action Plans (RAP). Project experience in Africa region is preferable.
7	Socio-economist/Sociologist	Post Graduate in Sociology/ Social science	At least ten (10) years of proven experience in social impact assessment of transport sector projects including preparation of Resettlement Action Plans (RAP). Project experience in Africa region is preferable.
8	River Navigation Expert	A Post Graduate Degree in river hydraulics/ hydrology/ Water Resources Engineering or its equivalent;	At least ten (10) years of experience in hydraulic engineering, including river navigation, morphology and sediment transport analysis, such as siltation, scour and dredging. Should have been involved 5 years in projects related to river navigation, maintenance dredging

			issues, port infrastructure & development, marine and cargo handling and logistics management. Project experience in Africa region is preferable.
--	--	--	---

Table 6.1: Qualification and Experience of Key Professional (Continued)

S.#	Expert	Qualification	Experience
9	Civil Engineer	Post Graduate in Civil Engineering	At least ten (10) years of experience in the development of river channel and terminal infrastructures and facilities, and/or layout of terminals, including modern equipments and systems for river terminal infrastructure management. A specific experience in the preparation of similar studies or supervision of similar projects is suitable.

6.2 Key Personnel Input

Input requirement, in terms of man-months, for key personnel is indicated below. These key professional, where required, need to be supported by local professionals and technicians for field works/ surveys, data collection, etc. Such requirement shall be indicated by the consultants in their technical and financial proposals. The number of man-months required for the study should be in the range of 60-80 man-months and the duration of the study will be 12 months.

7 Study Implementation Modalities

7.1 Study Completion Schedule

The study, as mentioned earlier, will be carried out within 12 months. Time-lines for various major activities/ milestones under each phase are as under:

Table 7. 1: Study Implementation schedule

Activities/Deliverables	Responsibility	Duration (Months)
Phase 1: Pre-feasibility Study including Institutional Assessment		
Commencement of the Study	Consultant	Mo
Submission of Inception Report	Consultant	Mo + 1
Submission of Report on Legal and Institutional framework	Consultant	Mo + 2
Submission of Report on Traffic Demand Analysis	Consultant	Mo + 5
Submission of Report on Environmental and Social Impact Assessment	Consultant	Mo + 7
Submission of Report on Techno-economic feasibility Study	Consultant	Mo + 9
Submission of Draft Final Report	Consultant	Mo + 10
Comments from Client	MININFRA & WB	Mo+ 11
Submission of Final Report	Consultant	Mo + 11.5

7.2 Study Deliverables

7.2.1 Work Program

The consultant shall organize the study in a logical order as per the TOR and ensure that the required key personnel are available for timely completion of the study and the study deliverables meet the internally acceptable professional standards. The consultant shall commence the study within one month of issue of the order to commence work. The work program will be finalized in consultation with the MININFRA. For each of the three phases, the consultant shall prepare and submit the following reports.

7.2.2 Reports

Inception Report: The consultant will submit an Inception Report within 2 weeks of commencement of the study. The Inception Report shall give a brief appreciation of the project and its area of influence, identify data sources and gaps, state of mobilization of key personnel, methodology proposed to be adopted for the study including various field surveys and investigations and a concrete work program of execution of the study.

Progress Reports: The consultant will submit a progress report on 5th of every month, a Progress Report for the previous month. This report shall contain details of work completed/in progress during the month, input of key personnel (in man-months), and the results and recommendations as well as the work program for the next month. The report shall also identify the problems faced and those that are likely to affect the study completion schedule and the remedial measures to reduce the delays, if any.

Task Specific Reports: The consultant shall submit a number of task specific reports outlining objectives, methodology, work program, operational guidance and outputs of the concerned activity as follows:

- i) Report on Legal and Institutional framework;
- ii) Report on Preliminary Engineering Design;
- iii) Report on Traffic Demand Analysis
- iv) Report on Environmental and Social Impact Assessment
- v) Report on Techno-economic Feasibility Study

The task specific reports will eventually become the part of the Final Report after the completion of the study.

Draft Final Report: The contents of the Draft Report shall cover all the tasks as per the study TOR and clearly bring out the results of the different investigations/surveys conducted during the study as well as their conclusions and recommendations. The consultant shall include extracts of the working methodologies and findings of the all task specific reports in the draft final report for the whole study. These will have to be accompanied by all the pertinent supporting information and documentation. .

Final Reports: After taking into account various suggestions/recommendations of MININFRA and the World Bank, the consultant shall prepare a final report and submit to MININFRA.

7.2.3 **Submission of Reports**

The consultant shall prepare above-mentioned reports and the accompanying documents and maps in adequate number, as indicated below, both in English and French and submit to MININFRA with copies to CGPT and World Bank as under:

Table 7. 2: Submission of Reports

S.#	Report/ Language	Number of Copies to be Submitted to			
		MININFRA	CGPT	World Bank	Total
1	Inception Report				
	English	3	2	2	7
	French	3	2	2	7
2	Progress Reports				
	English	3	2	2	7
	French	3	2	2	7
3	Task Specific Reports				
	English	3	2	2	7
	French	3	2	2	7
4	Draft Report				
	English	3	2	2	7
	French	3	2	2	7
5	Final Report*				
	English	5	2	2	9
	French	5	2	2	9

*In the case of final report, 2 CDs containing full set of the reports including supporting data, results of investigations/surveys and all relevant maps and drawings should be submitted to the MININFRA.

7.2.3 **Milestones**

The consultant shall achieve the key milestones of the study within specified timeframe as per internationally recognised standards. The milestones for the study are more or less analogous to that of the main deliverables, which are:

- i) Inception report
- ii) Report on Legal and Institutional framework;
- iii) Report on Preliminary Engineering Design;
- iv) Report on Traffic Demand Analysis
- v) Report on Environmental and Social Impact Assessment
- vi) Report on Techno-economic Feasibility Study
- vii) Completion of the study and submission of the Final Report

7.2.4 **Study Output**

The principal outputs of the study are:

- a. The consultant will have to explore the possibilities of water transport operations on the River Akagera and the lake Victoria and identify the associated constraints
- b. The consultant will have to recommend specifically whether or not the Akagera River is actually navigable from a technical and economic point of view.
- c. The Consultant will recommend to MINIFRA the optimum solution for the navigability of the river Akagera
- d. Based on the above, the Consultant will furnish the following reports:
 - Report on hydrological and hydraulic investigations;
 - Report on geotechnical investigations;
 - Report on topographical studies;
 - Report on quantum of civil works;
 - Report on equipments;
 - Report on economic and financial viability of the project;
 - Report on environmental social impact assessment (including the measures of poverty reduction);
 - Report on legal and institutional aspects, with recommendation of the method of management of infrastructures and equipments for project implement;

- Report on financial aspects covering project cost estimates including infrastructures and other equipments and their associated operating and maintenance cost.
- e. A combined report covering all the above aspects should be prepared in English and in French and submitted to MININFRA along with its electronic Version (2 CD Rom of every report).

7.2.5 **Study Monitoring and Control**

The study shall be accomplished under the authority of the Ministry of Infrastructures. A Steering Committee will be formed, chaired by the Coordinator of the Management Unit for Transport Projects and Programs (CGPT) and comprising the representatives of the ministry and its sister organisations, members of academic, professional and planning institutions and a number of nominated multimodal/inland water transport experts to ensure adequate monitoring of the study. The committee will organise meeting fortnightly on every alternate month throughout the tenure of the study to monitor progress and recommend appropriate measures to resolve any critical problems or issues, which might arise while executing the assignment.

The Government of Rwanda (GoR) shall extend to the consultant the necessary assistance to facilitate the study, the collection of the data and the access to the administrative services that deem essential in supporting the undertakings. In addition GoR will facilitate coordination of the consultants as deems necessary for the study. Moreover, if necessary for the sake of the successful completion of the study, GoR will consider holding tripartite (Rwanda/Uganda/Tanzania) consultation meeting to resolve any critical issues, which might come up during execution of the study. The consultant shall be responsible for the analysis, the interpretation of all the data, and the conclusions and the recommendations drawn from these data.

7.2.6 **Payment Schedule**

Payment will be based on the achievement of certain milestones, which will reflect the delivery and acceptance by MININFRA of predefined outputs. The proportion of payment to be paid after each milestone or group of milestones will be as follows:

- i. Delivery of the Inception Report including work schedule - 10% of total payment;

- ii. Completion of the preliminary engineering design of the study demonstrated by the delivery of all relevant task specific and progress reports- 15% of total payment;
- iii. Completion of the traffic demand analysis study as demonstrated by the delivery of all relevant task specific and progress reports- 15% of total payment;
- iv. Completion of the environmental and social impact study demonstrated by the delivery of all relevant task specific and progress reports- 10% of total payment;
- v. Completion of the techno-economic feasibility study as demonstrated by the delivery of all relevant task specific and progress reports- 20% of total payment;
- vi. Completion of project, to include the delivery of an agreed Final Report - 30% of total payment;

A.7 TOR FOR CONSULTANT TO REVIEW THE EXISTING DOCUMENTS FOR NAVIGABILITY OF THE KAGERA RIVER

Introduction

The Nile Basin Initiative. The Nile Basin Initiative (NBI) is a partnership of the riparian states of the Nile². The NBI seeks to develop the river in a cooperative manner, share substantial socioeconomic benefits, and promote regional peace and security to achieve its shared vision of “sustainable socioeconomic development through the equitable utilization of, and benefit from, the common Nile Basin water resources”. The NBI’s *Strategic Action Program* is made up of two complementary programs: the basin wide *Shared Vision Program* to build confidence and capacity across the basin, and *Subsidiary Action Programs* to initiate concrete investments and action on the ground in the *Eastern Nile and Nile Equatorial Lakes sub-basins*. The programs are reinforcing in nature. The Shared Vision Program focuses on building regional institutions, capacity, and trust, to lay the foundation for unlocking the development potential of the Nile, which can be realized through concrete investments carried out under the subsidiary action programs.

The Nile Equatorial Lakes Subsidiary Action Program (NELSAP). The countries of the Nile Equatorial Lakes Subsidiary Action Program - Burundi, D.R. Congo, Egypt, Kenya, Rwanda, Sudan, Tanzania, and Uganda - have identified a number of projects to promote poverty alleviation, economic growth, and the reversal of environmental degradation in the sub-basin. The projects are grouped into two major areas: *Natural Resources Management and the Environment* and *Hydropower Development and Trade*, and target investments in agricultural development, fisheries development, water resources management, water hyacinth control, hydropower development and transmission interconnection. A small NELSAP Coordination Unit (NELSAP-CU) based in Kigali, Rwanda, in collaboration with the NBI Secretariat in Entebbe, Uganda, coordinates and facilitates the activities of the program.

The Kagera Transboundary Integrated Water Resources Management and Development Project. The Kagera Transboundary Integrated Water Resource Management and development project is one of the three river basin projects implemented under the NELSAP. Others include the Mara River basin Project and the Sio-Malaba-Malakisi Transboundary Integrated Water Resources Management and Development Projects located in Kenya and Tanzania respectively. The Kagera region contains some of the worlds poorest countries and is marred by conflict and civil strife. The basin is characterized by low productive peasant agriculture and endemic poverty. There is continuing land degradation and loss of soil fertility caused by population

² Burundi, Democratic Republic of Congo, Egypt, Ethiopia, Kenya, Rwanda, Sudan, Tanzania and Uganda. Eritrea is participating actively in the NBI in an observer.

pressure and primitive farming methods. There is ongoing deforestation and an almost total absence of reforestation activities. Virtually the only source of energy is biomass, contributing to the deforestation. The soil erosion results in an increased nutrient load in the river and also in Lake Victoria, leading to problems with water hyacinth and eutrophication. In the basin area there is also insufficient water for household use and for grazing. Wetlands are exploited and degraded, and there are unplanned migrations across borders of pastoralists with their cattle causing friction in the border zone.

Overall project objectives. The overall Project Objective is “To develop tools and permanent cooperation mechanisms for the joint, sustainable management of the water resources in the Kagera River Basin in order to prepare for sustainable development-oriented investments to improve the living conditions of the people and to protect the environment.” Specific objectives include (i) establishment of a sustainable framework for joint management of the shared water resources of the Kagera River Basin (ii) development of an investment strategy and conducting pre-feasibility studies (iii) building capacity at all levels for sustainable management and development of Kagera River Basin and (iv) implementing small-scale investment projects.

Implementation mechanisms. The project which is jointly funded by Sida and NORAD, is implemented within a period of four years as part of the NELSAP portfolio. Coordination is maintained between this and other NELSAP projects through the NEL-CU office in Kigali, Rwanda. The project is managed by a small Project Management Unit (PMU) based in Kigali in Rwanda. The project is supervised by a Regional Project Steering Committee (RPSC) constituted by representatives of the national government agencies of Tanzania, Rwanda, Burundi and Uganda. The RPSC reports to the Nile Equatorial Lakes Technical Advisory Committee (NEL-TAC). In order to co-ordinate and facilitate the implementation of projects and activities at the national level, part-time National Liaison Officers (NLOs) have been appointed by the respective governments. They will devote 30% of their time to the project activities.

Implementation of Small scale projects. A number of identified small-scale investment projects will be implemented immediately to provide early benefits to communities within the Basin. These investments will build confidence in the project within the Basin, provide practical experience and lessons in investment activities, be potentially scalable across the Basin, and have transboundary benefits where possible. Review of the proposal for navigability of the Kagera river is one of the small scale projects to be undertaken under the Kagera TIWRM Project. Others include (i) Water supply systems (ii) Biodiversity (Basin catchment afforestation).

Justification for a Kagera navigability project. The Kagera basin riparian countries require improved trade through effective transportation systems. Three of the countries within the Kagera basin save for Tanzania are landlocked. Connection of Rwanda to the Lake Victoria would ease transportation of goods and services within the sub basin. In 1986 the now defunct Kagera Basin Organisation (KBO) prepared a study for the Government of Rwanda of this project, which remains a high priority for that Government. It would establish water transport links between Lake Victoria and Kagitumba in Rwanda, where an inland port would be established. This study will be

reviewed in the light of recent developments, cost estimates updated, and a recommendation made on how to proceed with this project.

Other Initiatives. Other initiatives within the framework of the Kagera include:

- Other interventions in the transport sector by the Government of Rwanda include projects for construction of railway lines and improving road infrastructure. Feasibility studies have been undertaken for the roads and railway options. The studies have indicated exceptionally costs for profitability.
- The Kagera River belongs to the network of inland navigation of the ACTTCN which plans to improve the effectiveness of the network of infrastructures of the Northern Corridor to intervene to make navigable Kagera.
- The Economic Community of the East Africa which gathers Kenya, Uganda, Tanzania and in an immediate future Burundi and Rwanda, develops a programme of infrastructures of fluvio-lake transport including the Kagera river
- COMESA within the particular framework of the project “Great Lakes Railways” could also intervene in any activity related to the navigability of Kagera
- Authority of Coordination of the Transport of Transit of the Northern Corridor (ACTTCN).
- PMAESA plans to launch a vast programme of development of fluvio-lake transport in all the zone of its intervention including the basin of Kagera.
- The CEPGL gathering two landlocked countries (Burundi and Rwanda) and the DR Congo had seriously supported a programme of diversification of its system of transport of opening-up including navigation on Kagera.
- Each bordering country namely by upstream downstream Rwanda, Burundi, Uganda and Tanzania took options aiming at the possibility of making navigable the individual national sections of the Kagera river.

All these steps and initiatives will reinforce the justification of the sub-project under consideration within framework NELSAP to make a more thorough study of the conditions of navigability of the river Kagera.

Objective of the Study

The primary objective of this assignment is to assess the available information and studies on the navigability of the Kagera River Project with a view to assess the status of the Project with respect to inland navigation and to determine the next steps in preparing the project by developing terms of reference for comprehensive feasibility studies including proposal of innovative project financing options. The consultant will establish whether the study from 1986 carried out under the Kagera Basin Organisation (KBO) remains valid, or whether it has been overcome by events during the 20 years since that study was written. The assessment would be carried out according to current best practice for transport development in the riparian countries.

Scope of Work

The scope of work will include, but not limited to:

- Compilation of Information, collection of all available documents and studies pertaining to the Navigability of the Kagera River. The Consultants facilitated by the Client will contact transport experts from Burundi, Rwanda, Tanzania and Uganda as well as international sources to collect available information.
- Collection of information and studies including those in progress or projected, in the national transport master plans of the Kagera River Basin Riparian Countries. The Consultant shall review of available reports and data referring to water transport on the Kagera River, in due consideration of transport master plans for the governments of Burundi, Rwanda, Uganda and Tanzania.
- The Consultant shall review documentation related to existing transport infrastructure, including competitive types of transport like road and railway transport in order to assess the potential capacity of the Kagera waterway.
- To analyze these documents in order to release the advantages and the disadvantages of navigation on Kagera in particular including the major concerns of safeguarding of the environment of the basin;
- The consultant will identify missing information required to undertake a fresh policy, legal and institutional framework, technical, economic and financial feasibility for navigability. Gaps in the evaluation of the traffic on the waterway , load forecast and market assessment in the Basin countries, environmental and social/ socio-economic impacts and participatory processes employed during project design will be documented as well..
- The consultant shall propose next steps in preparing the project, including key components of those steps.
- The consultant will visit key officials involved in the project in Burundi, Rwanda, Uganda and Tanzania. The consultant will be assisted by the Transport Experts through the Regional Project Steering Committee members and in each country.
- Identify other development opportunities associated with improved navigability or associated with interventions to improve navigability.
- Identify sections along the river at which the various interventions may be required. Visualization of the same may be necessary.
- Prepare draft TORs for subsequent studies to pursue improved navigability of Kagera.
- The consultant may offer suggestions and improvements to the ToR where he/she considers it would result in better implementation of this assignment. Such proposal if agreed will form part of the ToR of the assignment.

Outputs

- An Inception report will be submitted within 2 weeks of starting the assignment, describing the envisaged assignment, implementation and management strategy, alteration of work in comparison to what's estimated by ToR, refined work program. The report will be presented to the PMU for comments and approval.
- A draft report on the Navigability of the Kagera River Strategy two months after signing the contract. The draft final, report shall be presented for peer review and feedback to a section of stakeholders.

- The consultant shall submit the Final Report 2 months after signing of the contract, incorporating all necessary and relevant inputs obtained from the workshop. The report shall be submitted in 5 copies including the original. In addition, soft copies of the Final Report will be submitted on 2 CDs. The final report will include (i) A list of studies and documentation compiled;(ii) The institutions consulted during the assignment; (iii) analysis of the information compiled; (iv) proposed next steps regarding update of available studies and new studies required and to carry out load forecast and market assessment studies, pre-feasibility study, feasibility study, communication and stakeholder consultation processes, environmental assessment, financing options study, engineering and design study, etc and (v) review of innovative financing mechanisms for the project.

Five copies of each report shall be submitted in English, however the executive summary shall be submitted in French as well. In addition, soft copies of the Draft Report will be submitted on 2 CDs to the Client. All reports and communication materials developed by the consultant during this assignment shall revert to Project Management Unit.

Project Duration

The duration of the consultancy will be for 2 (two) months and shall start in May 2008 and is expected to be completed by July 2008.

Monitoring and Supervision

The Consultant will be directly be supervised by the Kagera PMU on behalf of the NBI/NELSAP. A Regional Project Steering Committee which consists of 12 high ranking Government Officers from the Governments of Burundi, Rwanda, Tanzania and Uganda will oversee the work of the consultant, while 4 National Liaison Officers one from each of the countries; Burundi, Rwanda, Tanzania and Uganda will coordinate the consultations at the national levels and liaison with the relevant institutions. The outputs from the study will be regularly communicated to the funding agencies (Sida, NORAD and the European Union) through the Nile Equatorial Lakes Subsidiary Action Program Coordination Unit.

Data and Facilitation to be provided by the Client

The Consultant will prepare the programme of work, study and review of all documents relevant to the assignment and the Nile Basin Initiative, consultant with the PMU staff, NEL-CU staff and staff of the national, governments of Rwanda, Tanzania and Uganda staff, consult with relevant institutions in the 4 riparian countries, hold stakeholders meeting at national level to validate the collected information and review the Navigability of the Kagera River. The PMU will provide temporary office space in Kigali at the PMU Offices for consultancy purposes.

On the other hand the Client will provide all the relevant reference documents within their custody, facilitate the consultant through arranging consultative meetings,

facilitation the consultant through arranging consultative meetings and organize meetings of the RPSC for validation of reports

Consultancy and Staffing Requirements

The Consultant should demonstrate past experience in river transport sector in the last fifteen years. The consultancy will require the services of a Civil/Hydraulic engineer who will work with a transport economist. Experience of the staff in integrated river basin management and inland port development will be desirable.

Quality Assurance and Quality Control

The Consultant will be required to demonstrate in their proposal, evidence of adoption of use of a Quality Assurance System (ISO 9001 or equivalent) as well as to describe how quality control will be implemented in the course of the project.