

AFRICAN DEVELOPMENT BANK



Multinational – Malawi, Mozambique, Zambia:

**Feasibility Study for the Shire-Zambezi Waterways
Development Project:**

Appraisal Report

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April 2011

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List of Acronyms

ADB/AfDB	African Development Bank
AICD	African Infrastructure Country Diagnostic Study
AMCOW	African Ministers' Council on Water
AU	African Union
BADEA	Banque Arabe de Développement Economique en Afrique
COMESA	Common Market for Eastern and Southern Africa
EAC	East African Community
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ESMP	Environmental and Social Management Plan
EU	European Union
GTZ	German Agency for Technical Cooperation
ICA	Infrastructure Consortium for Africa
IRR	Internal Rate of Return
JICA	Japanese International Cooperation Agency
JTC	Joint Technical Committee
KfW	Kreditanstalt für Wiederaufbau (Reconstruction Credit Institute)
MDGs	Millennium Development Goals
MLTSF	Medium to Long-Term Strategic Framework
MoU	Memorandum of Understanding
NEPAD	New Partnership for African Development
NPV	Net Present Value
PCR	Project Completion Report
PFS	Project Financial Statements
PMT	Project Implementation Unit
PPP	Public Private Partnership
REC	Regional Economic Community
RBO	River Basin Organisation
SADC	Southern African Development Community
ToR	Terms of Reference
WB	World Bank

Project Information

Client information

Recipient: Southern African Development Community (SADC)
Executing Agency: Southern African Development Community (SADC)

Financing Plan

AWF	EUR 1,745,048
NEPAD-IPPF	USD 1,553,778 (equiv. to EUR 1,123,159 as of 18 th March 2011)
COMESA	EUR 148,680
Malawi, Mozambique & Zambia	EUR 39,900
Total	EUR 3,056,786

Currency Equivalents (18th March 2011)

1 UA = 1.137 Euro
1 UA = 1.573 USD
1 UA = 236.698 MWK
1 UA = 53.982 MZN
1 UA = 7562.226 ZMK

Timeframe (Key milestones)

Application	November 2009
Approval	April 2011
Signature	May 2011
Effectiveness	July 2011
Last disbursement	March 2013
Completion	September 2013

**Multinational – Malawi, Mozambique, Zambia:
Feasibility Study for the Shire-Zambezi Waterways Development Project
Logical framework**

NARRATIVE SUMMARY HIERARCHY OF OBJECTIVE	EXPECTED RESULT	REACH	INDICATOR(S) AND SOURCE	TARGETS AND TIMEFRAME	RISKS /MITIGATION MEASURES
<p>Goal</p> <p>To contribute to the socio-economic development of the region including Malawi, Mozambique and Zambia through the reduction of the cost of transportation by the re-opening of the Shire - Zambezi Waterway for navigation to the Indian Ocean</p>	<p>Impacts</p> <ol style="list-style-type: none"> 1. Cost of transportation of goods reduced 2. Socio-economic development improved 3. Regional integration enhanced 	<p>Populations of Malawi, Mozambique and Zambia; Private businesses in the region</p>	<p>Indicators</p> <ol style="list-style-type: none"> 1. Percentage of the cost of goods accounted for by transportation costs in Malawi, Mozambique and Zambia 2. Prevalence of poverty in Malawi and Northern Mozambique 3. Volume (tons) of trade in goods within the region and with the rest of the World <p>Source: National Statistics Office, Malawi and Mozambique</p>	<ol style="list-style-type: none"> 1. Percentage of the cost of goods accounted for by transportation costs reduced by 50% in Malawi and by 25% in both Zambia and Mozambique by 2020 (Baseline trucking cost rates for hauling commodities from Blantyre to Beira Port are currently at USD 80/ton) 2. Percentage reduction in poverty levels from the current 65.3% of the population (roughly 6.3 million people) to 33% by 2020 3. Exports and imports increased by about 30% in 2020 from USD 560 million and USD 830 million respectively in 2006 	<p>Risks Inadequate financing for the development of inland waterway transport infrastructure</p> <p>Mitigation Measures Active encouragement of private sector participation and donor support through resource mobilisation roundtables</p>
<p>Objectives</p> <p>The purpose of study is to increase the body of knowledge on the Shire and Zambezi Rivers in order to facilitate and explore the feasibility for reopening the waterway for transportation</p>	<p>Outcomes</p> <ul style="list-style-type: none"> • Improved understanding of the technical navigability of the waterway • An appreciation of the financial underpinnings of the project • An appraisal of the socio-economic and environmental impact of the project 	<p>Businesses; RECs, Donors and National Governments</p>	<p>Indicators</p> <ul style="list-style-type: none"> • Resolutions of the Ministerial Council of Project approving the Feasibility Study Report • Resolutions of the Ministerial Council of Project approving the Investment Financing Arrangements Report • Percentage of required financial resources for detailed designs and 	<ul style="list-style-type: none"> • Feasibility Study Report approved by the Council of Ministers by August 2011 • Investment Financing Arrangements Report approved by the Council of Ministers by November 2011 • At least 50% of the required financial resources for detailed designs and investments mobilised by January 2012 	<p>Risks Difficulties in obtaining quality data and information for the Feasibility Study Low private sector and donor commitment to funding the project</p> <p>Mitigation Measures Early consultations and continued sensitisation of the relevant data and information-holding stakeholders Involvement of donors and the</p>

private sector in project from the onset, through consultations and a resource mobilisation roundtable

investments mobilized

Source:
 Quarterly Progress Reports;
 Proceedings of the Council of Ministers Meetings.
 Proceedings of Donors round table

Risks

1. Inadequate coordination and cooperation between the different partners involved in the implementation of the study (particularly the JTC and SADC)

Mitigation Measures

Appropriate measures are to be taken in the selection of the consultants and the different members of the study implementation team to ensure optimum cohesion and performance

Indicators

1.1 Availability of a validated navigability and technical investigations report.

1.1 Validated navigability and technical investigations report available 6 months from study commencement

1.2 Availability of a validated Transport economic and market analysis report.

1.2 Validated transport economic and market analysis report available 6 months from study commencement

1.3 Availability of a validated Environmental and Social Impact Assessment Report

1.3 Validated Environmental and Social Impact Assessment Report, available 6 months from study commencement date

Consultants, Businesses; RECs, Donors and National Governments

Outputs
Feasibility Report for the reopening of the waterway including:

1.1 Navigability and technical investigations report

1.2 Transport economic and market analyses report

1.3 Environmental and Social Impact Assessment Report

Study Components and Activities

Component 1: Waterway Transport Feasibility investigations

Activities:

1.1 Undertake Navigability and Technical Investigations

1.2 Carry out Transportation Economic and Market Analyses

1.3 Conduct Social and Environmental impact Assessment

Component 2: Development of the Waterway Transport Business Plan.

Activities:

2.1. Analyse and determine optimum investment financing and legal/institutional arrangements for the development and the management of the waterway

2.2. Organise and conduct investor conference for resource mobilisation for detailed designs and investments

2.1 Investment financing and legal/institutional arrangements Report

2.2 Investors conference Report

2.1 Availability of approved investment financing and legal/institutional arrangements Report

2.2 Availability of approved investors conference Report

2.1 Approved investment financing and legal/institutional arrangements Report available 10 months from study commencement date

2.2 Approved investors conference Report available 12 months from study commencement date

Component 3: Project Management

Activities:

3. Project Management Activities:

3. Validated interim reports;

Availability of interim

Quarterly progress reports prepared on time; interim

Procure and supervise the Consultants, organize the JTC and Council of Ministers meetings; monitor the implementation of the study; prepare quarterly progress reports and the project completion report

approved final Feasibility Study report; quarterly progress reports; and the project completion report

reports; approved final Feasibility Study report; quarterly progress reports; and the project completion report

reports validated on time; final Feasibility Study report approved 12 months from study commencement; and the project completion report available 15 months from study commencement date

Duration: 24 months

Funding: AWF		EUR	1,745,048
NEPAD-IPPF	USD 1,553,778, equivalent to	EUR	1,123,159
COMESA		EUR	148,680
Malawi, Mozambique & Zambia		EUR	39,900
Total		EUR	3,056,786

EXECUTIVE SUMMARY

Background: As far as a hundred and fifty years ago, the Shire - Zambezi was already used by explorers and missionaries as an inland transportation waterway from the Mozambican coast in the Indian Ocean to the Malawian District of Nsanje, over a distance of 380 km. Recent use of the waterway for transportation dates back to the early 1970s, where barge services transporting sugar cane molasses from Chiromo in Malawi to the port of Chinde in Mozambique were privately operated. Due to past unrest in the Region, goods transportation on the waterway was disrupted and Malawi turned to alternative transport modes on corridors such as Durban and Dar-es-Salaam to continue its external trade.

The economic competitiveness of goods produced in the landlocked countries of Malawi and Zambia and the related socioeconomic development of the countries is seriously hampered by the high transportation costs to and from these countries. Rail and road constitute the main modes of transportation of goods in these countries. In Malawi, goods transportation is largely done by trucks, where the percentage of transportation costs to the total production cost is estimated at 55%, compared to 17% in other developing countries¹. In a recent study of the Malawian smallholder cotton growers, transportation costs were found to be as high as 76.5% of total production costs².

Objectives of the Study: The objective of the study is to increase the body of knowledge on the Shire and Zambezi Rivers to facilitate and explore the feasibility for reopening the waterway for transportation. This will be achieved through the undertaking a detailed Feasibility Study and the preparation of an investment plan. The latter shall be undertaken on the condition that the project is found feasible, and will include plans for resource mobilisation for both the detailed designs study and the physical investments. The waterway, once reopened will provide access for the landlocked countries of Malawi, Zambia and the Northern parts of Mozambique to the Indian Ocean, that:

- Contributes to the reduction of both time and money elements of transport costs to users and hence cost of commodities to end consumers;
- Improves the reliability of the transport system in the region; and
- Reduces the transport externalities such as accidents, and emissions (carbon market).

Description: The proposed detailed feasibility study consists of two main components: i) Waterway Transport Feasibility Investigations that include navigability and naval architecture studies; transport economic and market studies; and environmental and social impact assessment studies; and ii) the Development of the Waterway Transport Business Plan, which includes the analysis and the determination of optimum funding options and legal/institutional arrangements for the development and the management of the waterway, and the organisation of an investors' conference for resource mobilisation for the detailed designs and investments.

Cost and Financing: The study will have a total duration of 24 months from the date of Grant signature. The total cost of the Feasibility Study is estimated at € 3 056 786, to be financed by the AWF, €1 745 048 or 57%; the NEPAD-IPPF, USD 1 553 778 (equivalent to €1 123 159) or 37%; COMESA, €148 680 or 5%; and the three cooperating countries, Malawi, Mozambique and Zambia, €39 900 or 1%.

¹ Malawi Growth and Development Strategy (2006-2011), pg. 20

² Malawi Transport Cost Study, TERA April 2005, pg. 74.

The cooperating countries will provide a vehicle, office space and office equipment for the Project Implementation Unit as well as National Counterpart Staff for the project.

Justification: The study is in line with both the AWF strategy (“Strategic Capital Investment – Project Preparation”) and the NEPAD-IPPF guidelines (preparatory activity for Regional Infrastructure Project), and falls under their Operational Areas. The activity will promote the joint development of shared waters and infrastructure that will foster regional trade, cooperation and integration for greater competitiveness. The shared use of trans-boundary water resources will ensure greater benefits to riparian countries and the region as a whole. It will particularly boost the agricultural development along the waterway through reduction of transport costs and therefore greatly contribute to poverty reduction.

In addition, the arrangements between riparian countries, putting high emphasis on environmental aspects (environmental degradation, water scarcity and climate change and variability), should foster cooperation between them, and further integration of their economies.

Recommendation: It is recommended that Grants not exceeding € 1 745 048 from the AWF and USD 1 553 778 (equivalent to €1 123 159) from the NEPAD-IPPF be extended to the Southern African Development Community (SADC), on behalf of the Governments of Malawi, Mozambique and Zambia for the purpose of implementing the study as detailed in this report.

1. BACKGROUND

1.1 *Origin of the Project*

1.1.1 As far as a hundred and fifty years ago, the Shire - Zambezi was already used by explorers and missionaries as an inland transportation waterway from the Mozambican coast in the Indian Ocean to the Malawian District of Nsanje, over a distance of 380 km. Recent use of the waterway for transportation dates back to the early 1970s, when a private company by the name of Mawtam Ltd operated a barge service transporting cane molasses from Chiromo in Malawi to the port of Chinde in Mozambique. During the civil war in Mozambique, 1977 to 1992, transportation of goods on the waterway was disrupted and Malawi turned to other transport corridors such as Durban and Dar-es-Salaam to continue its external trade.

1.1.2 The transportation of goods to and from the landlocked countries of Malawi and Zambia is predominantly carried out, at present, by road or rail through the major corridors which are now under rehabilitation and which connect the landlocked countries of Malawi, Zambia and Zimbabwe, through Mozambique, Tanzania or South Africa to the major Indian Ocean ports. These transportation costs on these modes currently account for a large percentage of the total costs of imported or exported goods. This cost constraint, further exacerbated by regularly increasing cost of fuel, is continuously driving the search for cheaper means of transportation, particularly by fluvial shipping on the Shire – Zambezi waterway.

1.1.3 A pre-feasibility study, funded by the European Union (EU), was conducted on the Shire - Zambezi Waterways in 2006 indicated that the rivers could be navigable if developed but further studies were required to determine the technical, economic, social and environmental viability and sustainability of the development and the operation of the waterway. A number of other studies on the navigability of the Shire-Zambezi waterway, albeit not officially adopted by the countries, have been carried out by interested parties, including the *Survey of the Navigability of the Zambezi River from Tete to Chinde (Reson)* and the *Study of the Navigability of the Shire-Zambezi Waterways by Conchar, Hansen Marrow and Pitman*, as well as more recent studies on the navigability of the waterway for the transportation of coal in the sub-region funded by private mining companies.

1.1.4 Within the framework of the development plans for the Shire-Zambezi Waterway from Nsanje to Chinde, the Government of Malawi has signed a MoU with a private company for the construction and the operation of the *Nsanje World Inland Port*. Construction work for Phase I of the Port, which covers 56ha and includes a 200m long quay, was commissioned in October 2010. On completion of Phase II, the Port will cover a total area of 300ha and include a railway siding container terminal, warehouses, port offices and other port facilities.

1.1.5 The Common Market for Eastern and Southern Africa (COMESA), on behalf of the Governments of Malawi, Mozambique and Zambia, submitted a request to the Bank on the 13th of November 2009 to support the detailed feasibility study for the re-opening of the Shire-Zambezi Waterways. The request for funding was later endorsed by the Southern African Development Community (SADC) Secretariat in June 2010. The Bank identified the African Water Facility (AWF) and the NEPAD Infrastructure Project Preparation Facility (IPPF) as possible sources of grant support for this project and the Facilities carried out a joint Appraisal Mission to the three cooperating countries in May 2010. The cooperation framework for implementing the Shire Zambezi Waterways Development project is provided by an MoU signed in 2007 between the Governments of Malawi, Mozambique and Zambia.

1.2 Sectoral Priorities

1.2.1 The landlocked geographical position of Malawi and Zambia, and the unreliability of existing routes, compels the countries to prioritise the development and diversification of routes for their imports and exports to the sea for international markets. The Fifth National Development Plan (2006-2010) of Zambia has a strategic focus on the development of sustainable, especially roads, bridges, dams and various means of communication.

1.2.2 Malawi is served by four main border crossings through which international freight is routed. These include: Mchinji on the Zambian border, which handles traffic to and from Zambia and DRC; Mwanza, on the southwest border with Mozambique, which handles traffic to/from Beira and South African ports as well as from the southern African region in general; Nayuchi, on the southeast border with Mozambique, which is the border post for rail traffic going through Nacala; and Songwe, on the Tanzanian border at Songwe River, which uses the North-South Corridor to/from the Port of Dar es Salaam. The Malawi Growth and Development Strategy (2006-2011) prioritises the development of transportation infrastructure, including plans to develop the Shire as a waterway to provide direct access to the ports along the Indian Ocean through the Shire-Zambezi Waterway.

1.2.3 In Mozambique, the development of water transport on the lower Zambezi River is being conducted with the participation of the private sector. Private firms currently operate barges in the lower Zambezi up to the port of Marromeo, 80 km from the coast of the Indian Ocean. The mining of the large quantities of coking coal discovered in the Tete Province of Mozambique is limited by the means of transportation of the coal to the Indian Ocean for export. In order to address this constraint, private companies in the country are conducting a number of studies on the navigability of the lower Zambezi River as well as on the socio-economic and environmental impacts of using the waterway. The Government of Mozambique is proactively pursuing this initiative by issuing to a private company in May 2010, a license to carry out trial runs on the Shire-Zambezi River for a period of one year in order to explore the navigability of the river as well as assess the socio-economic and environmental impacts of river transport activities.

1.2.4 African Union Heads of State and Governments have endorsed the Shire-Zambezi Waterways Development project as a priority project in the promotion of regional integration in the sub-region and in line with the Sharm El Sheikh Commitments by the Heads of State and Government of June 2008 for the Acceleration of the Achievement of Water and Sanitation Development Goals, which emphasized the development of national and shared water resources in Africa. The Shire Zambezi Waterways Development Project is equally considered by SADC as an important project in fostering regional integration in Southern Africa. SADC recognizes the “need to support current initiatives for inland waterways (e.g. Shire Zambezi Waterway)” and notes that “when implemented, the waterway would be a key lifeline for Malawi, Zambia and even Zimbabwe”³.

1.2.5 The development and management of the Shire-Zambezi Waterway will be regulated by a number of protocols and agreements on shared waters in Southern Africa. These include the revised SADC protocol (2000) on shared water resources and management of Trans-boundary waters; the Zambezi River Commission Agreement; and the Shire River Basin Agreement. The waterways will also be operated in line with the African Maritime Transport Charter of July

³ SADC Infrastructure - Development Status Report for Council and Summit September 2009, pg. 64

1994, which is in accordance with the July 1965, New York Convention relating to Transit Trade of Land-locked States.

1.2.6 Given the regional character of the project and its expected impacts on fostering regional integration, further developments of the Shire-Zambezi Waterways Development project will be informed by the Trans-boundary Water Resource Infrastructure Development Study of the Programme for Infrastructure Development in Africa (PIDA, as well as the African Infrastructure Country Diagnosis (AICD) Study. In addition, the monitoring and reporting on the project implementation shall be carried out within the framework of the Roadmap⁴ for Implementation and Reporting on the delivery of the Heads of State and Government commitments, developed by the AfDB in October 2009.

1.3 Problem Definition

1.3.1 The economic competitiveness of goods produced in the landlocked countries of Zambia and Malawi is seriously hampered by the high cost of transportation. Rail and road constitute the main modes of transportation of goods in these countries. In Malawi, trucks currently dominate the transportation of goods and the percentage of transportation costs to the total cost of production is estimated at 55%, compared to 17% in other developing countries⁵. In one study on smallholder cotton growers in Malawi, transportation costs were estimated to be as high as 76.5% of total production costs⁶.

1.3.2 A detailed overview of the existing transport system in the region and its shortcomings could be found in Annexe 6. The high transportation costs in the landlocked countries results from a number of difficulties and constraints faced by each mode of transport. The main corridors used for the import and export of goods from Malawi in particular, the Beira and the Nacala routes, are faced with inefficiencies emanating from administrative and technical problems. The Beira port is shallow and requires frequent dredging; the Nacala port, on the other hand, is a deep water port, but both the access road and rail serving it are currently not reliable and charge high fees. Besides, goods to or from each of the ports still require transshipment through Durban, adding to shipping costs and transit time. The rail link to Nacala is unreliable due to weak infrastructure and perennial flooding and the infrastructure at the port itself is inadequate resulting in lengthy delays. The Durban corridor is the most reliable but the route is far longer and more costly than the Nacala or Beira routes and the transit procedures on the route are a lengthy sequence of intermediate steps, requiring the declaration of the same information by truckers seven times at different locations⁷.

1.3.3 The capacity of the existing road and rail networks could be a limiting factor in the exploitation of the huge coal reserves, estimated at over 3 billion metric tonnes⁸, in the Tete Province of Mozambique. The mining of the coal by two private companies in the area is expected to reach 40 million metric tonnes by 2015, which would exceed the capacity of the Beira and the Nacala routes if major investments are not undertaken within the timeframe. The

⁴ The Roadmap was adopted by AMCOW for reporting to the AU and as a framework for country-level institutions (such as the Ministries responsible for water resources management, Regional Economic Communities and Basin Organisations) to report progress in the implementation of water infrastructure development actions to AMCOW.

⁵ Malawi Growth and Development Strategy (2006-2011), pg. 20.

⁶ Malawi Transport Cost Study, TERA April 2005, pg. 74.

⁷ Malawi – Country Economic Memorandum 2009, Transport & Trade Facilitation (Background Paper).

⁸ 2008 Minerals Yearbook, US Geological Survey, pg 31.3.

much needed revenues from the export of the coal, which is expected to contribute to the socioeconomic development of the country, might be compromised by the low capacity and level of service of existing transport corridors.

1.3.4 The burden of high transportation costs is particularly heavy on the poor of the landlocked countries of Zambia, where 64%⁹ of the population lives on less than 1\$ a day and Malawi with a poverty incidence of 52.4%¹⁰. At 54%¹¹, the poverty incidence in Mozambique is comparable and the rural poor living at great distances from the seaports equally bear the burden of high transportation costs. The Shire – Zambezi Waterways Development Project aims at providing a less costly and more reliable alternative route to the seaports on the coast of the Indian Ocean and should contribute to the socioeconomic development of the three countries as a result of the lower expected costs of transportation, improved competitiveness of exported goods and greater regional integration and cooperation.

1.4 Beneficiaries and Stakeholders

1.4.1 The main beneficiaries of the Feasibility Study are the Governments of Zambia, Malawi and Mozambique, who will use the results of the study, if the project is feasible, for the mobilisation of funds for the development of the Shire-Zambezi Waterway for the ultimate benefit of the populations of the three countries. Other Stakeholders include the Zambezi Basin Commission (ZAMCOM) the Zambezi River Authority, and the Southern African Development Community (SADC) Secretariat.

1.4.2 Potential financiers of the Shire-Zambezi Waterway Development project include the private land and maritime transport companies, transport infrastructure development and mining companies, the European Union (EU), the World Bank (WB), the African Development Bank (AfDB), BADEA, the Kuwaiti Fund, the Saudi Fund, the Japanese International Cooperation Agency (JICA), the People 's Republic of China, the GTZ, and the KfW.

1.5 Objectives of the Study

1.5.1 The objective of the study is to undertake a detailed Feasibility Study for the re-opening of the Shire - Zambezi Waterway for navigation to the Indian Ocean and to prepare an investment plan for resource mobilisation for detailed designs and investments, in case the project is feasible.

1.5.2 The Feasibility Study will investigate the technical, environmental, socioeconomic, institutional, legal and financial viability and sustainability of the waterway development and operation while taking into account the development needs of the riparian countries of the Shire and the Zambezi Rivers, that consist particularly of water infrastructure for transport, safe navigation, security, flood protection, irrigation, hydropower generation, tourism, recreation and environmental services.

⁹ 2005 Human Development Report, UNDP

¹⁰ Malawi Growth and Development Strategy (2006-2011), pg. 3

¹¹ Mozambique - Action Plan for the Reduction of Absolute Poverty (2006-2009).

1.6 Eligibility for both AWF and NEPAD IPPF Grants

1.6.1 The study is in line with the AWF strategy and falls under the Operational Area: “Strategic Capital Investment – Project Preparation”. As a preparatory study for a regional infrastructure project it is also in line with NEPAD-IPPF operational guidelines. The study is an important activity for the promotion of a joint development of shared waters and infrastructure in order to foster regional trade, cooperation and integration for greater competitiveness. The arrangements between riparian countries (Mozambique, Zambia and Malawi), putting high emphasis on environmental aspects (environmental deterioration, water scarcity, and climate change and variability), should foster cooperation between them, and further the integration of their economies.

1.6.2 The waterway project, once implemented will contribute to the reduction of poverty amongst the 40 million people living in the greater Zambezi River Basin. This will be achieved through boosting agricultural activities in lower Shire and Zambezi basins that is expected to result from the development of the waterway for navigation and the mass transportation of goods at lower costs.

1.6.3 The waterway is endorsed as a priority project in the promotion of regional integration in the sub-region and in line by the African Union Heads of State and Government (Sharm El Sheikh Commitments by the Heads of State and Government of June 2008). The project is equally an important priority for SADC as a vehicle for regional integration in Southern Africa and a lifeline for countries like Malawi.

1.6.4 The support for the project will equally enable the lessons learnt from this trans-boundary water resources infrastructure development venture, through regional cooperation, to be applied elsewhere on the continent. In addition, the leveraging effect of the action and the resource mobilisation activities included in the preparatory activities will attract capital investments for the development of the waterway infrastructure as well as for agricultural activities.

2. THE PROJECT

2.1 Impacts

2.1.1 The proposed re-opening of the Shire - Zambezi Waterway for navigation to the Indian Ocean is expected to contribute to the competitiveness of the economies of Malawi, Mozambique and Zambia through the reduction of the cost of transportation. The intervention will also foster regional integration and cooperation in a sustainable manner through the development and the use of shared water resources.

2.1.2 The expected long-term impacts of the action are the reduction of the cost of transportation (preliminary figures from the Prefeasibility Study Report 2006 provides cost reductions from about USD 80 to USD 45¹²) and the improvement of the socioeconomic development of the cooperating countries through the creation of employment during construction and during operations and maintenance of both the water way infrastructure and barges/vessels.

¹² This is a comparison of observed trucking cost rates for hauling commodities from Blantyre to Beira Port with the projected cost rates of waterway transport on Barges from Nsanje to Chinde Ports)

2.2 Outcomes

2.2.1 The main outcomes expected from this study are:

- The prepared and approved Detailed Feasibility Study Report for the re-opening of the Shire - Zambezi Waterway;
- The prepared and approved Investment Financing and Legal/Institutional Arrangements Report for the development and the management of the Shire-Zambezi Waterway; and
- The mobilised financial resources for detailed designs and investments in developing the Shire-Zambezi Waterway.

2.2.2 The attainment of these outcomes will be evidenced by the resolutions of the Ministerial Council of Project approving the Feasibility Study Report and the Investment Plan as well as the percentage of required financial resources mobilized.

2.3 Outputs

2.3.1 The outputs of the proposed Feasibility Study will be attained by taking into account the specific objectives outlined in section 1.5 of this appraisal report. The major outputs of the study are the following:

- The Navigability and Technical Investigations Report;
- The Transport economic and market analysis report;
- The Environmental and Social Impact Assessment Report, including the Environmental and Social Management Plan (ESMP);
- The Investment financing and legal/institutional arrangements Report;
- The Investors conference Report on the resources mobilised; and
- The validated interim reports; approved Final Feasibility Study Report; Quarterly Progress Reports; and the Project Completion Report.

2.4 Activities

2.4.1 The activities of the proposed Feasibility Study are detailed in the draft Terms of Reference found in Annex 5 and will be carried out by a consortium of sector-specialised firms, supported by the Project Implementation Unit and the Executing Agency. The activities are considered hereunder, component by component:

Component 1: Waterway Transport Feasibility Investigations

Activity 1.1: Undertake Navigability and Technical Investigations.

The following tasks will be considered under this activity:

- Hydrographic and Hydrological Surveys: these tasks will indicate and guide the determination of the navigability of the waterway and include (i) the undertaking of surveys and the preparation of drawings of longitudinal profile of the waterways at a scale of 1:100,000 including sounding information showing depth in different colours; (ii) the conducting of the end of the dry season and the end of the rainy season combined bathymetric and hydrographic surveys and the preparation of charts at 1:10000 scale for the Shire River from Nsanje Port in Malawi to the confluence with the Zambezi in Mozambique and for the Zambezi River from the confluence with the Shire River to Chinde Port in Mozambique; (iii) collating and processing existing hydrological data as

well as previous hydrological reports related to the project area including the determination of the effects of climate change and variability; (iv) the compilation of river flow data of both, the Shire in Malawi and the Zambezi rivers, with the latter commencing in Zambia through Cabora Bassa Dam exit and for the combined river flow from the confluence of the two rivers to Chinde; (v) the determination of the other competing needs for water resources (Energy, Agriculture, Domestic, leisure and environmental services) in the Shire-Zambezi Basin Catchment, as well as the adequacy of the source of water for the sustainable navigability of the Shire-Zambezi Waterway taking into account the risks associated with climate change and variability.

- River works, naval architecture and preliminary engineering designs: these tasks include (i) the determination of the types and sizes of barges that can optimally ply the waterway and consistent with the recommendations of environmental impact assessment; (ii) the investigation of port infrastructure development options to ensure the efficient transportation of goods on the waterway; (iii) the planning and the preliminary designs of dredging and river training works that need to be undertaken to optimise the navigability of the Shire-Zambezi waterway, consistent with social and environmental impact assessment recommendations; and (iv) the preparation of preliminary engineering designs of the facilities that need to be built, including quays, docking, navigation equipment, to make the Shire-Zambezi fully navigational.

Activity 1.2: Carry out Transport, Economic and Market Analysis

This activity will determine the feasibility of the development of a waterway transport mode that can contribute to the implementation of an overall efficient multimodal transport system for the countries of Malawi, Mozambique and Zambia, and for the region as a whole.

The following tasks will be considered under this activity:

- Market Analysis: this task includes (i) the assessment of the waterway market capture by carrying out a demand forecast for the new waterway mode based on the assessment of the baseline demand for transport in the region, and its current distribution between the various corridors and modes of transport; the preparation of an origin-destination demand matrix per commodity, for the main commodities traded in the region, and for the “with and without” project scenarios, for the 5, 10, 20 and 30 years’ time horizons; (ii) demand assignment to corridors and modal share will also be carried out under this tasks - based on transport generalised costs, including monetary and non-monetary costs (e.g. time saving, reliability, safety, etc.) the forecasted demand will be assigned to the various transport corridors and modes available, namely, waterway, road and rail for each of the time horizons considered; and (iii) a sensitivity analysis of the forecasts will be undertaken in order to derive an estimate of the optimal transport unit tariffs that future operators of the waterway should charge in order to optimise the project revenues.
- Economic Feasibility Study: under this task, and based on the traffic forecasts, an economic assessment of the impacts on the economies of each of the three countries separately and for the entire region will be undertaken for each project scenario and the impacts on the populations along the waterway corridor will equally be assessed. A quantitative assessment (transport efficiency) cost benefit analysis, will also be conducted for proposed scenarios of the project. And finally, a qualitative assessment (socio-economic impacts) shall be undertaken to identify and evaluate all socio-economic impacts of the project (directly related to the project and wider impacts), which are not easily quantifiable in monetary terms.

Activity 1.3: Conduct Social and Environmental Impact Assessment

Under this activity, the need to protect and to preserve the ecological system of the Zambezi Delta and the sensitive areas as well as the rich biodiversity of the Shire-Zambezi river system will be investigated within the context of operating commercial water transportation on the river system.

The following tasks will be considered under this activity:

- **Socio-Environmental Impact Assessment:** under this task, a survey will be undertaken to evaluate the exposure to the project and the perceptions of the communities living within the Mozambican Provinces of Sofala, Zambezia, and Tete, and the Nsanje District of Malawi. Socio-economic data will be collected to provide technical information on the various activities engaged by the inhabitants adjacent to the waterway corridor. A socio-economic profile of the project with respect to family size, age distribution and education, employment and community organisation shall be prepared. A gender impact assessment will equally be carried out to determine the involvement of women in addressing issues of income generation, the possible effects of the project on women's domestic and social life, the gender dimensions and the constraints of water transportation of persons, the economic and social impacts of the project on gender, and the gender dimensions of health related issues such as HIV/AIDS. Recommendations will be made in order to optimise and maximise the gender gains of the water transport project.
- **Environmental Impact Assessment (EIA):** this task involves the comprehensive environmental study of the Shire-Zambezi Waterway Development Project and will be carried out taking into account the regional strategic plans of the cooperating countries. Using numerical modelling, the technical and environmental viability of the waterway and the short, medium and long-term consequences of navigation on the economic and social activities along the river system will be determined. The technical, environmental and ecological measures required to maintain the navigable channels stable, especially at the Zambezi Estuary, and keep the negative impacts of navigation at minimum will be determined under this task. Finally, an assessment of the impacts (positives and negatives) of the proposed project to the economy, ecology and environment of the Shire-Zambezi River Basin and the consequences of future developments shall be carried out.

Component 2: Development of the Waterway Transport Business Plan

This component shall only be undertaken after the review and acceptance of the technical, socio-economic and environmental feasibility of the project by the three countries individually and jointly. For each of the recommended project scenarios, an investments and transactions analysis to determine the most viable investment scenarios for operationalising the waterway shall be undertaken.

Activity 2.1: Analyse and determine optimum investment financing and legal/institutional arrangements for the development and the management of the waterway.

The following tasks will be considered under this activity:

- Financial Feasibility Study: Under this task, the financial feasibility of the project shall be conducted in order to assess its viability from monetary terms, taking into account all cash flows involved as direct or indirect consequence of the project; various procurement methods for the development and the operation of the waterway will be investigated and the project financial Internal Rates of Return (IRR) and Net Present Values (NPV) computed. Investigations will be carried out on procuring both the capital investments (physical facilities to be constructed under the project, e.g. dredging of the waterway, new ports, navigation aids, any feeder road/rail connections, storage facilities, etc), and the services (procurement of vessels, operation of services), under public, private, or a PPP arrangements, and recommendations made on the option with best value for money.
- Legal and Institutional Feasibility Study: under this task, the following will be considered: (i) the review of the legal frameworks in the three countries in relation to privatisation and concession laws and an assessment the feasible structures for the project; (ii) analysis of the feasibility of private sector involvement in the development and operation of the waterway scheme within the legal frameworks of each of the three countries, and (iii) the review of the legal frameworks in the three countries and the recommendation of an optimal institutional set up for the oversight to enable smooth trans-border operations to take place while ensuring safety, the respect of environmental regulations and healthy competition amongst vessel operators on the waterway.

Activity 2.2: Organise investors' conference for resource mobilisation for detailed designs and investments.

The main tasks under this activity include:

- The undertaking of a review and the consulting of the various financial institutions, both the commercial and the development institutions to assess their appetite for the project and the likely lending terms applicable to similar projects in the region; and consultations with the potential private sector investors to assess their interest in the project and the expected returns on equity.
- The organisation of an investors' conference for resource mobilisation for detailed designs and investments involving both financial development institutions and private sector investors.

Component 3: Project Management

Project Management Activities will be carried out by the Implementation Unit of the study. These activities include: (i) the procurement the services and the supervision of the consortium of consulting firms; (ii) the organising of the Joint Technical Committee (JTC) and Council of Ministers meetings; (iii) the monitoring of the implementation of the study and the evaluation of progress, including financial management and accounting details; and (iv) the preparation of Quarterly Progress Reports and the Project Completion Report.

2.5 Phasing of the Study

For the purpose of optimal use of grant resources available the study will be undertaken in two phases, where phase two will be conditional upon the acceptance of phase one results by the both the Joint Technical and Consultative Committees. The phasing is as follows:

Phase 1: Establish technical, economic, and environmental viability

This first stage will include the following:

- Data collection and analysis from earlier studies. This will be complemented by a hydrographic and hydrologic surveys in the field in order to determine the navigability of the waterway.
- Identification of existing rail/road transport corridor options in the region to assess their potentials, weaknesses and possible solutions to meet the Malawian and Zambian transport demands.
- Development of scenarios for reopening the Shire–Zambezi Waterways for navigation and assessment of their technical, socio-economic, environmental feasibility. The project impacts, will be assessed for each of the three countries involved (Malawi, Mozambique and Zambia) separately and for the region as a whole.
- Subject Feasibility to a review involving the competent institutions of the three countries.

Phase 2: Undertake Detailed Planning and Investment Appraisal

This stage will involve the preparation of detailed technical planning parameters elaborated on the basis of decisions taken by the three countries on the results of the first stage.

For the project scenarios selected by the competent institutions of the three countries at the end of Stage 1 of the study, the Consultant will undertake a study of optimal procurement method including:

- A financial appraisal of each project scenario, testing the viability of procuring the project under a public, private, or a PPP arrangement.
- A legal analysis of the requirements under national legal frameworks and the bilateral agreements, and proposal of an institutional framework for a sustainable and safe operation of transport services on the Shire-Zambezi waterway.

2.6 Risks

2.6.1 The main risks at the impact level that could prevent the implementation of the recommendations of this study and thus lead to a poor attainment of the goals of the Shire Zambezi Waterways Development Project, include inadequate financing for the next steps in the development of the project.

2.6.2 As a mitigation measure, the study is designed to ensure active encouragement of private sector participation and donor support through resource mobilisation roundtables as well as extensive consultations with the potential financial stakeholders of the project.

2.6.3 Different levels of interest in the project among the riparian countries could lead to delays in the study implementation. Also changes in government's priorities may lead to the parallel implementation of competing projects which could cannibalise the waterway project and therefore reduce its attractiveness to private investors and the donors' community.

2.6.4 At the outcome level, the risks identified are difficulties in obtaining quality data and information for the Feasibility Study leading to unsatisfactory outcomes that would not enable private sector and donor to commit to funding the project. In order to reduce this risk, the study is designed with a focus on early consultations and continued sensitisation of the relevant data and information-holding stakeholders as well as on the involvement of donors and the private sector in project from the onset, through consultations.

2.6.5 Inadequate cooperation and coordination between the partners involved in the implementation of the study is considered a risk at the output level. This risk is mitigated by the design of the study execution and management teams, to ensure optimum cohesion and performance.

2.7 Cost and Financing Plan

The total cost of the Feasibility Study is estimated at € 3 056 786, to be financed by the AWF, €1 745 048 or 57.1%; the NEPAD-IPPF, €1 123 159 or 36.7%; COMESA, €148 680 or 4.9%; and the three cooperating countries, €39 900 or 1.3%. The cooperating countries will provide a vehicle, office space and office equipment for the Project Implementation Unit as well as support National Counterpart Staff for the project. The estimated cost of the study, by components and source of funding, is shown in Tables 2.1 and 2.2 respectively. The costs are based on current costs of undertaking similar activities in the region as well as on the financial proposal obtained from a consulting firm from the first attempt at the request for proposals for the study, carried out in May 2008. The detailed cost estimates are presented in Annex 3.

Table 2.1. Cost Estimates by Study Components (EUR) - Excluding Taxes

<i>Study Components</i>	<i>AWF</i>	<i>NEPAD-IPPF</i>	<i>Malawi, Mozambique & Zambia</i>	<i>COMESA</i>	<i>Total</i>
<i>Component 1: Waterway Transport Feasibility investigations</i>	1 044 000	1 069 675	-	-	2 113 675
<i>Component 2: Development of the Waterway Business Plan</i>	265 000	-	-	-	265 000
<i>Component 3: Project Management</i>	352 950	-	38 000	141 600	532 550
<i>Total Cost Excluding Contingencies</i>	1 661 950	1 069 675	38 000	141 600	2 911 225
<i>Contingencies 5% (2% price; 3% physical)</i>	83 098	53 484	1 900	7 080	145 561
<i>Total Cost Including Contingencies</i>	1 745 048	1 123 159	39 900	148 680	3 056 786
Percentages	57.09%	36.74%	1.31%	4.86%	100.00%

Table 2.2. Cost Estimates by Expenditure Categories (EUR) - Excluding Taxes

<i>Categories of Expenditure</i>	<i>AWF</i>	<i>NEPAD-IPPF</i>	<i>Malawi, Mozambique & Zambia</i>	<i>COMESA</i>	<i>Total</i>
<i>Consulting Services</i>	<i>1 309 000</i>	<i>1 069 675</i>	<i>-</i>	<i>-</i>	<i>2 378 675</i>
<i>Miscellaneous Services (workshops, meetings, quality control)</i>	<i>351 150</i>	<i>-</i>	<i>6 000</i>	<i>141 600</i>	<i>498 750</i>
<i>Goods</i>	<i>1 800</i>		<i>32 000</i>		<i>33 800</i>
<i>Sub-total</i>	<i>1 661 950</i>	<i>1 069 675</i>	<i>38 000</i>	<i>141 600</i>	<i>2 911 225</i>
<i>Contingency (5%) (physical 3%; financial 2%)</i>	<i>83 098</i>	<i>53 484</i>	<i>1 900</i>	<i>7 080</i>	<i>145 561</i>
<i>Total</i>	<i>1 745 048</i>	<i>1 123 159</i>	<i>39 900</i>	<i>148 680</i>	<i>3 056 786</i>

3 IMPLEMENTATION ARRANGEMENTS

3.1 Recipient and Executing Agency

3.1.1 The original request for grants funding was received from COMESA, on behalf of the Governments of Malawi, Mozambique and Zambia. Thus COMESA was proposed as grants recipient, whilst SADC as the executing agency. Following review by the Bank, it was suggested that such arrangement presents the risk of inadequate coordination between the two institutions, particularly with respect to financial management. Consequently the Bank proposed that either SADC or COMESA should be both Recipient and Execution Agency with the other providing informal support. This proposal was discussed at the 6th Joint Consultative Meeting of Ministers on the Shire-Zambezi Waterways Project and the Recipient role attributed to SADC.

3.1.2 As the Grant Recipient, SADC, shall represent the Governments of Zambia, Mozambique and Malawi and shall therefore sign the Grants Agreements with the AfDB. The Executing Agency shall also be SADC Secretariat and shall therefore be responsible for the contractual, financial and administrative management of the study as well as for budget management, disbursements and ensuring project management functions. COMESA will provide support as and when needed in areas such as the procurement of the services of the Consultants for conducting the Feasibility Study and the review of its key deliverables.

3.1.3 SADC, with technical support from COMESA, has in place an infrastructure and financial management department and experience is implementing projects financed by multi-lateral agencies including the European Union, the World Bank and the AfDB. Its capacity to ensure the efficient implementation of the study is therefore considered satisfactory.

3.2 Organisation, management and implementation of the study

3.2.1 The day-to-day management and coordination of the project will be undertaken by the Executing Agency supplemented individual Consultant and an Administrative Assistant.

3.2.2 Project Focal Persons will be appointed in the three countries to facilitate project implementation within their respective countries. Project Quality Control Experts, who shall be experts in the relevant disciplines, will be recruited on short term basis to supervise the work of the Consultants and review & validate deliverables.

3.2.3 The Joint Technical Committee (JTC), established under the MoU between the three countries to govern the project, will exercise oversight functions on the study implementation and shall review and approve all reports prepared by the Consultants. The JTC shall comprise representatives of the three countries, SADC and COMESA, and shall include the following expertise:

- Maritime Transport Economist
- Waterway/Maritime Engineer
- Water Resources Environmentalist
- Fisheries Specialist

3.2.4 The Joint Consultative Committee of Ministers, also established under the MoU, comprising Ministers responsible for Transport and other lead ministries of the three countries shall approve the draft and final Feasibility Study reports. The structure adopted for the management and monitoring of the study is shown in Figure 3.1 overleaf.

3.2.5 The role of managing the tasks under the project will be undertaken by the AfDB AWF and NEPAD IPPF departments and with the support from Legal, Financial Control and Procurement Departments in fiduciary aspects of grant administration. The Bank field Offices in the three countries will provide ad hoc support on similar aspects to the Execution Agency and the PMT as and when required.

Figure 3.1. Project Management Structure



3.2.6 The strategy adopted to ensure the achievement of the expected outputs of the study consists of the undertaking of the study by Consultants, supported by:

- (i) The National Focal Points who will arrange meetings with the government representatives, provide the necessary data and facilitate obtaining licenses and permits for conducting the study. Their fees and expenses will be paid by COMESA contribution and their recruitment will be competitive and in accordance with COMESA’s rules of procedures.
- (ii) Quality Control Experts will provide specific expertise and ensure that field surveys are undertaken according to the TOR requirements. Their recruitment will be undertaken in accordance with Bank rules for the recruitment of individual consultants.

The detailed Terms of Reference for the Consultants are presented in Annex 5 to this document.

3.3 Performance Plan

3.3.1 The performance indicators shown in Table 3.1 will be used in monitoring the attainment of the outputs of the study during implementation.

Table 3.1. Performance Plan

Outputs	Indicators	Targets and Timeframe
<p><u>Component 1</u></p> <p>1.1 Navigability and technical investigations report 1.2 Transport economic and market analysis report 1.3 Environmental and Social Impact Assessment Report</p>	<p>1.1 Availability of a validated navigability and technical investigations report. 1.2 Availability of a validated transport economic and market analysis report. 1.3 Availability of a validated Environmental and Social Impact Assessment Report.</p>	<p>1.1 Validated navigability and technical investigations report available 11 months from study commencement. 1.2 Validated transport economic and market analysis report available 6 months from study commencement. 1.3 Validated Environmental and Social Impact Assessment Report, available 9 months from study commencement date.</p>
<p><u>Component 2</u></p> <p>2.1 Investment financing and legal/institutional arrangements Report 2.2 Investors Conference Report</p>	<p>2.1 Availability of approved investment financing and legal/institutional arrangements Report. 2.2 Availability of approved Investors Conference Report.</p>	<p>2.1 Approved investment financing and legal/institutional arrangements Report available 15 months from study commencement date. 2.2 Approved investors conference Report available 17 months from study commencement date.</p>
<p><u>Component 3</u></p> <p>3. Validated interim reports; approved final Feasibility Study report; quarterly progress reports; and the Project Completion Report</p>	<p>3. Availability of interim reports; approved final Feasibility Study report; quarterly progress reports; and the project completion report.</p>	<p>3. Quarterly progress reports prepared on time; interim reports validated on time; final Feasibility Study report approved 18 months from study commencement; and the project completion report available 21 months from study commencement date.</p>

3.4 Implementation Schedule

3.4.1 The Project is expected to be completed within a period of twenty four (24) months, comprising 18 months for the implementation of the study and 6 months for the recruitment of the Consultants and for carrying out the activities leading up to effectiveness of the Grant.

3.4.2 The proposed schedule of the main activities is presented in Table 3.2. The preparatory phase with mobilisation and procurement of consultants and other preparations will start with a Launching Workshop between the Recipient, the Executing Agency, the Project Management Team and AWF-IPPF to clarify and affirm the procedures, reporting schedules, no-objection requirements, and other applicable cooperation arrangements.

3.4.3 The Consultants will submit an inception report and work plans to the Executing Agency for approval within six weeks of the study commencement. After the approval of the Consulting firm's plan of work, methods and tools, the timing for the starting and the completion of the different activities will be in accordance with the summary implementation schedule (Table 3.1.) The detailed Implementation Schedule is presented in Annex 4.

Table 3.2. Summary Activity implementation schedule

Activity	Duration in months																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Activities leading up to grant effectiveness and Procurement of Consultancy Services	■																								
Consultant Mobilisation, Licenses, Visas, etc							■																		
1,1: Navigability & Technical Investigations									■									■							
1,2 : Transport Economic & Market Analyses									■																
1,3 Social & Environmental Impact Assessment									■																
2,1 Analysis and determination of optimum investment financing and legal/institutional arrangements																			■						
2,2 Organise investors' conference for resource mobilisation for detailed designs and investments																								■	
3 Project Management Activities	■																								

3.5 Procurement Arrangements

3.5.1 The procurement of consultancy services for the Feasibility Study will be carried out in accordance with the *Bank's Rules and Procedures for the Use of Consultants* using the relevant Bank Standard Bidding Documents. Procurement arrangements for the services required for the study are summarised in Table 3.3; the costs shown are based on the detailed cost estimates given in Annex 3.

Table 3.3. Summary of Procurement Arrangements for the Study (EUR) – Excluding Taxes

Procurement Categories	Shortlist	Other**	Total
<i>Services</i>			
	2 497 609	-	2 497 609
Consulting Services	AWF (1 374 450)	-	AWF(1 374 450)
	IPPF (1 123 159)		IPPF (1 123 159)
<i>Miscellaneous Services</i>	-	-	-
Project Coordinator	(100 800)	-	100 800
Administrative Assistant	(25 200)	-	25 200
Quality Control Experts	25 200	-	25 200
	(15 120)	-	(15 120)
3 National Focal Persons (Senior Officials)*	-	75 600	75 600
PMT Support Staff (driver, cleaner)	-	(12 600)	12 600
PMT & Quality Control Experts travel expenses	-	(128 888)	128 888
JCT Meetings	-	47 250	47 250
Ministerial Committee Meetings	-	15 750	15 750
Investors Conference (Resource Mobilisation)	-	(63 000)	63 000
Project Office Rents	-	6 300	6 300
PMT Running Expenses	-	(24 990)	24 990
<i>Goods</i>			
Vehicle Acquisition	-	31 500	31 500

Project Office Equipment	-	2 100	2 100
<i>Total Cost of Study</i>	2 648 809	407 978	3 056 786
<i>Total AWF Grant</i>	(1 515 570)	(229 478)	(1 745 048)
<i>Total NEPAD-IPPF Grant</i>	(1 123 159)		(1 123 159)

The figures in brackets represent the amounts financed by the AWF;

*** Other refers to SADC procedures for the procurement of goods and the services of the National Focal Persons as well as to direct procurement of services, related to the organisation of meetings.*

3.5.2 Procurement of consultancy services leading to contract award shall follow the short-listing procedures and utilising the quality and cost based selection (QCBS) process. The Specific Procurement Notice (SPN) for this contract shall be advertised in the UNDB on line and on the Bank's Website in addition to posting it in at least one newspaper of national circulation in Malawi, Mozambique and Zambia, also preferably in any official gazettes or electronic portals of these countries with free access. The *Bank Standard Request for Proposal (RFPs) document* shall be used. The Consultancy Firm shall undertake the study in accordance with the Terms of Reference presented in Annex 5. A single consultancy contract, amounting to €2 497 609, shall be procured for i) the Waterway Transport Feasibility Investigations; and ii) the development of the Waterway Business Plan.

3.5.3 Recruitment of the services of an individual consultant as Project Coordinator, estimated at €100 800 and the services of an Administrative Assistant, estimated at €25 200, as well as the services of Quality Control Experts, estimated at €25 200, shall be undertaken in accordance with the *Bank Guidelines for Individual Consultants* following short-listing procedures. The request for expressions of interest (EOI) shall be published in at least one newspaper of national circulation in Malawi, Mozambique and Zambia and in any official gazettes or electronic portals of these countries with free access as well as in appropriate sub-regional newspapers.

3.5.4 The services of support staff for the Project Implementation Unit (PMT), estimated at € 12 600, shall be procured by direct negotiations with individual service providers, given the limited amounts involved that these services are readily available.

3.5.5 Miscellaneous expenditures falling under project management costs and estimated at € 63 000 for the organisation of an Investors' Conference, € 128 888 for traveling expenses and €24 990 for PMT running costs will be carried out using the existing administrative and/or accounting procedures of the Bank, in the course of the implementation of project management activities (office supplies, airline tickets, hotels, per diems), by the Programme Management Team.

3.5.6 Services related to the organisation of JTC meetings estimated at € 47 250 and Ministerial Committee meetings, estimated at € 15 750, will be procured directly from the appropriate service providers during the course of the implementation of the study (airlines, hotels, per diems) in accordance with SADC procedures. The services of three National Focal Persons, estimated at € 75 600, shall equally be procured in accordance with SADC procedures. PMT rented office space, estimated at €6 300, shall be procured in accordance with Government of Malawi procedures.

3.5.7 Goods comprising a vehicle, estimated at € 31 500, and office equipment, estimated at €2 100, shall be procured in accordance with Government of Malawi procedures.

3.5.8 The Appraisal Mission assessed the capacity of the Executing Agency and the Recipient with respect to staffing, accounting and internal control systems in place and found these sufficient. Procurement will be undertaken by the PMT, which will be coordinated by a Project Manager assisted by an Administrative Assistant. In the evaluations for the recruitment of these key PMT staff, familiarity with the Bank’s procedures will be a criterion.

3.5.9 *Procurement Plan:* The Executing Agency shall prepare and submit a Procurement Plan acceptable to the Bank before Effectiveness, setting forth: (a) the particular contract for the consulting services, during the life of the study; (b) the proposed mode of procurement; and (c) the related Bank review procedures (prior or post review). The Executing Agency shall update the Procurement Plan annually or as needed throughout the duration of the study. Any revisions proposed to the Procurement Plan shall be furnished to the Bank for its prior approval. The Executing Agency shall implement the Procurement Plan in the manner in which it has been approved by the Bank.

3.6 *Disbursement Arrangements*

3.6.1. The Special Account shall be used for the payment of i) Quality Control Experts services; ii) Project management expenditures; and iii) expenditures related to offices running costs, travel expenses and the organisation of meetings. The Special Account shall be opened by SADC and shall be denominated in foreign currency in a bank acceptable to the AfDB. The operation of the account will be the sole responsibility of SADC.

3.6.2 The consultancy services fees shall be paid using the Direct Payment Method upon verification and certification of invoices by the PMT, in accordance with the AfDB’s disbursement rules and procedures.

3.6.3 The Special Account shall be replenished on the condition that the preceding advance have been utilised and justified up to at least 50 percent and that all previous advances have been fully justified. A disbursement schedule based on the activity implementation schedule is presented in Table 3.4 below.

*Table 3.4: Disbursement Schedule - AWF & IPPF Grants in Euro
(Excluding Consultancy Services)*

Financing sources	1st Tranche	2nd Tranche	Total
AWF	222 359	148 239	370 598
IPPF	0	0	0
Total AWF/IPPF	222 359	148 239	370 598
% of total	60%	40%	100%

3.6.4 The financial management capacity of SADC, with COMESA support, was found to be adequate, considering the relatively small number of financial transactions expected in the study. Therefore, payments will be made to the Consultant based on the Executing Agency assessment of the work flow and the performance with respect to the terms of reference (ToR) of the assignment.

3.7 *Accounting and Audit Arrangements*

3.7.1 The Executing Agency shall maintain adequate records to account for the receipt of grant funds and disbursements made in payments for services rendered. The Recipient will equally

ensure the custody of supporting documents and the preparation of Project Financial Statements (PFS), ready for audit reviews. The Bank shall arrange for the audit of PFS. Progress Reports shall include such financial information.

3.8 *Supervision, Monitoring, Evaluation and Reporting Arrangements*

3.8.1 The Executing Agency shall be responsible for the day to day supervision of the consultancy services and for liaising with the Consultants to ensure timely production and delivery of the outputs of the study.

3.8.2 The Project Joint Technical Committee (JTC) shall ensure the quality of the Study and the reports delivered by the Consultants. These reports, prepared at various stages of the assignment, will be reviewed and validated by JTC and approved by and the Joint Consultative Committee of Ministers, at planned meetings. These meetings will ensure that the outputs presented are acceptable before proceeding with downstream activities of the study.

3.8.3 Furthermore, the Study has built-in a team of Quality Control Experts who assist in reviewing all interim reports prepared by the Consultants. The Experts will also provide peer review of the Consultants' outputs at key points in its assignment to help identify any major issues that might have been overlooked or could be a source of contention.

3.8.4 The Executing Agency shall submit quarterly progress reports to the Bank in a form to be agreed with all partners, and that clearly indicates the level of attainment of results and addresses any discrepancies from the set targets.

3.8.5 The Executing Agency shall prepare and submit a final report of implementation attesting to the completion of the study and showing lessons learnt from the implementation.

4 PROJECT BENEFITS

4.1 *Effectiveness and Efficiency*

4.1.1 The experience and the capacity of the Recipient and Executing Agency SADC Secretariat, supported by COMESA Secretariat, will ensure that the outputs of the study are effectively attained. This capacity is further complemented in the implementation of the study by the quality control measures included in the study, such as the Joint Technical Committee and the Quality Control Experts. The latter will control the quality of the results of the study and thus improve the level of attainment of its objectives. The design of the study is centred on the effective participation of all the three cooperating countries as well as on the involvement of other key stakeholders of the private sector and donors, from the onset. This approach should ensure the effective attainment of the goals of the project in the long run.

4.1.2 The strategy of procuring the consultancy services for the study in one package to be undertaken by a single firm or a consortium of sector specialised firms should ensure greater coherence in results of this complex study and result to an efficient and timely implementation of the study and the achievement of quality outputs. The efficient implementation will equally be ensured by the support to be provided by the National Focal Persons of the project, who will be at the level of senior officials from each of the cooperating countries. The latter will play a crucial role as facilitators in their respective countries, to enable the consultants access to data, organise surveys, organise meetings with authorities, etc, as well as providing guidance on the coherence of the proposed project options with countries policies and expectations.

4.1.3 The subsequent implementation of the recommendations of the Feasibility Study, which aim at developing the Shire-Zambezi Waterway to provide direct and efficient access to ports on the coast of the Indian Ocean to the landlocked countries of Malawi, Zambia and even Zimbabwe for international trade, will reduce the cost of transportation and increase the economic competitiveness of the sub-region and thereby contribute to poverty reduction and improvement of the living conditions of the populations of the sub-region.

4.2 *Viability*

4.2.1 The financial resources required for the implementation of the study are provided principally by the grants from the AWF and the IPPF and cover the cost of the consultancy services and some project management costs. Complementary financial and human resources required to cover the remainder of the project management costs and ensure the successful implementation of the study will be provided by the cooperating countries and COMESA. This, together with the organisational and management capacity of the Executing Agency, improves the chances of implementing the study successfully.

4.2.2 The participatory approach adopted in the management of the study, jointly by experts from the three countries, in the Joint Technical Committee, together with the SADC Secretariat and COMESA and the requirement to obtain the endorsement of the results of the study at key stages at the ministerial level of the three participating countries is designed to ensure a high quality study that provide good framework for a consensus among the countries to proceed with the project implementation.

4.3 *Sustainability*

4.3.1 Measures taken in the study design to ameliorate the technical sustainability of its outputs include the rigorous selection process adopted for the procurement of the services of Consultants for the study, provision of a team of Quality Control Experts who will provide additional measure to improve the technical quality of the study allows for greater sustainability.

The institutional sustainability of the outputs and the outcomes of the study are guaranteed by the satisfactory capacities of the Executing Agency, the SADC Secretariat.

4.3.2 The strategy adopted in the study design to obtain the endorsement and the adoption of the results of the study at the highest level in the cooperating countries, represented by the Joint Consultative Ministerial Committee, will improve the level of commitment of the sub-region's leaders to implement the recommendations of the study. This measure will lead to a high level of achievement of the expected impacts of the project, which was endorsed by the Heads of State and Government Summit of the AU as a project of paramount importance to regional integration.

4.3.3 The environmental and social sustainability of the Feasibility Study outputs will be ensured by conducting the study in accordance with the guidelines and procedures for Environmental and Social Safeguards of the AfDB, which promote the mainstreaming of environmental and social considerations in all interventions it supports. Furthermore, the Bank's experts who will review the outputs of the study will ensure that environmental and social issues have been adequately addressed in accordance with its well-developed policies and strategies on cross-cutting themes including gender, the environment and climate change.

4.3.4 The terms of reference of the Study will put particular emphasis on the detailed investigation of the gender dimensions of the impacts of the project and the designing of an Environmental and Social Management Plan (ESMP). The ESMP will address the gender dimensions and will propose specific measures to optimise and maximise the gender gains of the project for the benefit of women, children and the youth in the project area.

4.3.5 The participatory approach adopted in the monitoring and the implementation of the study, which includes the validation of its results and recommendations by the Environmental Protection Agencies (EPAs) of the three cooperating countries and by the main River Basin Organisations (RBOs) of the sub-region, will also improve the environmental and social sustainability of the outputs of the study. The EPAs and the RBOs are mandated to uphold and promote the application of integrated water resources management principles at trans-boundary level and their contributions will thus improve the sustainability of the outputs of the Feasibility Study.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

5.1.1 The Feasibility Study for the development of the Shire-Zambezi Waterway will investigate the socioeconomic, environmental, technical, institutional and financial feasibility of the development project as well as provide recommendations on how to address the sub-region's low economic competitiveness which is a direct result of its high transportation costs and is one of the impediments to the socioeconomic development of the landlocked countries of Malawi and Zambia. Through the Study, a business plan for mobilisation of resources for the development and the management of the waterway will be prepared in the event that the feasibility of the project is demonstrated.

5.1.2 The implementation of the waterway development project will contribute to improving the competitiveness of the sub-region and the living conditions of its people. The expected impacts of the project include an improvement of the socioeconomic development of the sub-region.

5.2 *Recommendations*

5.2.1 Based on a critical assessment of the relevance, effectiveness, and sustainability of the Project, as well as the credibility and capacity of the Recipient and the Executing Agency, it is recommended that a grant not exceeding €1 745 048 from the AWF and USD 1,553,778 (equivalent to Euro 1,123,159) from the NEPAD-IPPF be extended to the Southern African Development Community (SADC), on behalf of the Governments of Malawi, Mozambique and Zambia for the purpose of implementing the study as described in this report. These amounts represent 94% of the total project cost equivalent to € 3 056 786. The grants shall be extended to the Recipient subject to the following specific conditions:

5.2.2 The Conditions precedent to entry into force of the Grant Protocol Agreements and First Disbursement are as follows

The Grants shall enter into force upon signature. The First Disbursement of the Grants shall be conditional upon the fulfilment of the following conditions:

The Grant Recipient shall provide evidence that:

- a) The Individual Consultant to support the Executing Agency has been recruited (§3.2.1); and that the three National Focal Persons have been appointed, one in each of the cooperating countries (§3.2.1); and
- b) A Special Account denominated in foreign currency has been opened in a bank acceptable to the Bank for the disbursement of the AWF Grant and signatories acceptable to the Bank have been designated.

Annex 1: Map of the Project Sub-Region



Disclaimer

This map was provided by the African Development Bank exclusively for the use of the readers of the report to which it is attached. The names used and the borders shown do not imply on the part of the Bank and its members any judgment concerning the legal status of a territory nor any approval or acceptance of these borders.

Annex 2: Map of the Project alignment



Annex 3: Detailed Cost Estimates

mm = Man-Months; LS=Lump sum; m = month.						Sources of Financing (€)			
Item N°	Description	Units	Quantity	Unit Cost (€)	Total Cost (€)	AWF	NEPAD - IPPF	Malawi, Mozambique & Zambia	COMESA
	Component 1: Waterway Transport Feasibility investigations								
	Activity 1: Navigability & Technical Investigations								
1	Team Leader (Transport Planner.)	mm	6.0	16 000	96 000	96 000	-		
2	Assistant Team Leader (Civil Engineer)	mm	6.0	12 000	72 000	72 000	-		
3	Naval Architect	mm	2.0	12 000	24 000	24 000	-		
5	Hydrographer	mm	2.0	12 000	24 000	24 000	-		
6	Field Surveyor	mm	2.0	12 000	24 000	24 000	-		
7	Assistant Field Surveyor	mm	2.0	10 000	20 000	20 000	-		
8	Dredging Expert (Civil Eng)	mm	2.0	12 000	24 000	24 000	-		
	Hydrologist	mm	2.0	12 000	24 000	24 000	-		
9	Ports Engineer	mm	1.0	12 000	12 000	12 000	-		
15	Geologist		2.0	12 000	24 000	24 000	-		
18	Hire of equipment for Hydrographic / Bathymetric Surveys	LS	1.0	85 000	85 000	85 000	-	-	
19	Hire of equipment for Navigability Surveys	LS	1.0	25 000	25 000	25 000	-	-	
20	Hire of equipment for Hydrological Fluvial Morphology Surveys	LS	1.0	70 000	70 000	70 000	-	-	
22	Office Rents	m	6.0	1 000	6 000	6 000			
23	International Flights	Trip	40.0	2 500	100 000	100 000			
24	Local Transport Costs (Vehicle Hire)	m	6.0	5 000	30 000	30 000			
26	Per diem	LS	1.0	150 000	150 000	150 000			
27	Housing Allowance (long-term Experts)	mm	6.0	1 500	9 000	9 000			
28	Plans, Drawings & Reports	LS	1.0	100 000	100 000	100 000			
29	Translation of Documents	LS	1.0	50 000	50 000	50 000			
30	Miscellaneous Expenses: (computers & software, visas, permits & other fees, Communication & Consumables)	LS	1.00	75 000	75 000	75 000	-		

mm = Man-Months; LS=Lump sum; m = month.						Sources of Financing (€)			
Item N°	Description	Units	Quantity	Unit Cost (€)	Total Cost (€)				
	Activity 2: Transport Economic & Market Analyses								
31	Team Leader (Transport Planner)	mm	3.0	16 000	48 000	-	48 000		
32	Assistant Team Leader (Transport Economist)	mm	3.0	12 000	36 000	-	36 000		
39	Port Operations Expert	mm	1.0	12 000	12 000	-	12 000		
41	Logistics/Multimodal Expert	mm	2.0	12 000	24 000	-	24 000		
42	Social-economic Expert	mm	1.0	12 000	12 000	-	12 000		
46	Finance Expert	mm	2.0	12 000	24 000	-	24 000		
	Economist/Statistician	mm	6.0	12 000	72 000	-	72 000		
51	Data Acquisition	LS	1.0	93 675	93 675	-	93 675		
52	Office Rents	m	3.0	1 000	3 000	-	3 000		
53	International Flights	Trip	8.0	2 500	20 000	-	20 000		
54	Local Transport Costs (Vehicle Hire)	m	3.0	5 000	15 000	-	15 000		
56	Per diem	LS	1.0	60 000	60 000	-	60 000		
57	Housing Allowance (long-term Experts)	mm	3.0	1 500	4 500	-	4 500		
58	Plans, Drawings & Reports	LS	1.0	50 000	50 000	-	50 000		
59	Translation of Documents	LS	1.0	25 000	25 000	-	25 000		
60	Miscellaneous Expenses: (computers & software, visas, permits & other fees, Communication & Consumables)	LS	1.00	30 000	30 000	-	30 000		
	Activity 3: Social & Environmental Impact Assessment								
61	Team Leader (Transport Planner)	mm	3.0	16 000	48 000	-	48 000		
62	Assistant Team Leader (Environmentalist)	mm	3.0	12 000	36 000	-	36 000		
64	Legal/Institutional Expert	mm	1.0	12 000	12 000	-	12 000		
65	Hydrologist	mm	1.0	12 000	12 000	-	12 000		
70	Environmental Expert	mm	4.0	12 000	48 000	-	48 000		
71	Logistics/Multimodal Expert	mm	1.0	12 000	12 000	-	12 000		
72	Social/Gender Expert	mm	4.0	12 000	48 000	-	48 000		
73	Transboundary Water Resources Expert	mm	2.0	12 000	24 000	-	24 000		
74	Ecologist	mm	7.0	12 000	84 000	-	84 000		
75	Geologist	mm	1.0	12 000	12 000	-	12 000		
82	Office Rents	m	3.0	1 000	3 000	-	3 000		
83	International Flights	Trip	10.0	2 500	25 000	-	25 000		
84	Local Transport Costs (Vehicle Hire)	m	3.0	5 000	15 000	-	15 000		

mm = Man-Months; LS=Lump sum; m = month.						Sources of Financing (€)			
Item N°	Description	Units	Quantity	Unit Cost (€)	Total Cost (€)				
86	Per diem	LS	1.0	72 000	72 000	-	72 000		
87	Housing Allowance (long-term Experts)	m	3.0	1 500	4 500	-	4 500		
88	Plans, Drawings & Reports	LS	1.0	30 000	30 000	-	30 000		
89	Translation of Documents	LS	1.0	25 000	25 000	-	25 000		
90	Miscellaneous Expenses: (computers & software, visas, permits & other fees, Communication & Consumables)	LS	1.00	30 000	30 000	-	30 000		
	<i>Sub-total Component 1 - Excl Contingency</i>				<i>2 113 675</i>	<i>1 044 000</i>	<i>1 069 675</i>	-	-
	Contingency 5% (2% price; 3% physical)	%	5		105 684	52 200	53 484	-	-
	<i>Sub-Total Component 1</i>				<i>2 219 359</i>	<i>1 096 200</i>	<i>1 123 159</i>	-	-
	Component 2: Development of the Waterway Business Plan								
91	Team Leader (Transport Planner)	mm	0.0	16 000	-				
92	Assistant Team Leader (Financial Analyst)	mm	3.0	12 000	36 000	36 000			
93	Naval Architect	mm	1.0	12 000	12 000	12 000			
94	Legal/Institutional Expert	mm	2.0	12 000	24 000	24 000			
106	Finance Expert	mm	3.0	12 000	36 000	36 000			
	PPP Expert	mm	2.0	12 000	24 000	24 000			
112	Office Rents	m	0.0	1 000	-	-			
113	International Flights	Trip	8.0	2 500	20 000	20 000			
114	Local Transport Costs (Vehicle Hire)	m	3.0	5 000	15 000	15 000			
116	Per diem	LS	1.0	48 000	48 000	48 000			
117	Housing Allowance (long-term Experts)	mm	0.0	1 500	-	-			
118	Plans, Drawings & Reports	LS	1.0	10 000	10 000	10 000			
119	Translation of Documents	LS	1.0	20 000	20 000	20 000			
120	Miscellaneous Expenses: (computers & software, visas, permits & other fees, Communication & Consumables)	LS	1.00	20 000	20 000	20 000			
	<i>Sub-total Component 2 - Excl Contingency</i>				<i>265 000</i>	<i>265 000</i>	-	-	-

mm = Man-Months; LS=Lump sum; m = month.						Sources of Financing (€)			
Item N°	Description	Units	Quantity	Unit Cost (€)	Total Cost (€)				
	Contingency 5% (2% price; 3% physical)	%	5		13 250	13 250	-	-	-
	Sub-Total Component 2				278 250	278 250	-	-	-
	Component 3: Project Management								
121	Project Coordinator (Transport Eng./Economist)	mm	12	8 000	96 000	96 000			
122	Administrative Assistant	mm	12	2 000	24 000	24 000			
123	Quality Control Experts (Transport Economist/Engineer, Hydrologist, Civil Engineer, Hydrographer, Environmentalist, Sociologist)**	mm	12	2 000	24 000	14 400			9 600
	3 National Focal Persons (Senior Officials)*	mm	36	2 000	72 000				72 000
124	PMT Support Staff (driver, cleaner)	mm	24	500	12 000	12 000			
	Per diems for Project Coordinator	day	120	150	18 000	18 000			
	Per diems for Quality Control Experts	day	365	150	54 750	54 750			
125	JCT Meetings*	U	3	15 000	45 000				45 000
	Ministerial Meetings**	U	2	7 500	15 000				15 000
126	Investors Conference (Resource Mobilisation)	U	1	60 000	60 000	60 000			
127	Regional Flights	Trip	50.0	1 000	50 000	50 000			
128	Vehicle Acquisition	U	1.0	30 000	30 000			30 000	
	Vehicle Operation Cost	m	12.0	500	6 000	6 000			
129	Project Office Rents	m	12	500	6 000			6 000	
130	Project Office Equipment	LS	1	2 000	2 000			2 000	
131	Office consumables	m	12	150	1 800	1 800			
132	Reports (Preparation and dissemination)	LS	1	10 000	10 000	10 000			
133	Communications (Telephone +Internet)	m	12	500	6 000	6 000			
	Sub-total Component 3 - Excl Contingency				532 550	352 950	-	38 000	141 600
	Contingency 5% (2% price; 3% physical)	%	5		26 628	17 648	-	1 900	7 080
	Sub-total Component 3				559 178	370 598	-	39 900	148 680
	Total Cost Excluding Contingencies				2 911 225	1 661 950	1 069 675	38 000	141 600
	Contingencies 5% (2% price; 3% physical)		5		145 561	83 098	53 484	1 900	28 7 080

mm = Man-Months; LS=Lump sum; m = month.						Sources of Financing (€)			
Item N°	Description	Units	Quantity	Unit Cost (€)	Total Cost (€)				
	Total Cost Including Contingencies				3 056 786	1 745 048	1 123 159	39 900	148 680
	Percentages (%)				100	57	37	1	5

Annex 4: Activity Implementation Schedule

Activity	Duration in months																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
<i>Activities leading up to grant effectiveness and finalisation of Procurement of Consultancy Services</i>	■																							
<i>Consultant Mobilization, Licenses, Authorisations, Visas, etc.</i>						■																		
<i>1,1: Navigability & Technical Investigations</i>																								
o Hydrographic and Hydrological Surveys									■															
o River works, naval architecture and preliminary engineering designs											■							■						
<i>1,2 : Transport Economic & Market Analyses</i>																								
o Market Analysis								■																
o Economic Feasibility Study									■															
<i>1,3 : Social & Environmental Impact Assessment</i>																								
o Socio-Environmental Impact Assessment									■															
o Environmental Impact Assessment (EIA)										■														
<i>2,1 : Analysis and determination of optimum investment financing and legal/institutional arrangements</i>																								
o Financial Feasibility Study																		■						
o Legal and Institutional Feasibility Study																		■						
o determination of optimum investment																					■			
<i>2,2 : Organise investors' conference for resource mobilisation for detailed designs and investments</i>																								
o Review and consultation of the various financial institutions																						■		
o organisation of an investors' conference for resource mobilisation																							■	
<i>Project Management Activities</i>																								
o Preparation of Quaterly Progress Reports			■			■			■			■			■			■			■			
o Organisation of JCT Meetings			■								■				■					■				
o Organisation of Ministers Committee Meetings												■											■	
o Preparation of Project Completion Report																								■
o Monitoring and evaluation of study implementation	■																							

Annex 5: Terms of Reference

SHIRE ZAMBEZI WATERWAYS DEVELOPMENT PROJECT

DRAFT TERMS OF REFERENCE FOR THE FEASIBILITY STUDY

1 OBJECTIVES OF THE PROJECT

1.1 Overall Objectives

The overall objective of the project is to contribute to the provision of an efficient transport system, with affordable costs and reliable modes for the countries sharing the Zambezi River Basin namely: Malawi, Mozambique and Zambia by opening up the Shire and Zambezi Rivers for navigation to the Indian Ocean.

The objective of this assignment is to undertake a detailed feasibility study of the reopening of the Shire River in Malawi and Zambezi River in Zambia and Mozambique for navigation in order to demonstrate its technical, economic, financial, social and environmental viability and sustainability.

1.2 Specific Objectives

The specific objectives as stipulated in Article 6 of the MOU entered into by the Republic of Malawi, the Republic of Mozambique and the Republic of Zambia include the following:

- a) Undertake a detailed survey of the project area by collecting data on the hydrographical and hydrological systems to the most possible extent and to prepare detailed technical planning parameters on the basis of the results of the field surveys and laboratory works conducted;
- b) Investigate the traffic options on the existing transport corridors and assess their potentials and limitations to service the traffic demands of Malawi and Zambia, taking into consideration possible development of domestic and regional traffic;
- c) Demonstrate the technical, economic, financial, social, ecological, and environmental viabilities of the Shire-Zambezi Waterways, and Zambezi River in Zambia in line with the proposed project; and
- d) Provide the Governments of the three countries with recommendations on strategies to be applied, and measures to be undertaken in order to develop and coordinate the use of the waterway to achieve the objectives, in an ecologically, environmentally, and economically sustainable manner, and provide transport solutions depending on realistic alternative scenarios.

1.3 Review of Previous Work

As part of the assignment, during the inception phase, the consultant should collate and review the existing studies and data and provide as part of their Inception Report recommendations on possible adjustments to the scope of study and methodology. A list of available studies and data is provided in the Annex to these Terms of Reference. Also

the Consultants should ensure that the project design takes into account future development programs in the Region as will be outlined in the upcoming Programme for Infrastructure Development in Africa (PIDA) and AfDB Regional Integration Strategy Paper (RISP).

2 WORK ALREADY UNDERTAKEN

A pre-feasibility study funded by EU was conducted on the Shire - Zambezi Waterways. The results of the study indicated that the rivers are navigable but require further studies to cover the items agreed under Article 6 of the MOU.

It is therefore necessary to undertake a comprehensive Feasibility Study of the Shire-Zambezi Waterways in terms of technical, economic, social and environmental viability in order to proceed with the development of the waterway.

A Memorandum of Understanding was signed by Malawi, Mozambique and Zambia in 2007 to develop and implement the waterway as a trans-boundary facility.

The MOU provides for cooperation among the countries during the various stages of the development of the waterway and establishes appropriate consultative mechanisms.

A list of work undertaken by various interests is provided in the Annex for verification.

3 TWO STAGES OF THE STUDY

The study will be undertaken in two stages as follow:

Stage 1: Establish technical, economic, and environmental viability

This first stage will include the following:

- Data collection and analysis from earlier studies. This will be complemented by a hydrographic and hydrologic surveys in the field in order to determine the navigability of the waterway.
- Identification of existing rail/road transport corridor options in the region to assess their potentials, weaknesses and possible solutions to meet the Malawian and Zambian transport demands.
- Development of scenarios for reopening the Shire–Zambezi Waterways for navigation and assessment of their technical, socio-economic, environmental feasibility. The project impacts, will be assessed for each of the three countries involved (Malawi, Mozambique and Zambia) separately and for the region as a whole.
- Subject Feasibility to a review involving the competent institutions of the three countries.

Stage 2: Undertake Detailed Planning and Investment Appraisal

This stage will involve the preparation of detailed technical planning parameters elaborated on the basis of decisions taken by the three countries on the results of the first stage.

For the project scenarios selected by the competent institutions of the three countries at the end of Stage 1 of the study, the Consultant will undertake a study of optimal procurement method including:

- A financial appraisal of each project scenario, testing the viability of procuring the project under a public, private, or a PPP arrangement.
- A legal analysis of the requirements under national legal frameworks and the bilateral agreements, and proposal of an institutional framework for the a sustainable and safe operation of transport services on the Shire-Zambezi waterway.

4 SCOPE OF THE STUDY

The study will be done in accordance with the provisions of Article 6 of the MOU which demands a full feasibility study for the waterway project. Consequently, the study shall review previous work and undertake the required investigations and analysis to determine the viability of using the Shire-Zambezi Waterways for navigation from the technical, socio-economic, environmental, financial, and legal perspectives.

The main objective of the study is to develop an optimal transport system, from the following perspectives:

- capacity (ports quay and storage; vessels size, etc.);
- quality of service to users (e.g. types of facilities, frequency of services, safety, security, information);
- costs to users.

The following are the components, activities and outputs of the study, which are in accordance with the MOU.

4.1 NAVIGABILITY AND TECHNICAL INVESTIGATIONS

4.1.1 Activities:

a) Hydrographic and Hydrological Surveys

The study will undertake hydrographic and hydrologic survey which will indicate and guide the determination of the navigability of the waterway. The results of this work shall provide inputs to subsequent component studies.

The activities involved in the hydrographic and hydrological study will encompass the following:

Hydrographic Surveys

- Conduct surveys and prepare drawings of longitudinal profile of the waterways at a scale of 1:100,000 including sounding information showing depth in different colours.
- Carry out end of the dry season combined bathymetric and Hydrographic surveys and prepare charts at 1:10000 scale for the Shire in Malawi and Mozambique and the Zambezi in Zambia and Mozambique from Nsanje to Chinde.
- Undertake detailed sounding measurements at the end of the rainy season and end of the dry season and assess the impact on the navigability of the waterways and propose mitigation measures to counter sedimentation.
- Prepare a summary of results including data in tables and graphs in a form adequate to serve as detailed planning criteria for the design of a safe and navigable waterway.

Hydrological Surveys

- Collate and process existing hydrological data together with the review of all previous hydrological reports related to the project area and determine the effects of climate change and variability in the data.
- Compile river flow data of both, the Shire in Malawi and the Zambezi rivers, with the latter commencing in Zambia through Cabora Bassa Dam exit and for the combined river flow from the confluence of the two rivers to Chinde.
- Determine the adequacy of the source of water for the sustainable navigability of the Shire-Zambezi Waterway.
- Determine the competing needs for water resource (Energy, Agriculture, Domestic and Transportation) in the Shire-Zambezi Basin Catchment.
- Include brief highlights on other sources of water resource studies and their uses in the Shire-Zambezi Basin.
- Indicate planned future development and usage of such water resource by the community for domestic, agricultural and industrial purposes.
- Assess overall cumulative effects of the multiple water resource uses on short- and long-term yield and water quality.
- Determine and analyse the baseline water quality for parameters that are likely to impact the water course during the construction and operation of the Shire-Zambezi Waterway Project.
- Provide physical, chemical and biological characteristics of the water resource.
- Determine and recommend measures to mitigate the rate of siltation of the Shire-Zambezi Waterway.
- Collect and process all rainfall and climatic data together with all existing climatological reports.
- Investigate medium and long-term fluctuations in rainfall and estimate water availability for year round navigation; examine the optimality in the long-term of providing navigational locks that can ensure year round navigability of the waterway.
- Compute various frequencies of rainfall and possible maximum precipitation patterns relevant for the sustainable navigation of the Shire-Zambezi Waterway.
- Estimate precipitation effectiveness including onset, cessation length of rainy season, hydrologic ratio, water equivalent to avert drought, drought spells in the course of normal rainy season and seasonality index of rainfall.
- Assess the future impacts on the navigability of the water way of the proposed Kafui river dam construction on the water resources of the Zambezi River.

b) River works, naval architecture and preliminary engineering designs

As a sequel to the hydrographic and hydrologic studies, the consultant shall make proposals on the options of the type and sizes of barges that can optimally ply the waterway and consistent with the recommendations of environmental impact assessment; the consultant shall equally carry out the following activities:

The consultant shall investigate port infrastructure development options to ensure the efficient transportation of goods on the waterway, including facilities at Nsanje, Chinde and smaller intermediate ports along the waterway accessible to riparian populations. The investigations will also include options for river-going vessel types as well as combined river and sea-going vessel types that could transport goods directly from Nsanje to bigger ports on the Indian Ocean such as Beira or Quelimane.

The consultant shall undertake planning and preliminary designs of dredging and river training works that need to be undertaken to optimise the navigability of the Shire-Zambezi waterway consistent with social and environmental impact assessment;

The consultant shall also prepare preliminary engineering designs of the facilities that need to be built, including quays, docking, navigation equipment and other facilities to make the Shire-Zambezi fully navigational. The consultant will equally assess the Phase I of the port infrastructure constructed at Nsanje and propose measures to improve its operations and sustainability, as well as review and optimise the proposed designs for Phase II. The consultant shall assess the risks associated with seismic activity in the region and make recommendations on measures to be taken to ensure the structural stability of the proposed infrastructure in the case of earthquake events.

The consultant shall assess the stability of existing bridges over the rivers against accidental collision of their piers with vessels of maximum tonnage moving at maximum speeds; the consultant shall equally propose designs of any structures that might be required to protect the existing bridges against collision with vessels as required.

The consultant shall compile technical information on the availability of the required water flows in the Waterway in line with the existing water management authorities taking into account the other uses of water (e.g. water for irrigation, consumption, industry, existing and planned power plants at Mpanda Uncua, Boroma, Lupata and Mutarara.

The consultant shall conduct subsoil investigations and prepare topographic maps covering the areas proposed in the Pre-feasibility Study for the development of Nsanje and Chinde ports and the potential landing sites proposed at Chikwawa, Nchalo, Chiromo, at selected locations between Bangula and Nsanje where established trade routes would justify landing sites, at Megaza, Chipanga, Chindio, Caia ferry crossing, Mopeia, Marromeu/Valente and Luabo and including the development of the waterway in Zambia from Luangwa to Siavonga at initial and upstream at a later stage.

The consultant shall investigate the clearance (air draft and width) of all bridges (existing at Chikwawa and Chiromo and bridges planned to be constructed at Chipanga and Mutarara) as well as electricity lines, if any, in the course of the waterway.

The consultant shall assess the 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;

The consultant shall examine options of types and sizes of barges that should ply the waterway in order to optimise the economic benefits and minimise the environmental impacts;

The consultant shall prepare preliminary design of river works including dredging and river training requirements for sustainable navigation;

The consultant shall determine the locations and prepare the preliminary engineering designs of various facilities to be built to operationalise the waterway, including the appropriate navigational aids;

The consultant shall assess the volumes and costs of deepening and widening the waterway as proposed in the project taking into account the limitations as a result of natural variation of water depth over the year as well as determine the frequency and level of future interventions to maintain the river channels navigable.

The consultant shall propose options for optimising the operation of the infrastructure constructed under Phase I of the Nsanje Port as well as proposed improvements of the design of Phase II of the Port.

The planning and preliminary engineering design studies are required to determine the costs of future investments as well as operations and maintenance costs of the waterway. The consultant shall therefore prepare cost estimates of river works and facilities to be realised to make the waterway navigable and these costs shall be required as inputs into the economic and market analysis.

4.1.2 Outputs:

- Drawings of longitudinal profile of the waterways at a scale of 1:100,000 and sounding information showing depth in different colors;
- River flow data of both, the Shire in Malawi and the Zambezi rivers, with the latter commencing in Zambia through Cabora Bassa Dam exit and for the combined river flow from the confluence to Chinde with regard to water levels (their peaks, annual and seasonal variations) and the related discharge quantities of the Shire and Zambezi River from relevant sources in Malawi and Mozambique; inclusive of discharges into the rivers by all tributaries along the Waterway.
- End of the dry season combined bathymetric and Hydrographic charts at 1:10000 scale for the Shire in Malawi and Mozambique and the Zambezi in Zambia and Mozambique from Chikwawa to Chinde; accurately determining the existing channel width and depth throughout the waterway; inclusive of the type of waterway bed material.
- Provide technical information on the availability of the required water flows in the Waterway in line with the existing water management authorities taking into account the other uses of water (e.g. water for irrigation, consumption, industry, existing and planned power plants at Mpanda Uncua, Boroma, Lupata and Mutarara.

- Detailed sounding measurements taken at the end of the rainy season and end of the dry season assessing the impact on the navigability of the waterways and proposing mitigation measures to counter sedimentation if required.
- Summary of results including data in tables and graphs in a form adequate to serve as detailed planning criteria for the design of a safe and navigable waterway. Include possible influence of barrages/hydro power plants;
- Results of Subsoil Investigation and Topographic Maps covering the areas proposed in the Pre-feasibility Study for the development of Nsanje and Chinde ports and the potential landing sites proposed at Chikwawa, Nchalo, Chiromo, at selected locations between Bangula and Nsanje where established trade routes would justify landing sites, at Megaza, Chipanga, Chindio, Caia ferry crossing, Mopeia, Marromeu/Valente and Luabo and including the development of the waterway in Zambia from Luangwa to Siavonga at initial and upstream at a later stage.
- 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;
- Identify and assess existing navigational constraints including limitations as a result of natural variation of water depth over the year. Determine clearance (air draft and width) of all bridges (existing at Chikwawa and Chiromo and planned to be constructed at Chipanga and Mutarara) and electricity lines, if any, in the course of the waterway;
- Existing type of vessels and their navigational requirements. Then propose options of types and sizes of barges that should ply the waterway;
- Preliminary design of river works including dredging and river training requirements for sustainable navigation;
- Location and preliminary engineering design of various facilities to be built to operationalise the waterway;
- Assessment of volumes and costs for deepening and widening the waterway as proposed in the project, and determination of the frequency and level of future interventions to maintain the river channels navigable.
- Designs of any structures that might be required to protect existing bridges against collision with vessels
- Options for optimising the operations of the infrastructure constructed under Phase I of the Nsanje Port as well as proposed improvements of the design of Phase II of the Port.
- Cost estimates of river works and facilities to be realised to make the waterway navigable.

4.2 TRANSPORT ECONOMICS AND MARKET ANALYSES

The main objective of this component is to assess the feasibility of the development of waterway transport mode that can contribute to the implementation of an overall efficient multimodal transport system for the countries of Malawi, Mozambique and Zambia, and for the region as a whole. Hence the feasibility should design a waterway mode that:

- Is fully integrated with the existing modes, namely road, rail and lake transport;
- Contributes to the reduction of both time and money elements of transport costs to users and hence cost of commodities to end consumers;
- Improves the reliability of the transport system;
- Reduces the transport externalities such as accidents, and emissions (carbon market).

In order to achieve the above, this component will consist of the following activities:

4.2.1 Activities

a) *Market Analysis*

Central to the design of an efficient and well-tailored waterway transport system is the assessment of its potential future market capture.

The waterway market capture

The forecasting of demand for the new waterway mode should follow from the assessment of the baseline demand for transport in the region, and its current distribution between the various corridors and modes of transport, undertaken a part of the inception phase of the study. The study will produce forecasts of the future demand for freight transport between the main origins and destinations in the region, for key commodities, including both raw, intermediate and finished products.

In this regard, the study shall produce an origin-destination demand matrix per commodity, for the main commodities traded in the region, and for with and without project scenarios. The matrices will be produced for the following horizons:

- baseline year 2009, or earlier years if data is not available;
- waterway scheme opening (WSO) year
- WSO + 5;
- WSO + 10;
- WSO + 20;
- WSO + 30.

The demand growth between the above horizons will need to take into consideration:

- background economic growth, translated in terms of growth in production and demand for commodities, both for the local, regional and international markets;
- induced growth in demand for commodities transport due to new investments along the waterway encouraged by the improved access to the transport system;
- transferred traffic, from competing corridors and modes, to take advantage of the reduced cost and time of travel along the Shire – Zambezi waterway alternative.

The latter would naturally include demand transferred from international through (transit) traffic making use of the new facilities to link up industries with markets beyond the waterways in the three countries. In this regard, the study shall also explore potential for future economic developments not only along the waterway corridor, but also other feeder corridors that could benefit from the new waterway mode to connect to international gateways, such as in Zambia, Zimbabwe and southern DRC.

Demand Assignment to Corridors and Modal Share

The study shall then, for each horizon assign such demand between the various transport corridors and modes available, namely, waterway, road and rail. The assignment will be on the basis of transport generalised costs, including monetary and non-monetary costs (e.g. time saving, reliability, safety, etc). Other considerations such as logistical (e.g. availability of storage facilities, etc) and non-logistical (special requirement of some commodities, e.g. perishable products), will have to be taken into account when identifying alternative routes and modes for the assignment.

Optimisation

The Consultant should then undertake a sensitivity analysis of the forecasts to derive an estimate of the optimal transport unit tariffs that future operators of the waterway should charge in order to optimise the project revenues. These transport tariffs should then be compared, using a Benchmark analysis, with the tariffs currently practiced:

- in other similar modes in the region;
- in competing corridors from the region;
- internal tariffs used elsewhere

b) Economic Feasibility Study

Based on the traffic forecasts, the Consultant should undertake an Economic assessment of the impacts of each project scenarios on:

- the economies of each of the three countries separately and for the entire region (the project area of influence);
- impacts on the populations along the waterway corridor either sides of the borders between Malawi and Mozambique;

The consultant should undertake a quantitative assessment for the monetised impacts and a qualitative one for the wider Economic impacts.

Quantitative assessment (transport efficiency)

The Consultant should undertake a Cost Benefit Analysis (COBA), taking into considerations at least the following monetised costs and benefits for each proposed scenario of the project:

Costs:

- the project construction costs, irrespective of sources of funding, including the costs of land expropriation, and environmental mitigation measures;
- the project operation and maintenance costs throughout the appraisal period;

Benefits:

- the time savings for both commodities using the new waterway mode, as well as for the existing modes, due to reduced congestion on them;
- the transport costs saving due to a more efficient transport system, including savings in road and rail maintenance costs;
- potential accidents and loss/damage of commodities' savings.

Qualitative assessment (socio-economic impacts)

The Consultant will assess in this section identify and appraise all socio-economic impacts of the project that are not easily quantifiable in monetary terms. Thesis should include both:

- Impacts directly related to the project
- Wider socio-economic impacts of the project

As part of the assignment the Consultant shall also propose complementary measures to the investments in transport infrastructure that will play a catalytic role in the achievement of the project development objectives. These include access to energy, communication, health and education services.

4.2.2 Outputs

a) Market Analysis

The forecasts will be presented year on year, by interpolation between the above forecasting horizons, taking into consideration the ramp up effects. The forecasts will be detailed for both, the new waterway project, the competing modes and the feeder modes. The forecasts will also be broken down by commodity type.

For the waterways, the Consultant will, depending on type of commodity and destination, propose an optimal logistical chain that is likely to be adopted by the trading clients and the freight forwarders. This would include:

- the type of flux (just in time or extensive use of warehousing);
- containerised vs. bulk transport.

b) Economic Feasibility Study

The costs and benefits will be presented for each of the three countries separately and for the region as a whole. The appraisal period will be for **30 years**.

Then for each proposed scenario of the project the Consultant will then compute the project Net Present Value (**NPV**, using a discount rate to be proposed by the Consultant and approved by the client), and Economic Internal Rate of Return (**EIRR**), for each of the three countries separately and for the region as a whole.

The socio-economic impacts of the project will be presented as follow:

Impacts directly related to the project:

- number of new jobs created, directly linked to the project: in project construction, project operation, project maintenance;
- number of jobs lost, as a direct consequence of the project, including in the transport industry (competing corridors and modes), in the fishing industry, etc.;

- number of people and communities affected;

Wider socio-economic impacts of the project:

- impact on the incomes as well as the incremental economic benefits to the project;
- impact on the costs of living, including the costs of housing, food, and other commodities;
- impact on local industries of competition from new commodities coming to market (enabled by the new project);
- number of jobs created, indirectly linked to the project: passing by trade; tourism in the region; catering; new businesses along the waterway corridor induced by the project; including new commodities, whose production was not viable prior to the project due to high transport costs;

4.3 SOCIAL AND ENVIRONMENTAL IMPACT ASSESSMENT

The study should pay attention to the need to preserving the ecological system of the Delta, bearing in mind that the Shire-Zambezi is rich in biodiversity which need to be preserved and protected, and has many sensitive areas.

The environmental and social impact assessments shall be undertaken in accordance with the requirements of the legislation and policies of Malawi, Mozambique, Zambia, AfDB, World Bank OP 4.01 and 4.12 and any other International Standards and Guidelines i.e. Equator Principles. The consultant shall develop an Environmental and Social Management Plan (ESMP) with specific measures to address all the gender dimensions of the impacts of the project and to optimise the project gender gains. In addition the Consultant should assess the impacts of the project on climate change in line with the AfDB Guidelines with the view to prepare the project to be eligible for climate change funds.

4.3.1 Activities

a) *Socio-Environmental Impact Assessment*

The survey shall evaluate the exposure of the communities within Sofala, Zambezia, Tete, and Nsanje Districts to the project and how they perceive it as a means of bringing development to their area. Socio-economic data to be collected would have as the main objectives the following:

- Provide technical information on the various activities engaged by the inhabitants adjacent to the waterway corridor;
- Identify land use patterns and land tenure issues;
- Establish a socio-economic profile of the project with respect to family size, age distribution and education, employment and community organisation;
- Identify wealth/poverty indicators i.e. possessions, housing condition and transport;

- Determine present composition of household income, expenditure and savings, etc.;
- Determine the cultural background of the people in the area and their religions;
- Gender Impact Assessment e.g. involvement of women in addressing issues of income generation, effects on women's domestic and social life, constraints of water transportation persons and the gender dimension, economic and social impact on gender, health related issues i.e. AIDS, optimise and maximise the gender gains of the water transport.
- Incidence of water related diseases
- Change in disease incidence, way of life, changes to well-being, changes to quality of life;
- Present and potential use of natural resources;
- Employment opportunity and economic development;
- Survey for and advise on possible involuntary resettlement of communities due to project activity, as defined by the AfDB Guidelines and World Bank OP 4.12;

b) Environmental Impact Assessment (EIA)

A comprehensive environmental study of the Shire-Zambezi Waterway Development Project shall be carried out taking into account the regional strategic plans of the participating countries. The study shall also take into account the following:

- Nature and type of affected ecosystems and species;
- Extent of the area affected;
- Probability, nature, duration, intensity and significance of potential impacts on aquatic species;

The key issues to be addressed by the study will include environmental, and ecological impacts of the proposed waterway project, over the Shire-Zambezi River Basin, potentially rich in biodiversity, with a number of ecologically sensitive areas, that are physically and biologically linked to fishing, tourism and other activities aiming to improve the local and national economies, and the livelihoods of the local people.

- Demonstration of technical and environmental viability of the waterway and the consequences of its navigability in the economic and social activities along the Zambezi River in Zambia, Shire River in Malawi/Mozambique and the Delta region in Mozambique, Modern tools such as Numerical Modeling should be used to show the short, medium and long term effects.
- Demonstration of the technical, environmental and ecological measures to be undertaken to turn the navigable channels stable, especially at the Zambezi Estuary, and keep the negative impacts at minimum.

- Assessment of impacts (positives and negatives) of the proposed project to the economy, ecology and environment of the Shire-Zambezi River Basin and consequences of future development, namely on:
 - a) Fishing industry along the Zambezi River Delta (Sofala, and Zambezia Banks), contributing 91% of the total Shrimps catch in Mozambique, and involving more than 2000 working post;.
 - b) Artisanal fishing involving more than 18.000 people and implications on housing and local economies;
 - c) Tourism development along the rivers, especially for the Marromeu Game Reserve and Gorongosa National Park;
 - d) Agricultural development, Water Supply, and Power generation;
 - e) Complimentary and competitive transportation modes underway in the three countries;
 - f) Loss of biodiversity, disturbance of aquatic habitat, disturbance of plant habitat, impact of threatened species, changes in species population, changes in aquatic and mammal food web in Shire-Zambezi Basin;
 - g) Land use changes, visual aspect and impact on sensitive lands within the Shire-Zambezi Basin and Lake Urema in the Gorongosa National Park,
 - h) Impact of the project on water quality and aquatic life;
 - i) Menace and impact of water hyacinths on the Shire-Zambezi ecosystem and waterway;
 - j) Loss of biodiversity in the Shire-Zambezi as a result of project activities;
 - k) Impact on the environment from the operation of Ports at Nsanje, Chinde and Marromeu;
 - l) Potential impact on the environment from the construction of ports at potential landing sites at Chikwawa, Nchalo, Chiromo, Megaza, Chipanga, Chindio, Caia Mopeia, and Luabo;
 - m) Potential impact on plants, aquatic life and wetlands from dredging along the Shire-Zambezi River i.e. Ndinde and Elephant marsh;
 - n) Impact from competing resource use for irrigation especially for proposed irrigation systems i.e. Shire Valley Irrigation Project;
 - o) Impact from competing resource use for hydro power use at Cabora Bassa Dam and proposed plants at Mpanda Uncua, Boroma, Lupata and Mutarara;
 - p) Impact of sedimentation on the ecology and waterway project;
 - q) Baseline for carbon emissions and estimation of carbon savings as a result of the project in order to benefit from the Clean Development Mechanism (CDM);
 - r) Migratory changes of birds and fish;
 - s) Soil contamination and River bank erosion;
 - t) Changes to historical sites and archaeological changes; and
 - u) Changes in ambient noise levels, risk of surface water contamination.

4.3.2 Outputs

- Identified impacts (positives and negatives) of the proposed project on the economy, ecology, environment, and sociology of the Shire-Zambezi Basin and development of plans to enhance the following:
 - a) Fishing industry along the Zambezi River Delta (Sofala and Zambizia Bank).

- b) Artisanal fishing involving more than 18.000 people and implications on housing and local economies;
- c) Tourism development along the rivers, especially for the Marromeu Game Reserve lying within the waterway area;
- Registration documents for Zambia, Malawi and Mozambique which shall contain the relevant information required by the various country environmental organisations;
- Environmental Pre-Viability Report and Scope Definition for Mozambique which shall contain the relevant information required by MICA0;
- Environmental and Social Scoping Report for Zambia, Malawi and Mozambique which shall contain the relevant information required by the various country environmental organisations;
- Social Assessment Report;
- Ecological Assessment Report;

Environment and Social Assessment Report which shall meet the requirements of the legislation and policies of Malawi, Mozambique, Zambia, AfDB, World Bank OP 4.01 and 4.12 and any other International Standards and Guidelines.

4.4 INVESTMENT FINANCING AND LEGAL ASPECTS

The component shall only be undertaken after the review and acceptance of the technical, socio-economic and environmental feasibility by the three countries individually and jointly. For each of the recommended project scenarios, the Consultant shall undertake investments and transaction analysis to determine the most viable investment scenarios for operationalising the waterway. This work shall include public sector facilitation and investments requirements, private sector investments and a combination of public and private sector investments. The study should also propose funding possibilities and the strategy for mobilising resources to fully operationalise the waterway. This may include organisation of various forums and round tables. The detailed activities under this component are discussed below.

4.4.1 Activities

a) *Financial Feasibility Study*

The financial feasibility of the project should assess its viability from monetary terms, taking into account all cash flows involved as direct or indirect consequence of the project.

The Consultant should undertake a detailed business case including the following:

- Based on the project costs and revenues cash flows, develop an Excel based financial model that can model various procurement methods and that computes the project Financial IRR, and NPV ;
- Using the financial model appraise for each project scenario, the viability of procuring both the capital investments (physical facilities to be constructed under the project, e.g. dredged waterway, new ports, navigation aids, any feeder road/rail connections, storage facilities, etc.), and the services (procurement of vessels, operation of services), under public, private, or a PPP arrangement, and propose the option with best Value for Money;.
- Assess the impacts of the current financial crisis on the costs of borrowing in Africa; and hence on the financial viability of the project;
- Undertake a stress analysis, on the project costs and revenues to assess the stability of the outputs;
- Based on the estimate of the capital investments required for the project, the Consultant should undertake a review and consultation with the various financial institutions, both the commercial and the development institutions to assess the appetite for the project and the likely lending terms, applicable to similar projects in the region;
- Consult with the potential private sector investors to assess the interest on this project and the required returns on equity;
- Organise a workshop/ road show for fund raising involving both financial institutions and private sector investors.

b) *Legal and Institutional Feasibility Study*

This study should at least include the following three components:

- Review the legal frameworks in the three countries in relation to privatisation and concession laws and assess the feasible structures of the project.
- Discuss the feasibility within the legal framework of each of the three countries, of the private sector involvement in the construction and operation of the waterway project;

Review the legal frameworks in the three countries and propose an optimal institutional set up for the oversight and the smooth trans-border operation to take place. These arrangements should also ensure safety, the respect of environmental regulations and healthy competition amongst vessel operators on the waterway.

4.4.2 Outputs

a) *Financial Feasibility Study*

- Excel based financial model that includes project costs and revenues cash flows, that is flexible to model further scenarios if needed. The model should take into account various taxes, depreciations, lending terms, and various procurement methods and should be able to compute the project, or components thereof, Financial IRR, and NPV;
- Financial appraisal for each project scenario, including an assessment of the viability of procuring both the capital investments (physical facilities to be constructed under the project, e.g. dredged waterway, new ports, navigation aids, any feeder road/rail connections, storage facilities, etc.), and the services (procurement of vessels, operation of services), under public, private, or a PPP arrangement, and propose the option with best Value for Money;
- Assessment note of the impacts of the current financial crisis on the costs of borrowing in Africa; and hence on the financial viability of the project;
- A stress analysis note, on the project costs and revenues to assess the stability of the outputs;
- Report on consultation with the various financial institutions (both the commercial and the development institutions) and private sector investors on their appetite for the project and their likely requirements (lending terms, return on equity), applicable to similar projects in the region;
- Workshop/ road show for fund raising involving both financial institutions and private sector investors.

b) *Legal and Institutional Feasibility Study*

- Legal analysis report on the requirements under national legal frameworks and the bilateral agreements, and proposal of an institutional framework for the a sustainable and safe operation of transport services on the Shire-Zambezi waterway

5 DELIVERABLES

The Consultant shall prepare appropriate reports for consideration by the Joint Technical

Committee from inception to the completion of the study. The reports will comprise: Inception Report, Quarterly Progress Reports, Draft Feasibility Study Report and Final Feasibility Study Report as detailed below:

5.1 Inception Report

The Inception Report shall provide details of the activities, strategies, milestones and time-phased action plan which the consultant intends to use to fulfill the Terms of Reference, and if necessary, indicate those areas of the Terms of Reference that require modification. This Report shall include detailed performance schedules and personnel deployment for both phases. This report shall be submitted by the consultant six weeks from the date of commencement of the study.

5.2 Quarterly Progress Report.

The first Quarterly Progress Report shall cover the period up to the end of the first quarter following the mobilisation of resources. Reports shall be submitted quarterly thereafter, each within 14 days after the last day of the period to which it relates. Reporting shall continue until the Consultant has completed the Draft Survey Report.

5.3 Interim Study Reports

The consultant shall prepare and submit the following interim reports:

- *1st Interim Report*: this report shall contain the results of the transport economic and market surveys as well as the initial EIA scoping activities; this report shall be submitted by the consultant three (03) months from the date of commencement of the study.
- *2nd Interim Report*: this report shall comprise the findings of the navigability and technical investigations and shall be submitted by the consultant six (06) months from the date of commencement of the study.

5.4 Draft Feasibility Study Report

The consultant shall incorporate the comments on the interim reports and compile the Draft Feasibility Study Report, which shall include the completed Navigability & Technical Investigations; the Transport Economic & Market Analyses; and the Social & Environmental Impact Assessment components of the Feasibility Study. This report shall be submitted by the Consultant eight (08) months from the date of commencement of the study and it will be discussed by the Joint Technical Committee at a meeting to take place not later than 60 days after the submission of the Draft Report.

The Joint Technical Committee shall be established in accordance with the provisions of the MOU.

5.5 Final Study Report

The Final Study Report shall include the Investment Analysis component of the Study as well as the three components included in the Draft Report. The Final Report shall incorporate the feedback received from the Joint Technical Committee and shall be submitted four weeks after receiving the feedback from the Joint Technical Committee.

Submission of Reports

The Consultant will submit reports to the Chairman in-charge of the Joint Technical

Committee of the project.

The Chair shall in turn submit these reports to the other member states. The final report shall be submitted to the Chairman in charge of the Joint Technical Committee (20 copies in hard and electronic form) with single copies to SADC and COMESA.

6 PROFILE OF THE BIDDERS

The Consultant for the implementation of the study will be selected by the Joint Technical Committee from an International bidding process

The experts required for this assignment are expected to have appropriate qualifications and professional experience in Hydrography, Hydrology, Survey, Navigation, Naval Architecture, Civil Engineering, Geology, Economics, Fisheries, Environmental and natural resource sciences as profiled below.

A bidder comprising a consortium which includes firms and experts from the three member states shall have an added advantage.

Team Leader

The Team Leader shall have at least 20 years experience in the field relevant to the assignment. The team leader shall have a minimum of Masters Degree in Civil Engineering and its equivalent and be a full member of a professional institution such as Institute for civil Engineers (ICE) or its equivalent.

He/she shall be experienced in infrastructure analysis of river transport projects in developing countries.

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.

Navigation Specialist

The Navigation Specialist shall have at least 15 years experience in the field relevant to the assignment.

He/she shall have a minimum of University Degree in Maritime Studies, or Hydrography and Oceanography, and possess sector specific experience particularly in:

- Data on types of ships and their navigational requirements;
- Review of existing data and identification of additional data requirements;
- Collection of additional data and subsequent analysis of the bathymetric characteristics of the navigational routes,
- Inventory of existing transport and navigational routes including assessment of navigational constraints; and
- Assessment of possibilities for alleviating navigational constraints for each route, and associated costs.

Hydrologist

The Hydrologist shall have at least 15 years experience in the field relevant to the assignment.

He/she shall have 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. He shall be conversant with water sampling techniques and sedimentation profiling. In addition, the Hydrologist shall have experience in analysing meteorological data.

Field Surveyor

The Field Surveyor shall have at least 15 years experience in the field relevant to the assignment.

The Surveyor shall have a minimum of University Degree and experience in planning and execution of field surveys and the evaluation of survey data towards the preparation of topographic maps and GIS the formulation of design criteria of port structures and engineering works along waterways.

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.

Dredging Expert/Civil Engineer

The Dredging Expert/Civil Engineer shall have at least 15 years experience in the field relevant to the assignment.

The Expert shall have experience in planning and design of river training works including dredging works in complex river systems of larger magnitude for commercial waterways. The expert must have experience in formulation of terms of reference for subsoil investigation works. In addition, the Dredging Expert /Civil Engineer shall have experience in the design of waterway facilities, such as ports and ancillary facilities.

Geologist

The Geologist shall have at least 10 years experience in the field relevant to the assignment.

The Geologist shall have experience in Geomorphology, sedimentology and seismology. The expert must have strong knowledge in structural and geological setting in Southern Africa. He/she shall have a university degree.

Environmental Expert

The Environmental Expert shall have a minimum of Masters Degree and at least 15 years experience in the field relevant to the assignment.

The expert shall be an environmentalist with extensive experience in EIA studies preferably on the developments and river environments of southern part of Africa.

Aquatic and Terrestrial Biologist or Ecologist

The Aquatic and Terrestrial Biologist or Ecologist 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 sustaining the fishing industry in the lower Shire-Zambezi River especially in the estuary.

He/she shall have experience in Management of river and Marine ecosystems.

Sociologist

The sociologist shall have a University Degree in Sociology or related studies and 10 years working experience.

He/she shall have wide experience working in African environment, with particular reference to resettlement and other social impacts of large transportation infrastructure projects.

Economist

The Economist shall have at least 15 years experience with Masters of Arts or Science Degree in Economics or equivalent.

He/she should demonstrate a detailed understanding of regional economics especially with reference to transport and logistics.

Transport Modeling and forecasting expert

The expert shall have at least a Masters degree in Transport Modeling and Engineering. He/she shall have at least 10 years of experience modeling and forecasting, involving maritime and multimodal transport. Among the experience at least five projects undertaken in Africa.

Legal/Institutional Expert

The Expert shall have at least a Masters degree in International Law or Hydro-Politics with at least 10 years relevant experience in handling trans-boundary water related projects, preferably in Africa;

Logistics Expert

The Logistics Expert shall have at least a Masters degree in Transport Economics or Engineering, with at least 10 years of relevant experience in transport logistic projects and operations, involving river and or maritime transport.

Public Private Partnerships (PPP) Expert

The PPP Expert shall have at least a Masters degree in Business Administration or a related discipline and at least 10 years experience in structuring PPP options for transport related investments.

7 WORKING LANGUAGES

The working languages for this contract are English and Portuguese. All reports prepared in one these languages shall be translated into the second language by the consultant. In addition, knowledge of local languages will be an added advantage.

8 LOCATION OF ASSIGNMENT AND DURATION

8.1 Location(s) of Assignment

Services will be performed in Malawi, Mozambique and Zambia where necessary consultations could be made with other upstream member states.

The Consultants will make their own arrangements for all necessary living accommodation, transport, field visits, and all other expenses related to the assignment.

8.2 Duration of the Study

The Consultant will commence work not later than 1st December 2011 and the approximate duration of the assignment shall be 18 months.

9 SUPPORT TO THE STUDY

9.1 Government Inputs

The Governments of Malawi, Mozambique and Zambia through their Ministries responsible for transport will provide for the cooperation of the other Government Ministries, departments and other agencies required for carrying out the work.

The Ministries will provide the Consultant with relevant information which is necessary for the proper and timely execution of the study.

9.2 Other Support

The consultant will be provided with support by Ministries responsible for Transport in the respective countries namely Malawi, Mozambique and Zambia as appropriate.

Office space will be made available at Lilongwe in Malawi, Tete in Mozambique and Lusaka in Zambia. The Consultant has to set up his own office facilities when in the project site areas.

Appendix 1. Environmental and Social Impact Assessment Procedures

The Shire-Zambezi Waterway Development Project is a category 1 project according to the African Development Bank (AfDB) Environmental and Social Assessment procedures for the Bank's Public Sector Operations. According to Annex 7, a project of this nature which is both a waterway and coastal development and may have the potential to generate adverse environmental and social impacts that may affect ecological sensitive areas and communities along the water course is classified as a category 1 project.

At the end of the Mission Trip from Zambia on the first leg through Mozambique and the third leg in Malawi, the project has been advanced to more specific activities like the location of the Nsanje Port and the possible dredging at specific location on the Shire-Zambezi. It is therefore recommended an Environmental and Social Impact Assessment including the preparation of an Environmental and Social Management Plan (ESMP) instead of a Strategic Environmental and Social Assessment (SESA).

Legal Framework

The participating Countries Malawi, Zambia and Mozambique have each enacted environmental laws to govern projects of this nature. These legal frameworks are only binding within their respect countries but a joint approach will be adopted since the environmental and social issues of concern transcend their common boundaries. It was agreed at the Technical Session that approved the TOR to register the project in each Country (Malawi, Zambia and Mozambique) through the National Focal. All transaction in acquiring an Environmental License for the project will be facilitated by the National Focal Person. The environmental and social impact assessments study shall be undertaken in accordance with the requirements of the legislation and policies of Malawi, Mozambique, Zambia, AfDB, World Bank OP 4.01 and 4.12 and any other International Standards and Guidelines i.e. Equator Principles. A list of some of the legal procedures and guidelines are provided in Appendix 3.

Environmental Pre-Viability Report and Scope Definition (EPDA)

An EPDA is compulsory for all Category A projects and must contain the following information:

- Non-technical summary highlighting the key issues and conclusions;
- Names and contact details of the proponent and the lead EIA consultant;
- The sphere of influence of the proposed activity (both direct and indirect), and the predevelopment
- land use in this zone;
- Description of the activity, including all actions relating to the planning, construction,
- exploration and decommissioning (if a short-term project) stages and all reasonable
- alternatives;
- Description of the biophysical and socio-economic environments;
- Identification and assessment of any fatal flaws;
- Indication of potential environmental impacts;

Identification and description of the aspects to be investigated in detail in the EIA (specialist studies).

Environmental Terms of Reference

The Terms of Reference (TOR) set out the process to be followed in the ESIA or should contain at least:

- Description of the specialist studies;
- Location of the project, its sphere of influence and current land use;
- The compatibility of the project in the land use planning context;
- Description of reasonable alternatives which will be investigated in the ESIA;
- Methodology to be used to identify impacts during each stage in the project life-cycle;
- Description of the proposed public participation process;
- Name and address of the proponent;
- Names of the EIA team;
- Any other additional information as necessary.

Environmental and Social Impact Assessment

The Environmental and Social Impact Statement shall include the following:

- A non-technical summary covering the main issues and conclusions;
 - The legal and planning context of the activity;
- A description of the activity and its alternatives in the planning, construction, operation and, in the case of a short-term activity, decommissioning phases;
- Geographical location of the area of influence of the activity, as well as a description of the baseline environmental situation;
 - A comparison of the alternatives and a prediction of the environmental impacts of each alternative with and without mitigation measures applied;
 - Socio-economic impacts of the project such as resettlement of the affected people;
 - Identification and assessment of the impacts and mitigation measures;
 - An environmental management plan which includes the monitoring of impacts, environmental, education and accident prevention and contingency plans;
 - An indication of whether the environment of any neighboring state is likely to be affected;
 - Names of the team that carried out the study;
 - A report on the public participation programme.

The specialist study reports must be attached to the ESIA in the form of appendices.

Appendix 2: Work Already Undertaken

A pre-feasibility study funded by EU was conducted on the Shire - Zambezi Waterways in 2006. The results of the study indicated that the rivers are navigable but require further studies to cover the items agreed under Article 6 of the MOU.

A Memorandum of Understanding has already been signed by Malawi, Mozambique and Zambia to develop and implement the waterway as a trans-boundary facility.

The MOU provides for cooperation among the countries during the various stages of the development of the waterway and establishes appropriate consultative mechanisms.

It is necessary to undertake a comprehensive Feasibility Study of the Shire-Zambezi Waterways in terms of technical, economic, social and environmental viability in order to proceed with the development of the waterway.

Due to the difficulty to locate data or sources of data on hydrology, technical, ecology and environment on the fluvial systems of the Shire and Zambezi River and the surrounding wetlands, the three countries have suggested that the Feasibility Study be conducted in two phases as elaborated in the scope of the study (section ii).

Since the Pre-Feasibility Report was prepared in 2007, there have been a lot of activities aimed at navigating the Shire-Zambezi waterways by various interests. It is important for the consultant to review all of the studies and other work undertaken prior to embarking on the Feasibility Study. Information provided, that is to be verified, indicated that the following has been accomplished to date:

The firm Mota Engil has undertaken studies on the Shire and Zambezi rivers that have culminated in the detailed engineering design and construction of the inland port at Nsanje, Malawi. The first phase of this project includes the construction of the landing stage, container yard and other facilities to enable barges to dock and discharge/load cargo. The construction of the landing stage is currently ongoing and the first phase works are scheduled to be completed in December 2010. A major dual carriage highway is also under construction to link the Nsanje port to Blantyre. The studies undertaken prior to construction include:

The Export Trading Company has been given a one year license by the Mozambican authorities to undertake trial barge runs on the lower Zambezi River. This will eventually include trial runs on the Shire River in order to chart the navigational course of the Shire-Zambezi waterway. Initial work undertaken by the company indicates that the Shire stretch of the waterway is all navigable for barges up to 1,220 tons except for Nndinde Marshes where there may be the need to widen one channel on the inland delta created to be utilised for navigation. Export Trading has undertaken freight and traffic studies in the catchment in order to determine the potential for business on the waterway.

The Export Trading Company has privately undertaken a market Study on Freight volumes in and around the catchment of the Shire-Zambezi waterway.

Two companies, Taka Taka and (name to be provided) have undertaken detailed river hydrographic studies using multi-beam sonar systems on the Shire-Zambezi waterway to determine its navigability. (Information to be verified)

Naval Africa Design is a company that is setting up shop in Tete, Mozambique for the construction of barges, for carrying cargo on the lower Zambezi River. (Information to be verified)

The coal mining company, Riversdale (www.riversdalemining.com.au), intends to transport the bulk of its coal on the Shire-Zambezi Waterway to the sea port of Chinde for export. In this regard, they have teamed up with another coal mining company, Vale (www.vale.com), to conduct studies which include Environmental Impact Assessment on the lower Zambezi River in connection with the transportation of coal on the river (information to be verified).

Appendix 3: List of Reference Documents

- i. Prefeasibility Study for the Reopening of the Shire – Zambezi Waterway (Malawi – Mozambique; EUROPEAID/119860/C/SV – HYDROPLAN), 2006;
- ii. The African Development Bank (AFDB) IESIA Guidelines (2003); the AFDB ESA Procedure (2001); the AFDB Gender Policy (2001); the AFDB Involuntary Resettlement Policy (2003);
- iii. Commission of the European Communities, Directorate-General for Development: Sectoral Environmental Assessment Sourcebook, 1993;
- iv. Report on the Navigability of the Shire-Zambezi Waterways (Conchar, Hansen Marrow, Pitman);
- v. Survey of the Navigability of the Zambezi River from Tete to Chinde (Reason)
- vi. The African Maritime Charter
- vii. Malawi Water Resources Act, 1969;
- viii. Malawi National Water Policy, 2005;
- ix. Malawi Public Sector Investment Programme 2009/10 – 2013/14;
- x. Environmental and Social Assessment Procedures for AfDB's Public Sector Operations;
- xi. AfDB's Environmental Assessment Guidelines – Forestry and Watershed Management, March 1997;
- xii. AfDB's Environmental Assessment Guidelines on Coastal and Marine Resources Management, June 1995;
- xiii. AfDB's Environmental Assessment Guidelines on Population and Health, March 1997;
- xiv. AfDB's Guidelines for Integrating Gender Issues into Bank Group – Industrial Projects, February 1992;
- xv. AfDB's Guidelines on Involuntary Displacement and Resettlement in Development Projects, May 1995;
- xvi. AfDB's Handbook on Stakeholder Participation, 2001;
- xvii. The Environmental Protection and Pollution Control Act (EPPCA), 1990 of Zambia;
- xviii. The Environmental Protection and Pollution Control (Amendment) Act (EPPCA), 1999 of Zambia;
- xix. The Constitution of the Republic of Mozambique (2004) Articles 90, 98, 102 and 117 of Mozambique;
- xx. National Environmental Management Programme (NEMP), 1995 of Mozambique;
- xxi. National Environment Management Programme (MICOA 1996) of Mozambique;
- xxii. Framework Environmental Act (No. 20 of 1997) of Mozambique; and
- xxiii. EIA Regulations (Decree No. 76 of 1998) of Mozambique.

Relevant Legal Regulations in Malawi

1. National Environmental Action Plan (1994)
2. Environment Management, Act No. 23 of 1996
3. National Environmental Policy (1996)
4. The Environment Support Programme (1998)
5. National Lands Policy (2002)
6. Water Resources Act, Chapter 72.03 (1969)
7. Water Resources (Amendment) Bill (1999)
8. Water Resources Management Policy and Strategies (1994)
9. Water Works Act, Chapter 72.01 (1995)
10. Draft Irrigation Act (1998)
11. Draft National Irrigation Policy and Development Strategy (1998)

12. Irrigation Action Plan (1998)
13. Draft Water Resources Management Policy and Strategies (1999)
14. National Forest Policy (1996)
15. Forestry Act, Chapter 63.01 (1997)
16. A Guide to the Forestry Act (1997)
17. Fisheries Conservation and Management Act, Chapter 66.05 (1997)
18. A Guide to the Fisheries Conservation and Management Act of 1997 (*Fisheries Department Bulletin*, No. 36, April 1998)
19. Draft Fisheries Conservation and Management (Local Community Participation) Rules (1998)
20. National Fisheries and Aqua-culture Policy (2001)
21. Fisheries Conservation and Management Regulations (2000)
22. National Parks and Wildlife Act, Chapter 66.07 (1992)
23. National Parks and Wildlife (Amendment) Bill (1999)
24. National Parks and Wildlife (Hunting Weapons) Regulations, *General Notice*, 83 (1994)
25. National Parks and Wildlife (Control of Trophies and Trade in Trophies) Regulations, *General Notice*, 86 (1994)
26. National Parks and Wildlife (Protected Areas) Regulations, *General Notice*, 87 (1994)
27. National Parks and Wildlife (Protected Species) (Declaration) Order, *General Notice*, 89 (1994)
28. National Wildlife Policy (1998)
29. Collaborative Wildlife Management (1998)

Annex 6: Extract from the Prefeasibility Study - Overview of the existing Transport system in the region

1. TRANSPORT CORRIDORS

Introduction

As a landlocked country Malawi depends on transport corridors for its external trade. It either has to have access to ports with international shipping connections or to neighboring countries, which are its customers and suppliers. Thus, the question of the transport corridors is one of vital importance to the country.

The long civil war in Mozambique disrupted many of the traditional trade routes towards the open sea, including the former Shire-Zambezi waterway operations. In a long and costly process, the country re-orientated its trade lanes during the 1980ies and 1990ies to its present configuration.

The opening of new roads and the availability of improved transport equipment - last not least the advent of the container - helped in this process, but also imposed some constraints, which today tend to cement trade routes, transport modes and resulting commercial habits.

Thus, the opening of a potential new transport corridor may not necessarily meet with general approval, as many more or less vested interests profiting from the present situation may feel jeopardised by a new orientation. Advantages must really be substantial and risks minor in order to convince the final customers, who after all will have to take the decision to ship their cargoes by a new route with a new set of transport means.

However, considering that trucking is by far the least economic mode of transport and thus the most expensive for the country, any other option beyond trucking should merit at least a hard glance.

Dar es Salaam Corridor

Dar es Salaam is the final port in the northern corridor, the catchment area of which is the northern part of Malawi. The distance is about 1,300 Km from Mzuzu. It is a large port which handles about 4.5 m tons p.a., of which around 110,000 tons are destined for Malawi. Contrary to former times, the port is now said to be rather efficient though it has to live with a narrow access channel to the harbor and limited quay facilities.

This route has a border crossing at Songwe in Malawi. Furthermore, Malawi operates two bonded cargo facilities in Tanzania: one in Dar es Salaam and an inland depot at Mbeya.

The northern corridor is hardly used for Malawi export goods. On the import side, fuel (53,600 t in 2003) and fertiliser (11,300 t) add up to a meagre 7% of the total Malawian import balance. Usually, this cargo is railed from Dar es Salaam to Mbeya via the TAZARA line and from there trucked to Malawi. As this entails transshipments delays and costs, sometimes the direct trucking route is favored even on the long distance on partly bad roads. An average transit time of 4 days was given for this corridor, assuming that no major disruption occurs at Mbeya (transshipment) and at the border. The freight rate (2003) for transporting fuel from Dar es Salaam to Lilongwe was US\$ 134/t in rail/road configuration against US\$ 146 in direct trucking.

Nacala Corridor

The aptly named Nacala corridor connects the southeastern region around Blantyre to the Mozambican port of Nacala over a distance of about 750 Km. Nacala is a natural deep water port

which can handle all vessel sizes. The port facilities are said to just being improved. There is a railway line and a road going to Nacala. The railway suffers from frequent problems with bridges (washouts) and managerial problems, which makes its traffic unreliable. The road conditions are said to be very bad so that trucking is hardly an option on this route. The border post is Nayuchi.

The railway line is being operated under a concession by a private group composed by the Malawi CEAR and the Mozambican CFM-Norte. Both governments appear to be unsatisfied with the group's operational performance and revision or even cancellation of the concession appears possible.

This must also be seen in connection with the ongoing negotiations between the governments and the Brazilian company CVRD , which is the main concessionaire of the Mozambican Moatize coal exploitation project. CVRD has applied for a long term (25 years) concession of an extended Nacala corridor version, which would connect the Moatize site via Malawi to the present Nacala line and the port, thus enabling the company to export its coal via Nacala's deepwater port.

The main commodities being exported via Nacala in 2003 were sugar (52,000 t), food crops (16,300 t) and tea (4,200 t). On the import side, it was fertilisers (52,000 t) and fuel (28,900 t).

The transit time is said to be 10 days. It could be much better, however the frequent interruptions and delays make this potentially best performing transport corridor not the preferred one for many exporters and importers. Vessel calls are irregular.

The freight rates are given (2003) as follows: in export: sugar from Blantyre to Nacala: US\$ 22/t, food crops from Blantyre to Nacala US\$ 37.2/t, tea from Blantyre to Nacala US\$ 36/t. In import: fertiliser from Nacala to Lilongwe US\$ 40/t and fuel from Nacala to Lilongwe US\$ 95.1/t.

Beira Corridor

Historically, the Beira corridor had been the main Malawi trade artery, having been disrupted by the war in Mozambique. Presently it is returning to its old predominance and handles again nearly half of its foreign trade. The Sena railway line in Mozambique, coming up from Beira, is being rehabilitated by an Indian consortium and will have a connecting spur into Malawi, liaising with the Malawi railway network at Nsanje/Bangula. It is assumed to be operational in 2009, then connecting Malawi again directly to Beira by railway. Up to then, there is only a road connection starting in Blantyre of some 800 Km, passing through the border post of Mwanza.

The main commodities moving on this route are: in export: sugar (50,700 t in 2003), tobacco (31,700 t) and tea (7,100t). In import: fuel (123,800 t in 2003) and fertiliser (33,900 t).

The transit time between southern Malawi and Beira by road is about 3 days. Beira offers regular feeder calls for Durban.

The freight rates in 2003 were: in export: sugar from Nchalo to Beira US\$ 44/t, tobacco from Lilongwe to Beira US\$ 109.8/t and tea from Blantyre to Beira US\$ 83.1/t. In import: fuel from Beir to Malawi US\$ 121/t and fertiliser from Beira to Lilongwe US\$ 60/t.

South Africa Routes

The South African corridor is actually a network of roads, liaising southern Malawi via the border post of Mwanza through Mozambique to Zimbabwe and South Africa. The distances are around 600 km to Harare, 1,600 Km to Johannesburg and 2,000 Km to Durban. Durban is the main intercontinental shipping hub of southern Africa and from there Malawi cargo destined to Europe, America and Far East is shipped. Durban is accessible from Malawi either by land transport by ruck or by feeder shipping through the corridor ports of Beira and Nacala.

Accordingly, the main volumes of cargo are moved on these routes by truck. Thus, in 2003: in export: tobacco (77,700 t), tea (28,200 t), cotton (11,500 t) and sugar (10,400 t). In import: general cargo (375,200 t) and fertiliser (128,800 t).

The transit time for the South African run is about 7 days.

Freight rates in 2003 have been: in export: tobacco from Lilongwe to Durban US\$ 129.4/t, tea from Blantyre to Durban US\$ 132.6/t, cotton from Malaka to Johannesburg US\$ 104/t, sugar from Malawi to Johannesburg US\$ 67/t.

Malawi Hinterlands

Malawi is a landlocked country. But beyond there are further landlocked countries which depend on Malawi for their trade lanes. This applies namely to Zambia in the west, which shares a border of 837 Km with Malawi. All handicaps which apply to Malawi, hit Zambia too.

Zambia

Seen from Zambia, Malawi constitutes a transport "corridor" on its own, through which Zambian cargo can access the Indian Ocean ports through the enumerated corridors of Dar es Salaam, Nacala and Beira. As for South Africa, Zambia probably uses a direct road link via Zimbabwe.

The border post, through which Zambian cargo enters Malawi, is Mchinji on the western Malawi border. Mchinji is also the railhead for CEAR, thus allowing Zambian cargo to access the Malawi railway network with a direct connection to Nacala, at present. In future and after rehabilitation of the Sena Line with its extension into Malawi, Zambian cargo would also have railway access to the port of Beira.

Zimbabwe

Though Zimbabwe does not have a common border with Malawi, it plays an important role as a transit country for Malawi's transport routes to South Africa. Furthermore, it generates substantial trade exchange with Malawi in its own right.

2. NATIONAL TRANSPORT

The war in Mozambique in the 1970ies forced Malawi to re-orientate its external trade and transport routes, as the nearest ports Beira and Nacala were not available any more. South Africa, being by far the main trade partner of Malawi, was accessible only by road, which implied the increased use of trucks. Thus, the trucking industry during the 1990ies was much promoted and attracted much entrepreneurial initiative. It has developed into an important economic force, which is said to even exert strong political influence.

This is felt to be reflected in a preference for road traffic and the funding for maintenance of the roads. The established transport modes like railway and shipping on Lake Malawi have been unable to offer the same speed and efficiency as the road transport, reflected in a steady decline of their performances. Without projects allowing them to operate near full capacity and/or shielding them from the trucks competition, no fundamental change appears possible, as they will never be able to offer the same flexibility as their road competition.

Complementary transport modes

The port of Nsanje will be the start and end point of the planned Shire-Zambezi Waterway project. Geographically, it is situated in the southernmost tip of the country, away from the main cargo attracting centers Lilongwe and Blantyre. Thus, its performance will depend of the connection to these centers, which can only be provided by other means of transport.

Consequently, these have a complementary role to the shipping project, at least concerning their pre-/post-carriage function within Malawi.

As soon as these other transport modes cross the border into Mozambique, their role changes and they become competitive. This is the case specifically with the Nacala corridor railway and the rehabilitated Sena line railway, namely when it will be extended into Malawi by 2009. Their competitive effect on the shipping project will depend largely of their technical and managerial performance. The Nacala line presently offers a striking example of how an in principle superior system cannot exploit its apparent advantages.

In a transport market, which the consultants estimate to become more and more competitive, the shipping project will only have a chance with excellent management, which does not only focuses on the fluvial leg proper, but understands its service to be one of an integrated transport chain, from door-to-door.

Road Network

Malawi disposes of a road network of about 14,600 Km. In 2001, 2,700 Km of these were all-weather surfaced roads in relatively good shape, whereas the remainders were unpaved country roads. These last need repair after each rainy season, which is usually done by grading.

Road transport has been completely liberalised and officials of the NRA complained about the difficult data collection situation since. Also since that time, transport services are freely offered by hauliers from several countries and there are few restrictions. The trucking industry is apparently highly fragmented. However, there are also some truck owners with substantial fleets. Apparently, there are no trustworthy figures about the number and capacity of the existing truck fleet. Furthermore, the discrimination between commercial trucking and transport for own account is fluid.

As for the road connection from Blantyre to Nsanje, it is in good shape down to Nchalo; afterwards it becomes a gravel road in bad condition till Nsanje. Any development in Nsanje will require extensive road rehabilitation.

Rail Network

The Malawi railway network is operated by the private company CEAR - Central East African Railway under concession from government. The network comprises around 800 Km in Cape gauge (1.067 mm) able to handle up to 15 t axle loads, practically all in single-lane configuration.

The network starts at Mchinji at the western border to Zambia, goes via Lilongwe down to Lake Malawi, where it links at Chipoka port to the Lake Malawi shipping operation. From there, the tracks run southward to Nkaya. There one track branches off to become the Nacala corridor line, which crosses the Mozambican border at Nayuchi and connects eastward to Nacala port.

The other line continues southward to Blantyre, Bangula and Nsanje, from where it continued in former times down to Sena in Mozambique, where it connected to the Sena line and Beira.

Presently, this branch is only operational down to Makhanga near the decommissioned bridge at Chiromo, the tracks beyond having been partly washed away. The Sena line coming up from Beira is being rehabilitated and its extension into Malawi is planned for 2009. Then, the old deactivated tracks passing Nsanje will be used again and any shipping venture will have a complementary rail link towards the north into Malawi and a competitive one towards the south to Beira.

Officially, CEAR operates about 50 Diesel locomotives, 40 passenger wagons and slightly over 800 cargo wagons.

CEAR performance

The picture is gloomy and shows a decline in all sectors, most notably in the domestic transport. It is difficult to understand, how an in principle efficient transport mode has apparently fallen out of favour with an increasing number of its customers.

Together with the Mozambican CFM-Norte it operates the Nacala corridor line.

Waterways

Malawi Lake Services

Malawi Lake Services (MLS) was established as a division of Malawi Railways (MR) to provide the essential transport services for freight and passengers along the 500 km length of the lake.

MLS operates a fleet of about 10 vessels. Ship services are provided to 21 landing points on Lake Malawi, four of which have freight and passenger handling facilities.

With the increasing efficiency, speed and deregulation of road transportation, the lake transportation experiences similar problems as general freight carried by rail. Due to the lack of flexibility and the additional costs of transshipment, the activities of MLS have been gradually declining over the years, with the exception of renewed interest in the mid 1970ies to the 1980ies, when access to ports in Mozambique, Nacala and Beira, were closed due to the civil war.

Investments were made into port infrastructure and vessels, but problems were experienced with low lake water levels and access to the key ports. The lake levels have since recovered, but the traffic volumes still showed a steady decline, leading to a decision in 1995 to separate MLS from Malawi Railways and to concession the operations to a private sector enterprise. This was eventually concluded in 2002, when Glens Waterways Limited was granted the concession, but it has not yet been possible to operate MLS as a viable, profitable business. It is a general experience of ports that, when they once lose customers because of long lasting low water periods it is difficult to win back these customers after water level and transport conditions have recovered.

Current operations are primarily focused on the provision of essential services for passengers and small amounts of freight on the passenger vessels. Operations are based around the use of the passenger vessels Ilala and Mtendere, although both vessels require modernisation and upgrading. Given the current traffic levels, it would be very difficult to justify the replacement of these vessels. The following Table presents the vessels currently operating on Lake Malawi.

Source: Malawi Lake Services, September 2004.

The current demand for general freight is much smaller than the capacity offered by the current freight vessels. The existing freight vessels, therefore, appear to be redundant, unless they can be linked to or incorporated into specific long-term or larger scale projects and not the conventional general freight business.

River Traffic

At present the water transport activities in Malawi are limited to regular passenger and freight services on Lake Malawi, whereas the extensive national river system is not used for commercial transport other than small scale ferry activities across the rivers, using small canoes and dugouts and a small number of boats operated by lodges offering wildlife watch tours to their guests.

Airways

Malawi has four major airports in Lilongwe, Blantyre, Mzuzu and Karonga. Lilongwe and Blantyre handle the international traffic, the other two mostly domestic traffic.

The national carrier Air Malawi is 100% government owned. It operates 2 B-737 and several smaller planes. It is said to be in a difficult situation and privatisation is considered to be an option.

Furthermore, several private operators operate a fleet of small one-and two engined planes, mostly in the touristic trade.

Freight types and volumes

Any transport company lives of the cargo it carries. Transport companies/modes and their cargoes come together through very special parameters, as each side demands and offers specific conditions. Thus, neither transport modes nor cargoes are indiscriminately suited to each other.

In order to illustrate this, a short balanced description appears necessary:

Truck: their positive aspects are: instant readiness, highest speed and nearly unlimited mobility, thus allowing quick door-to-door transport, which is best suited to most customers and their relatively small and expensive cargo loads. Its small cargo capacity is easily filled, thus preventing many empty runs. On the negative side figure: highest energy input and environmental pollution, high degree of road attrition and frequent accidents.

Railway: trains transport large cargoes in small units at regular speed over long distances. Trains can flexibly be sized according to the available cargo, which requires good loading management.

However, all these positive qualities can only be used when an expensive to build railway network is available. A technical problem/failure usually disrupts the whole system.

Vessel: vessels are by far the most economic and environmentally friendly transport mode. They transport any kind and volume of cargo worldwide, the cargo not being restricted in size. However, when used in the fluvial role, they depend of rivers and canals as the railways of their tracks.

Furthermore, it cannot be sized to its cargo; the cargo must be sized to it, thus being the least flexible transport mode. Cargo acquisition and cargo availability becomes paramount in order to avoid ballast runs.

The question now is, considering the a.m. qualifications, what kind and volumes of cargoes may be available for a new Shire-Zambezi Waterway operation?

Types

Container

The use of container is not yet as widespread as it could be. Thus, only 15% of Malawi's main export commodity tobacco (2003: 109,400 t) is transported in container while the rest goes break bulk to Johannesburg. The reason is that containerisation of tobacco in Malawi costs about US\$ 157/t, whereas it costs only US\$ 124 when done in South Africa. It would be interesting to look into the reasons for such an enormous discrepancy. Statistics on quantities, types, destinations and other data about container traffic in Malawi could not be traced as the pertinent database was said to be "under construction".

Solid bulk

Sugar and fertiliser are more often than not carried in 50 kg bags. The reasons for this should also be looked into in detail in a coming study, since it is important for the configuration of a potential vessel for the shipping project.

The main bulk commodities traded in 2003 were: in export: sugar 130,000 t and in import: fertilisers 225,900 t. Theoretically, these two commodities would be ideally suited to build up a balanced two-way transport link.

Liquid bulk

Fuel is imported mainly through the Dar es Salaam (road tankers: 65,000 t = 26%), Nacala (by rail tankers: 35,000 m³ = 14%) and Beira (by road tankers: 150,000 m³ = 60%) corridors. The Dar es Salaam route is used for supplying the northern part of Malawi and is thus not that interesting under this project's perspective.

The Nacala line is not operating at possible capacity due to shortage of tank waggons and locomotives and limited storage capacity in the port. The railway tariffs are differentiated by type of fuel, so that the given rate of US\$ 95.1/t from Nacala to Lilongwe is a weighted average rate.

Beira offers sufficient storage capacity. Assuming each road tanker to carry 30,000 ltrs., the above mentioned volume would require 5,000 trips a year or about 14 tankers per day. A trucker rate of US\$ 121/t was quoted for the Beira corridor run in 2003.

Ethanol started to be exported via the Dar es Salaam route in 2005. However, the volume was still rather modest (5 mn. ltrs.) and prospects were said to be opaque.

3. TRANSPORT COSTS AND TRANSIT TIMES

The road transport costs are difficult to summarise, since they depend of the respective company's purchase policy (new or used) as well as of its utilisation. Accordingly, cost estimates for Malawi trucking companies range widely and previous studies found a rate of US\$ 1 per vehicle kilometer as more or less representative. This would mean for a truck with an 18 t payload a ton-kilometer cost of US\$ 0.055.

Based on a distance of 2,136 km from Blantyre to Durban, the corresponding transport cost reaches US\$ 117.48 per run.

Durban is the biggest hub for Malawi cargo exported to its main customers in Europe and America. Thus and in consequence, most export corridors are ultimately focused on a connection to Durban.

Maritime feeder times from Durban to

- Beira: 3 days
- Nacala 5 days and
- Dar es Salaam 7 days

The frequency of feeder calls is best in Beira (in average every 3 days), somewhat irregular (on inducement?) at Nacala and weekly in Dar es Salaam.

Land transport times from Malawi to:

- Dar es Salaam 4 days
- Nacala 10 days
- Beira 3 days
- Durban 7 days

Land transport is available practically anytime. Most goods exported from and imported to Malawi do not require a delivery "just in time", neither are they highly perishable goods. The advantage to economize transport cost is therefore much bigger than the one to safe transport time.

Main Cargo Movers

The transport vessels to be deployed in a potential new Shire-Zambezi Waterway project would offer a relatively large cargo space available in the southernmost tip of the country. Depending of the fluvial conditions and the vessel type, up to 1,800 mt cargo capacity can be assumed.

This means that a large volume of cargo must be concentrated in the departure port (Nsanje) and be ready for loading at a pinpoint date. In the opposite direction it means that large volumes of cargo materialise at a pinpoint date and must be absorbed without delay by the port's installations.

It is obvious that such operations demand appropriated installations and equipment, well instructed staff and efficiently coordinated loading/discharging operations.

Such cargo consolidation spots (ports) generate a catchment area around them. However, beyond a certain distance it makes no sense to use an intermediate transport link, as the additional pre-and post-carriage costs as well as handling costs will become higher than the economy the new link offers, summing up into a composite rate uncompetitive with other transport modes.

As the natural catchment area for this project one can assume all the southern part of Malawi as long as suitable hinterland transport links to the port at Nsanje are available or can be established.

This highlights the importance of improving the presently very bad road and to rehabilitate the once existing railway connection between Blantyre and Nsanje.

Thus it is essential to identify the companies and institutions in this catchment area which generate and receive large amounts of cargo suitable for shipment by vessel. It can be assumed that these are companies the transport priorities of which are already focused in a general southern direction, meaning that they are already users of the Beira and the South African corridors. They should be receptive for any proposal which might reduce their transport costs without reduction in transit time, reliability and cargo safety.

Fuel

Malawi imports in average of the last years about 250,000 m³ of fuel. In principle, this would be an ideal cargo for a tanker vessel, were it not for a lacking corresponding liquid cargo on the export side, which means that the vessel would have to make a return trip empty.

There are however indications that the fuel rates charged by road tankers from Beira to Malawi (US\$ 121/t) may even make a one-way fluvial transport leg profitable. After all, the road tankers also are faced by the "empty-return-trip-problem". Thus, in a future study, this possibility should be investigated.

Malawi's main fuel suppliers are BP and Mobil, which operate mainly out of Beira, where they maintain large fuel depots.

Fertilisers

Fertilisers are imported into Malawi either as a finished, bagged product or as components, which are then blended into a final product in Malawi. The main importers are Farmers World, Optichem, SFFRFM and Yara, some of them being subsidiaries of fertiliser companies in Europe or South Africa.

Most of the fertilisers are shipped directly by road from the manufacturers around Johannesburg. Much of it is shipped bagged instead of containerised, since the trucks on the route are limited to 28 t-loads. The same load containerised would be a net 24 t-load due to the tare weight.

Food Crops

Food crops are an eventually rewarding cargo, since its growth potential is said to be substantial. The main cargo movers in this sector were said to be Bharat Trading Co., HMS Ltd., Rab Processors and Transglobe Exports. They export mainly to Far Eastern countries and consequently use most the Nacala line.

As the season for food produce coincides with the seasons of other agricultural products, the supply of international trucks is a marked constraint in this sector.

Sugar

Sugar is produced in Malawi in considerable quantities (482,000 t in 2004) as growing conditions are excellent. Roughly half of it (268,000 t) is exported, mostly via the Nacala and the Beira corridors (each with about 40% share of the total).

One of the main producers is the large Sucoma estate at Nchalo, which is owned and operated by the Illovo Sugar Company. The estate borders the at that point already navigable Shire river. In former times sugar and molasses were exported by barge on the Shire-Zambezi waterway to Chinde, but that operation was stopped by the war in Mozambique in the beginning of the 70ies.

It would be a substantial step towards the implementation of the project, if the company could be persuaded to ship their sugar again on the waterway, as this would mean a steady flow of basic cargo for the venture. A volume of about 50,000 t annually is said to be available, which would employ about half of the carrying capacity of a vessel as defined in scenario 2.

In order to avoid the otherwise necessary transshipment from truck to vessel in Nsanje, the option of a dedicated loading pier on the Shire at the Nchalo estate should be studied. This would greatly reduce the shipping costs both for the shipper and the vessel operator.

As it can be assumed that the sugar estate also consumes large amounts of fertilisers, the volumes earmarked for it could be shipped in from Beira on the return voyage of the vessel, thus establishing a balanced trade.

4. PLANNED DEVELOPMENTS

There are some developments both in Malawi and in Mozambique, which may have a direct bearing on this project. Some of them may affect the competitive situation and others may turn into an outright impediment. Thus it appears imperative to monitor them in the coming studies and in one case (the planned bridge at Morumbal) to take provisions to minimise its specific effects.

Anticipated Transport Demand

It is difficult to assess Malawi's anticipated transport demand. The economy has recently passed through several crises and growth is weak. The country's main export commodities show partially erratic developments with inconclusive trends, while the import side is dominated by the ever increasing fuel bill.

Furthermore the statistical sources show great discrepancies which entail the question as to their consistency. As the figures given in the TERA report have possibly be compiled under that consultants' specific rationale, those extracted from the "Quarterly Statistical Bulletin" are supposed to have a more continuous interpretation.

Sentiments expressed by businessmen are mixed. Whereas importers of consumer goods appear to be quite satisfied and optimistic about the future development, names connected to export business are markedly more reserved about the prospects. Their revenues depend mostly of hardly predictable, volatile, international markets, where Malawi's agricultural products have to face stiff competition.

All this does not warrant the establishment of a trend. At the most, one can predict a stagnant development with exception of the fuels, which does not forebode well for the balance of payments. Thus, the current account balance is running a chronic and increasing deficit (2000: -11,259 mn MK; 2003: -41,802 mn MK) only partially offset by the positive capital (2000: 14,462

mn MK; 2003: 14,012 mn MK) account balance and the alarmingly increasing debt relief (2000: 0; 2003: 4,634 mn MK).

As a result, the potential project operators will have to fight for their share in a market which strong and established competitors (truckers) have already taken hold of.

Furthermore, in 2009 the Sena line will become operational, which probably will develop into the most "dangerous" competitor. The railway coming up from Beira, will not have to stop and transship at Nsanje; it will go on straight into the two main cargo generating and absorbing centers Blantyre and Lilongwe!

Endorsed Projects

Beira Corridor

The main project in the Beira corridor is the rehabilitation of the Sena Line, which had been partly destroyed during the war. An Indian consortium of Rail India Technical and Economic Services (Rites) and Indian Railway Construction International (Ircon), in association with Mozambique's publicly-owned port and railway company, CFM, took over management of Mozambique's Beira railway system.

The new Beira Railroad Company (CCFB) is owned 51% by the Indian consortium and 49% by CFM. The Beira system consists of two lines: the Machipanda line from Beira to Zimbabwe, which is fully operational; and the Sena line to the Moatize coal mines, with a spur into Malawi, which has been out of commission for more than 20 years. Rites and Ircon plan to invest \$US 33 million in the Sena line and a loan of \$US 110 million has been negotiated with the World Bank, which is said to include the Malawi connection.

It is planned to become operational in 2009. Then, Malawi will have again a direct rail link to its main trade port of Beira. This line will constitute the main, direct and most competitive alternative to any shipping on the Shire-Zambezi Waterway, so that its progress and performance must be closely monitored in any future development and assessment of this project.

Access to Nsanje Port

Nsanje, the base port of this project, is presently connected to the rest of the country towards the north, by a gravel road in bad conditions over about 80 Km. Towards the south, the same road continues and enters after some 30Km into Mozambique. It is imperative for any project, that this road be improved, which is said to have been decided.

Furthermore, the former railway connection to Blantyre is deactivated. It also continued into Mozambique, linking up with the Sena line at Sena. It presently stops at Makhanga near the Chiromo bridge, where the tracks cross the Shire river. The bridge suffered washouts and needs extensive rebuilding. This is planned to be implemented with Japanese assistance. As to the tracks, they will probably be rebuilt as and when the Malawi spur of the Sena line is implemented in 2009.

Both the road and the railway connections are essential for the project as they define the pre-and post-carriage costs of the fluvial transport. The less efficient they are, the less competitive will be the whole transport chain.

Nacala Corridor

In the recent past the Nacala corridor and its railway had been hailed as the least cost route for Malawi's foreign trade. However, its actual performance had never been able to fulfil this promise due to frequent flooding and the resulting line closures, a shortage of rolling stock, handling problems in the port of Nacala and lack of effective coordination between the operating companies, the Malawi CEAR and the Mozambican CFM-Norte.

Thus, both the governments of Malawi and of Mozambique are analysing their options in order to improve this situation.

One option is seen in the proposal of the future concessionaire of the vast Moatize coal reserves, the Brazilian CVRD, to take over the management of the Nacala line and to extend it westward through Malawi into Mozambique to the coal site. This would mean a complete reconstruction and modernisation of the line in order to handle the heavy coal traffic and the construction of a new coal terminal near Nacala, where deep-drawing cape-size bulk vessels can berth. Assuming that provisions can be negotiated to guarantee Malawi cargo to be transported efficiently on this new Nacala line, this corridor could then finally live up to the expectations it had never fulfilled.

Apparently however, negotiations have not yet come to an end.

Roads and Bridges

There are two bridges on the Shire-Zambezi Waterway's path, which deserve some comments:

The bridge at Caia over the Zambezi

This bridge represents a long aspiration by Mozambique, since it is a vital link in the central region, which is divided by the wide Zambezi over hundreds of kilometers. Its construction had begun over 30 years ago, but was halted by the war. In 2005 construction began again by a Portuguese consortium and the bridge will be operational by 2009.

The bridge will be 16 m wide and 2.376 km long, with four lanes, two for vehicles and the other two for bicycles, motorbikes and pedestrians. More important under project aspects is the air draught with 13 m over flood level. Thus, there should not be any problem with navigation. The construction work is being funded by the European Union (€25 mn), Sweden (€21 mn), Italy (€20 mn) and Japan (US\$9 mn).

The bridge at Morumbal over the Shire

Mozambique plans also the bridge at Morumbal, which crosses the Shire south of the Ndinge marsh. It is being financed by and planned in Japan, the construction is foreseen to start in October 2007 and it will be operational by mid-2009.

The bridge will be a flat two-lane road bridge about 200 m long. At flood level, there will be an air draught of max. 3 m only. This is clearly insufficient for larger vessels, which will thus be unable to operate on the lower Shire during flood periods.

Further Potential Developments

Beyond the cited examples it is apparent that any project in central Mozambique may have impact on this project, being it bridges, roads, railways, ports along the Zambezi river, new cargo sources, cabotage ventures, etc.

Due to their short stay in Mozambique, the consultants were unable to trace concrete projects in the Mozambican "pipeline". There were only rumours of an intended new road from Quelimane towards Malawi - which in fact would be the shortest possible connection to a seaport - and that some projects along the Zambezi were on hold due to the poor navigability of the river.

This last point may present the opportunity to resume discussions with the Mozambican Government to address an apparently common concern.