



## **FISHERIES MANAGEMENT AND DEVELOPMENT PROCESSES IN LAKES EDWARD AND ALBERT**

**Developing a Fisheries Management Plan within the  
Framework of the Integrated Lakes Management Plan**

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## ACRONYMS AND ABBREVIATIONS

ACP	Africa Caribbean and Pacific
AfDB	African Development Bank
AU	African Union
BCLME	Benguela Current Large Marine Ecosystem
BMU	Beach Management Unit
CAS	Catch Assessment Survey
CBD	Convention on Biological Diversity
CCLME	Canary Current Large Marine Ecosystem
CES	Catch and effort Survey
CIFA	Committee for Inland Fisheries of Africa
CIFAA	Committee for Inland Fisheries and Aquaculture of Africa
CITES	Convention on International Trade in Endangered Species of Wild Fauna and
COFI	FAO Committee for Fisheries
COOPECVI	Coopérative des Pêcheurs de Virunga
CPUE	Catch per Unit Effort
DR Congo	Democratic Republic of Congo
EAF:	Ecosystem Approach to Fisheries
EIFAC	European Inland Fisheries Advisory Council
ENCOM	Eastern Nile Council of Ministers of Water Affairs
ENSAP	Eastern Nile Subsidiary Action Plan
ERA	Ecological Risk Assessment
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FMIS	Fisheries Management Information System
FMP	Fisheries Management Plan
FFMP	Framework Fisheries Management Plan
FS	Frame Survey
GDP	Gross National Product
GEF	Global Environment Facility
GPS	Geographical Positioning Station
IBAR	Inter African Bureau for Animal Resources
ICCN	Institut Congolais pour la Conservation de la Nature
ICCON	International Consortium for Cooperation on the Nile
ILMP	Integrated Lakes Management Plan
IUU	Illegal, Unreported and Unregulated (catches)
LEA	Lakes Edward and Albert
LEAB	Lakes Edward and Albert Basin
LEAF	Lakes Edward and Albert Fisheries
LVFO	Lake Victoria Fisheries Organization
MAAIF	Ministry of Agriculture, Animal Industry and Fisheries (Uganda)
MCS	Monitoring, Control and Surveillance
MIS	Management Information System
NBI	Nile Basin Initiative
NBD	Nile Basin Discourse

NEL	Nile Equatorial Lakes
NELSAP	Nile Equatorial Lakes Subsidiary Action Plan
NELSAP-CU	Nile Equatorial Lakes Subsidiary Action Plan Coordination Unit
NGO	Non-Governmental Organization
PFRS	Policy Framework and Reform Strategy for fisheries and aquaculture in Africa
PNV	Parc National des Virunga
SAP	Strategic Action Programme for Lake Victoria
SVP	Shared Vision Programme
UGREP	Unité de gestion des Ressources en Pêche
UNDF	Uganda Nile Discourse Forum
UWA	Uganda Wildlife Authority
TDA	Transboundary Diagnostic Analysis

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## EXECUTIVE SUMMARY

Inland water bodies are natural capital assets which must be managed in a manner to not only maintain existing benefits (food security, livelihoods and income), but also seek to increase the sustainable contribution of the sub-sector to the blue economy growth of our member states. The current benefits are however under threat from a variety of sources, key amongst which include poor governance frameworks, open access nature, unsustainable fishing practices, weak capacity, threats by climate change, environmental and other natural disasters, lack of alternative livelihoods etc. The vast majority of these water bodies are shared ecosystems which in turn pose significant management challenges to fisheries management bodies.

The overall goal of the Policy Framework and Reform Strategy (PFRS) for fisheries and aquaculture in Africa is to create an enabling environment for food security, livelihoods and wealth. Therefore one of the PFRS key policy arenas is to promote sustainable development of small-scale fisheries on the continent that includes inland fisheries development. The formulation of realistic fisheries management plans informed by assessment of management and development issues could be a precursor to solving some of the challenges in the subsector. This study which was commissioned by the African Union with support from the European Union under the Fisheries Governance Project, assessed the issues which could ultimately contribute to realistic regional fisheries management plans in shared water bodies on the continent.

Lakes Edward and Albert (LEA) are internationally recognized water bodies with a catchment area of 47,500 km<sup>2</sup>. These Lakes' Basin areas are shared between the Democratic Republic of Congo (DR Congo) and Uganda. The two lakes are of major ecological significance because they support a wide diversity of flora and fauna. They also play major economic roles in the riparian countries, including fishing industry for local consumption and export, water supply (for domestic and industrial purposes), lake transportation, and irrigation.

The Nile Basin Initiative (NBI) within the Nile Equatorial Lakes Subsidiary Action Plan (NELSAP) and in furtherance to implementing its broad mandate to develop an integrated Lake Management Plan (ILMP) is developing and managing the fisheries in Lakes Edward and Albert (LEAF). The partner States are DR Congo and Uganda.

This paper assesses efforts made to manage and develop LEAF in the framework of the Lakes Edward and Albert Fisheries Project (LEAF); identifies and analyze the main environmental stresses and key strategic transboundary issues and challenges which affect and could potentially impact on the sustainable development of the fisheries, and suggests possible interventions to facilitate the development of fisheries specific management plans within the ILMP.

The LEAF I was designed as a pilot project to among other things generate replicable experiences in the management of fisheries resources in a transboundary context; to avail the Governments of DR Congo and Uganda with a sustainable investment and management plans for the joint use of the water and fisheries resources of the lakes. The project delivered its main envisaged outputs. LEAF II is being prepared to consolidate gains made in LEAF I and to ensure sustainable utilization of fisheries and allied natural resources of Lakes Edward and Albert Basin through harmonized legal framework and policies. This will be achieved by supporting interventions in two domains namely: (a) fisheries

resources development and management and (b) integrated water resources management.

The fisheries management and fisheries research institutes in the riparian states are directly responsible for the management of fisheries in the section of the lakes within their jurisdiction, while bilateral coordination of fisheries activities is promoted by NELSAP. The fisheries policy, laws and regulations of Uganda are up-to-date. The fisheries policy and law of DR Congo are outdated (1987 and 1937 respectively). A revised law is pending action by the deliberative assemblies. Both countries have ratified CBD, CITES and RAMSAR Convention. The Code of Conduct for Responsible Fisheries has been incorporated in the national fisheries legal frameworks of the countries either through legislation, regulations or administrative decisions, or policy.

The fisheries on the Lakes are essentially open access and management of the fisheries is difficult owing to the spatially dispersed nature of the fishery. Compliance is low and regulations are poorly enforced. Many fishers are using destructive gear and bad management methods. Civil society organizations (CSO) are participating in the management (control and enforcement) and the collection of data in both countries.

The authorities have adopted traditional approaches to management including limitations on access, closed seasons, minimum sizes of landed fish and limitations on the type and mesh size of the gear to be used. Such centrally imposed limitations have been unsuccessful.

Participatory approaches including co-management systems are now being used in an effort to overcome the limitations imposed by central government agencies.

The key transboundary issues and challenges in the management of the fisheries are related to inadequate fisheries governance. The main issues are: absence of up-to-date policies, laws and regulatory standards at national level; the non-harmonization of policies, laws and regulatory standards at regional level; low compliance to fisheries laws and regulations and inadequate enforcement and limited effective involvement of stakeholders in the fisheries management process.

These issues together with the prevalence of poverty and increase in population in the lakes basin contribute to excessive pressure being exerted on the fisheries resources and poor management practices resulting in declining fish stocks, destruction of critical habitats and the environment, as well as conflicts among stakeholders.

The key challenges are to correct the imperfections in the fisheries governance and in addition reduce the pressure on the resources; generate appropriate scientific knowledge and incorporate the use of local knowledge to guide resource management; ensure the availability of reliable data and information to guide management; and develop the human and institutional capacity to manage the complexity of resource uses and pressures, and also to understand and develop mechanisms for adaptation to climate variability and climate change. There are also a number of important environmental stresses. LEAF II envisages addressing many of these issues and challenges.

The scope and content of LEAF II Project Preparation Report (PPR) is sound. The LEAF PPR foresees the elaboration of two fisheries management plans for the lakes. The Paper contains strategies, processes, and mechanisms to facilitate the development of fisheries specific management plan within

the framework of the ILMP. It also strongly suggests that the management plan is premised on the principles of the Ecosystem Approach to Fisheries (EAF) and effectively implemented by Partner States and other stakeholders, donors, non-governmental organizations, etc.

## SECTION ONE: INTRODUCTION

### **1.1. Purpose of the Paper**

This paper, set against the above background, assesses efforts made to manage and develop the fisheries in Lakes Edward and Albert in the framework of the Lakes Edward and Albert Fisheries Project (LEAF), executed by the Nile Basin Initiative (NBI); identifies and analyze the main environmental stresses and key strategic transboundary issues and challenges which affect and could potentially impact on the sustainable exploitation, management and development of the fisheries, and suggests strategies, processes and mechanisms to facilitate the development of fisheries specific management plan within the framework of the integrated Lakes Management Plan (ILMP) of the Lakes.

### **1.2. Context and Rationale**

Inland water bodies are natural capital assets which must be managed in a manner to not only maintain existing benefits (food security, livelihoods and income), but also seek to increase the sustainable contribution of the sub-sector to the blue economy growth of our member states. The current benefits are however under threat from a variety of sources, key amongst which include poor governance frameworks, open access nature, unsustainable fishing practices, weak capacity, threats by climate change, environmental and other natural disasters, lack of alternative livelihoods etc. The vast majority of these water bodies are shared ecosystems which in turn pose significant management challenges to fisheries management bodies.

The overall goal of the Policy Framework and Reform Strategy (PFRS) for fisheries and aquaculture in Africa is to create an enabling environment for food security, livelihoods and wealth. Therefore one of the PFRS key policy arenas is to promote sustainable development of small-scale fisheries on the continent that includes inland fisheries development. The formulation of realistic fisheries management plans informed by assessment of management and development issues could be a precursor to solving some of the challenges in the subsector. This study which was commissioned by the African Union with support from the European Union under the Fisheries Governance Project, assessed the issues which could ultimately contribute to realistic regional fisheries management plans in shared water bodies on the continent.

Africa has about 80<sup>1</sup> transboundary water basins that serve multiple functions. The transboundary water basins cover approximately 64% of the continent's land area, which contain 93% of the water resources and are inhabited by 77% of the population (UNEP, 2010). The water basins contain fisheries resources and a wealth of aquatic and other biodiversity. The Equatorial lakes, Lakes Edward and Albert are among these transboundary water basins.

Inland fisheries make very significant contributions to nutrition and food security, employment, income generation and improvement of livelihoods to populations in African countries. In several countries, especially land-locked countries and riparian communities along major rivers and lakes of the continent, fish is probably the major protein source. Inland fisheries are the fourth (10.66%) most important source of animal protein after cattle (22.4%), marine fish (21.10%) and chicken (15.79%) (AUC-NEPAD, 2014). Although most of the catch of inland water fisheries is consumed locally, products from inland fisheries are also important in regional, intra- and international trade. For example the value of the exports of catch from Lake Victoria in 2014 was over US300 million (LVFO, 2015).

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<sup>1</sup> Source: *Water and Sustainable Development in Africa: An African Position Paper African Water Task Force, August 2002*

The most recent estimate (2014) of the total fish production from Africa is 10.35 million tonnes. Of this, about 2.85 million tonnes or 33.1% is from inland capture fisheries. Total aquaculture production was 1.71 million tonnes and marine capture fisheries 5.78 million tonnes (FAO, 2016, Garibaldi, pers. com). The value added by the fisheries sector as a whole in 2011 was estimated at more than US\$24 billion, 1.26% of the GDP of all African countries. Of this, about US\$6.2 billion was inland fisheries (US\$4.7 billion from direct fishing and US\$1.5 billion from post-harvest). The fisheries sector as a whole employs 12.3 million people as full-time fishers or full-time and part-time processors, representing 2.1% of Africa's population of between 15 and 64 years old. The share of inland fisheries was about 5 million (3.3 million as fishers and 1.5 million processors). The estimated number of women in the inland fisheries sector was slightly over 1.3 million with the majority of them (about 1.1 million) in the post-harvest sub-sector (de Graff and Garibaldi, 2014)

Conventional wisdom holds that the contribution of inland fisheries is grossly under-estimated because of the difficulty of collecting data from highly dispersed landing sites (Welcomme et al. 2014); implying that with good management, inland fisheries can become a strong engine for development and economic growth.

Effective fisheries management of transboundary fishery resources is dependent on among other things the availability and implementation of appropriate fisheries and aquaculture policies; the conduct of fisheries management practices in a regulatory framework that is consistent, harmonized and applicable, and the development and implementation of an appropriate fisheries management plan which should be a negotiated instrument between the fisheries management authorities of the concerned countries and their stakeholders; an instrument that provides a clear vision for the fishery, realistic and measurable objectives and other parameters as a road-map for moving the fishery forward on an agreed schedule of shared responsibilities among the fisheries management authorities and the stakeholders.

Efforts to promote the rational management of inland fisheries particularly in transboundary water bodies in Africa date back to 1970<sup>2</sup>. At the Fifty-four Session of the FAO Council, African countries, Members of FAO, conscious of the fact that several rivers and lakes are common to two or more countries, and that their fisheries resources constitute a field of international interest requested FAO to establish a body similar to the European Inland Fisheries Advisory Council (EIFAC) for the African Continent. In follow up to this request, an ad hoc Consultation on the Proposed Establishment of an Inland Fishery Body for Africa was held in Rome in April 1971. The Consultation among other things estimated that the presence of several shared rivers and lakes as well as extensive floodplains and wetlands suitable for inland fisheries necessitated joint policy and the adoption of a uniform and standard methodology for resource appraisal and for collection of statistics and biological data in order to determine the consequences of fishing on stocks and strongly recommended the establishment of such body. Consequently, the FAO Council at its Fifty-six Session, in June 1971 established the Committee for Inland Fisheries of Africa (CIFA)<sup>3</sup>.

Since then several actions were taken by African countries with the assistance of development partners, including in particular FAO, to promote the sustainable development of inland fisheries particularly in transboundary inland water bodies. CIFA among other things established three sub-Committees,

<sup>2</sup> The Author is aware that studies had begun in several water bodies as early as the late 1800s; but we refer to joint efforts at the international level.

<sup>3</sup> The FAO Council at its Hundred and Thirty-third Session in 2007 changed the name to "The Committee for Inland Fisheries and aquaculture of Africa" (CIFAA) to reflect the importance of aquaculture in global fishery sector but also in Africa

namely: the Sub-Committee for the Protection and Development of the Fisheries of the Sahelian Zone, (1974), the Sub-Committee for Development and Management of the Fisheries of Lake Tanganyika (1977), and the Sub-Committee for the Development and Management of Fisheries of Lake Victoria (1981) to coordinate fisheries research and development activities on these major inland water bodies, floodplains and wetlands.

### **1.3. Main Area Covered**

This paper comprises six sections.

Section One the Introduction gives the Objective of the paper, Context and rationale, Main Areas covered and the Methodology;

Section Two presents the profile of the Nile Basin Initiative (NBI), describes the main features of Lakes Edward and Albert and their fisheries;

Section Three, briefly describes the main outputs of the Lakes Edward and Albert Fisheries (LEAF) pilot project and highlights the salient features of the LEAF II Project

Section Four: assesses the governance of the fisheries and management approaches applied

Section Five identifies and analyzes the environmental stresses and the key strategic transboundary issues and challenges which affect and could potentially impact on the sustainable exploitation and management of the LEA fisheries and highlights the degree to which the proposed LEAF II project addresses them;

Section Six: suggests strategies, processes and mechanisms to facilitate the development of fisheries specific management plan within the framework of the integrated Management plan of the Lakes.

### **1.4. Methodology**

The assignment was essentially a Desk Study combined with two day mission to the headquarters of the Nile Basin Initiative in Entebbe, Uganda. The approach for the study consisted of four distinct but interrelated phases of literature search/review and virtual search of websites; a field visit to Entebbe at which Semi-structured interviews were conducted.

## **SECTION TWO: PROFILE OF THE NILE BASIN INITIATIVE, MAIN FEATURES OF LAKES EDWARD AND ALBERT AND THEIR FISHERIES**

### **2.1. The Nile Basin Initiative**

The Nile Basin Initiative (NBI) was established in 1991 by the ten Nile Riparian States as a cooperative programme to address poverty, environmental degradation and instability in the Nile Basin while promoting socio-economic development. In 2001, the International Consortium for Co-operation on the Nile (ICCON) was launched whose Vision is “to achieve sustainable socio-economic development through equitable utilization of, and benefit from, the common Nile Basin Water resources”. The NBI shared vision is supported by the following four specific objectives to: (a) develop the water resources of the Nile basin in a sustainable and equitable way to ensure prosperity, security, and peace for all its peoples; (b) ensure efficient water management and the optimal use of the resources; (c) ensure cooperation and joint action between the riparian countries, seeking win win gains; and (d) target poverty eradication and promote economic integration.

In order to transform their Vision to action, the Nile riparian countries developed a Strategic Action Programme (SAP) of two complementary programmes (i) the Shared Vision Programme (SVP) and (ii) the Subsidiary Action Programme (SAP). The SVP which is piloted by the NBI Secretariat seeks to build trust among the states, improve implementation capacity and lay foundations for cooperative investment and development. The SAP is oriented towards investment projects at the sub-basin level, involving all potentially affected states and to promote in a sustainable and equitable way to ensure prosperity, security, and peace for the whole Nile Basin.

Two SAPs have been initiated: the Eastern Nile Subsidiary Action Plan (ENSAP) and the Nile Equatorial Lakes Subsidiary Action Plan (NELSAP). The ENSAP countries are Egypt, Sudan and Ethiopia under the Eastern Nile Council of Ministers of Water affairs (ENCOM) and the NELSAP countries are Burundi, Democratic Republic of Congo, Egypt, Kenya, Rwanda, Sudan, Tanzania and Uganda. NELSAP countries have established a NELSAP coordinating unit (NELSAP-CU) based in Kigali, Rwanda. The NELSAP works with member States to develop bankable projects, mostly funded by the African Development Bank (AfDB). The investment portfolio for NELSAP currently stands at US\$940 million.

Within NELSAP and in furtherance to implementing its broad mandate to develop an integrated Lake Management Plan (ILMP), the NBI is developing and managing the fisheries in Lakes Edward and Albert (LEAF) for which the partner States are the Democratic Republic of Congo (DR Congo) and Uganda.

### **2.2. Main Features of Lakes Edward and Albert**

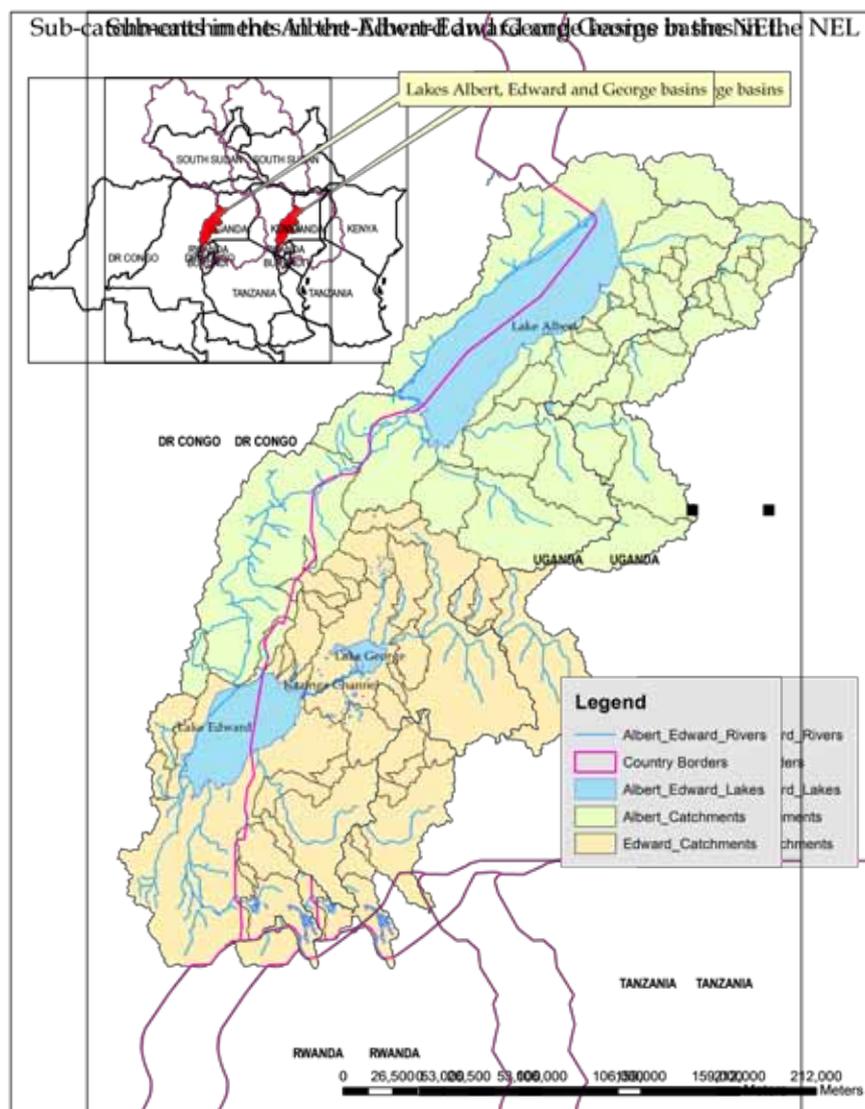
Lakes Edward and Albert (LEA) are internationally recognized water bodies with a catchment area of 47,500 km<sup>2</sup>. These Lakes' Basin areas are shared between the DR Congo and Uganda. For Lake Edward the share for DR Congo is 71% and 29% for Uganda, whereas for Lake Albert the sharing is 46% for DR Congo and 54% for Uganda. Fig. 1 represents the Basin map for Lakes Edward and Albert.

The catchment area of Edward is 12,000km<sup>2</sup>, traversed by a number of streams often fringed by thick forests at their low ends. The Semliki River carries the outflow from Lake Edward in addition to the runoff from its own catchment to Lake Albert. The catchment area of Semliki River is 8,000km<sup>2</sup> bringing the total area of the George-Edward-Semliki system to 30,500km<sup>2</sup>. After leaving Lake Edward, the Semliki River flows a distance of 250 km down the Rift Valley to the west of the Rwenzori Mountain.

The drop of water level between the two ends of the river caused by the rapids in the upper part of its course is 295m. The drainage basin of Lake Albert is 17,000 km<sup>2</sup>. The inflow to the lake consists of the supply brought by the Kyoga Nile; the supply brought by the Semliki and the runoff from the lake catchment.

The two lakes are of major ecological significance because they support a wide diversity of flora and fauna. They also play a major economic role in the riparian countries, of Uganda and DR Congo, including supporting fishing industry for local consumption and export, water supply (for domestic and industrial purposes), lake transportation, and irrigation development. The oil and gas industry water requirements in the Lake Albert basin have for instance been estimated to increase from the present day 7MCM annually to 36.5 MCM annually by 2040.

The Lakes are a repository of the urban, domestic and industrial wastewaters, including urban runoff, as well as the sediment loads and nutrients from the agricultural and livestock areas, which enter the Lakes through the numerous river systems. The discharge of these effluents into the Lakes causes pollution, by increasing the concentration of Chemical Oxygen Demand (COD), total Phosphorus (TP), total Nitrogen (TN), and Chlorophyll-a, resulting into eutrophication.



**Fig 1:** Basin Map for Lakes Edward and Albert

In terms of biodiversity, Lakes Edward and Albert Basin area is home to highly diversified fauna with an estimated 24 fish species. The lakes have more than 60 endemic cichlid species. There are national parks, wildlife reserves, forests and forest reserves in the Lakes Edward and Albert (LEA) Basin, and these make up some 20% of the land use in the Albertine Graben. The Albertine Rift harbours a great diversity and a great number of mammals, birds, snakes and amphibians, many of which are endemic. Despite its socio-economic potential and rich natural heritage, the region is under threat from unsustainable natural resource exploitation practices with undesirable consequences.

### **2.3. The Fisheries of Lakes Edward and Albert**

Information on the fisheries of Lakes Edward and Albert are scarce. There is insufficient information on the key commercial species, size of stock, distribution and movement patterns, population structure, breeding habits, estimates of potential yield, characteristics of fishing gear, catch rates, description of the lake bottom, etc. No doubt research institutions in DR Congo and Uganda have undertaken studies on some or all of these aspects. However the information does not seem to be in the public domain.

The Uganda Nile Discourse Forum (UNDF, 2013) reports that the commercially exploited species in Lake Edward include the Nile tilapia, Bagride, catfish (*Bagrus docmak*), lungfish and African catfish; while in Lake Albert the species exploited are primarily Nile perch, Nile Tilapia, Tiger fish, *Alestes Baremose* and Barbines. The fisheries resources of the lakes are important for economic growth and social development of an estimated 12 million people in the region, of whom 73% (8.7 million) depend on fisheries, for their livelihoods. The fisheries sub-sector contributes between 1.5 and 2.5% to the GDP of the respective economies of the DR Congo and Uganda. Over 50% of those involved in fisheries are women who are engaged mostly in fish processing and marketing.

The mostly traditional and artisanal fisheries in Lake Edward and Lake Albert are of particular significance in terms of food availability (being the cheapest form of animal protein in both countries), employment creation (fishing, fish processing, marketing, boat building and other ancillary activities) and poverty reduction (as an easy entry sector, safety net in times of crisis). Total production from the lakes is not readily available. The annual production from Lake Albert (Uganda side) over a thirty year period (1955-1985) fluctuated between 4000 and 20 000 tonnes (UNDF, 2013). Most of the catch on the Ugandan side is marketed in DR Congo. An estimated 8.800 fishers operating about 2500 small craft operate within Ugandan waters.

## **SECTION THREE: KEY OUTCOMES OF LEAF I and SALIENT FEATURES OF LEAF II**

### **3.1. Key Outcomes of Lakes Edward and Albert Fisheries Pilot Project**

The LEAF I Pilot Project was designed as a pilot project to generate replicable experiences in the management of fisheries resources in a transboundary context; to avail the Governments of DR Congo and Uganda with a sustainable investment and management plans for the joint use of the water and fisheries resources of LEA; and to highlight the characteristics and nature of Lakes Edward and Albert Basin (LEAB) and the major socio-economic problems.

More specifically the project aimed at enabling the DR Congo and Uganda to:

- strengthen collaboration for rational and sustainable development and management of the shared water bodies by adopting joint fisheries and watershed management measures;
- foster bilateral cooperation and peace between riparian communities as well as at national level through consultation meetings;
- adopt joint fishing regulations for harmonizing fishing activities, in order to minimize; conflicts regarding the lakes;
- contribute to conservation of biological diversity in the two lakes; reduce loss of life through the establishment of safety regulations and standards;
- reduce loss of life through the establishment of safety regulations and standards

The project delivered its main envisaged outputs, namely: i) development of Integrated Lake Management Plans; ii) promotion of fisheries co-management; iii) integrated capacity building and stakeholders' participation; and iv) the identification of investment opportunities (LEAF II PPR, 2016).

Creation of Platform for Sustainable Management and Utilization of Natural Resources of the Lakes Edward and Albert □ Fisheries and water resources diagnostic and feasibility studies were undertaken, resulting in Integrated Lakes Management and Investment Plans (ILMP). The ILMP prepared in 2008 comprise investment plans and capacity development programs for sustainable fisheries and water resources management to address constraints and promote opportunities.

**Promotion of co-management of Fisheries Resources:** The project promoted co-management systems as part of measures to improve the governance of the fisheries in the two lakes for sustained use of the resources. It also ensured that co-management of fisheries was strengthened and understood. Measures included: review of modalities for beach management units; development of local management regulations; training /capacity building; and establishment of co-management structures. Addressing the challenges of the fisheries through the implementation of co-management systems represents new options, and requires institutional transformation for focused support to fishers and fishing communities. In terms of replicability, LEAF II will promote co-management to communities all around the two lakes.

**Promotion of Community Development Activities:** The project promoted community driven development activities for fishing communities. The scope included: (i) sensitizing fishing communities; (ii) implementation of community based pilot micro projects (through micro-grants to local governments); and (iii) formulation of priority investment community development activities, which could be scaled up through implementation of the LEAF Integrated Lakes Management and Investment Plan under LEAF II. During implementation Civil Society Organizations (CSO) in Uganda and DRC were used to identify

the most pressing development concerns and offered unique and valuable insights on the strategies used.

### **3.2. Salient Features of LEAF II Project**

Transboundary Diagnostic Analysis (TDA) of the Lakes carried out in the mid-2000s identified poverty; inadequacies in policy, laws and institutions; declining biodiversity and over-fishing; degradation of river banks and lake shores; water quality deterioration, water level fluctuations and climatic changes; land degradation, deforestation, poor mining and quarrying; civil wars, population displacement and conflicts in resource use; poor public/ stakeholder participation; poor information generation, dissemination and poor management practices as the main transboundary concerns.

Currently, the environmental problems are exacerbated by the growing population pressure in the lakes basin, pollution of various types which has increased both competition and conflicts over the use of shared transboundary natural resources.

On the basis of the TDA results, a pilot project - Lakes Edward and Albert Fisheries – (LEAF) was executed between 2008 and 2012. The objectives of the project were outlined in Section three above. The Pilot project is reported to have achieved its objective and a second project (LEAF II) is under consideration by the African Development Bank (AfDB) to consolidate the gains of LEAF I and also draw on the lessons learned in its implementation

#### **Objectives and Expected Outcomes**

The overall goal of LEAF II is to “assist DR Congo and Uganda to develop and implement coordinated approaches and planning frameworks for poverty reduction and sustainable livelihoods for men and women (in the local fishing communities) within Lakes Edward and Albert basin through sustainable transboundary management of natural resources of Lakes Edward and Albert.

The project objective is to ensure sustainable utilization of fisheries and allied natural resources of Lakes Edward and Albert Basin through harmonized legal framework and policies.

#### **Relevance of the Project**

Lakes Edward and Albert natural resources are crucial to social and economic development of the estimated 12 million people living within the region in the DR Congo and Uganda. The project supporting transboundary cooperation in the management of water and other natural resources for mutual benefits of people in DR Congo and Uganda is consistent with the shared vision of the NBI. The project is also consistent with the Nile Equatorial Lakes (NEL) indicative Multi Sector Investment strategy and action plan (2012)<sup>4</sup>. The strategy proposes promotion and development of capture fisheries and aquaculture through better management of lake and river resources of the Nile Equatorial Lakes Region, and through the use of water stored or diverted for other purposes. The LEAF II project is also in line with the NELSAP Strategic Plan 2012-2016 with the objectives of contributing to the poverty eradication, economic growth enhancement and reversal of environmental degradation in the Nile Equatorial Lakes region

At national level, the project is aligned with the National Development Plan (NDP), 2010-15, Vision 2040 for Uganda. The NDP emphasizes the need to accelerate economic growth to increase average

<sup>4</sup> NELSAP / NBI, December 2012. Nile Equatorial Lakes Multi Sector Investment Opportunity Analysis (NEL MSIOA). NEL indicative Investment strategy and action plan. Draft version. Report prepared by BRL Ingénierie. 111 pages

income and provide the financial resources required to expand public investment and service delivery. It is also aligned with the Second Generation Growth and Poverty Reduction Strategy Paper (GPRSP 2) for the DR Congo. The GPRSP 2 is designed to consolidate the achievements of GPRSP 1 and emphasize growth, job creation and the fight against climate change as key levers to bring about a significant reduction of poverty. These strategies emphasize healthy ecosystems, poverty reduction and sustainable economic growth. They also identify degradation of natural resources as a key impediment to attainment of results.

The project also is aligned with the aims of IGAD (of which Uganda is a member) Environment and Natural Resources Strategy, and the agricultural and environmental policies of ECCAS (of which the Democratic Republic of Congo is a member) and the international agreements relating to wetlands (RAMSAR), climate change (UNFCCC), biodiversity (CBD) and the Code of Conduct for Responsible Fisheries.

The NBI-NELSAP and member states recognize that it will take a long time for the environmental status of the two lakes to exhibit measurable improvement after introducing the stress reduction interventions. In view of this, LEAF II is regarded as an instrument: (i) aiming to achieve stress reduction outcomes in priority hotspots; and (ii) laying a foundation for the long-term programme for sustainable improvement of fisheries and water resources management in the LEA basin.

### ***The main beneficiaries and expected outcomes***

The project impact area is the communities around LEAB. The project will be implemented over a five-year period in the riparian communities of the two lakes in the two countries where population living below poverty level are much higher than the national averages (for instance for DR Congo 85% in the riparian communities as against 71% national average). The main beneficiaries are the estimated 400,000 men, women and children (in the local fishing communities) within Lakes Edward and Albert basin for who the fishery is a direct source of livelihood.

The project will contribute to broad-based poverty alleviation and improvement of livelihoods of people, by supporting sustainable management of shared natural resources of the Lakes Edward and Albert basin (LEAB), which many communities depend upon. The project aims to create an enabling environment and to strengthen the legal, policy, institutional and regulatory framework for sustainable management of natural resources and protection of the environment. It will also contribute to the creation of alternative incomes opportunities and food security for men and women in the fishing community. The project will, in essence strengthen capacity of government institutions to promote environment-friendly interventions in the use of the Lakes' resources.

### ***Main Components and Sub-Components***

The project objectives will be achieved by supporting interventions in two domains namely: (a) fisheries resources development and management and (b) integrated water resources management each with five and six sub-components respectively as summarized in the table below:

Fisheries Resources Development and Management	Integrated Water Resources Management
<ol style="list-style-type: none"> <li>1. Updated and harmonized policy, legal and regulatory frameworks, and innovative financing mechanisms jointly adopted by DRC and Uganda</li> <li>2. Bilateral agreement regarding the protection of fisheries and water resources established</li> <li>3. New technology introduced for sustainable fisheries management</li> <li>4. Local communities adopt responsible fishing practices and processing techniques.</li> <li>5. Transboundary learning mechanisms, communications and Knowledge Management</li> </ol>	<ol style="list-style-type: none"> <li>1. Enhanced regional project coordination</li> <li>2. Integrated Lake Basin Management Plan Updated</li> <li>3. Establishment of financially Sustainable Basin Management Organization as proposed under the LEAF Integrated Lake Management Plans</li> <li>4. Water Resources Information System Strengthened</li> <li>5. Catchment Management Planning</li> <li>6. Aquatic Weeds Control on Lake Albert</li> </ol>

The NELSAP CU is mandated by the NILECOM, to coordinate programmes and other interventions undertaken by the NELSAP partner states in the NEL region. Therefore, while project implementation will primarily be the responsibility of national institutions, the coordination of the project regionally between the two member states of Uganda and DR Congo will be the responsibility of the NELSAP CU, through a Project Coordination Unit.

## **SECTION FOUR: GOVERNANCE OF THE FISHERIES AND MANAGEMENT APPROACHES APPLIED**

### **4.1. Governance of the fisheries**

In Uganda, management of Lakes Edward and Albert falls under the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). Within the Ministry, the department of Fisheries Resource is responsible for regulation, law enforcement and fisheries management services. Various other governmental institutions are also involved in fisheries management, including the Ministry of water and Environment, National Environment Management Authority, Wetlands Inspection Division, Fisheries Resources Research Institute and Uganda Wildlife Authority. Under the Local Government Act, Local Governments are responsible for fisheries extension. Local governments are also charged with protection of the environment, including the banks of lakes, rivers, streams and wetlands and the collection of taxes and fees from the fisheries sector. Furthermore, at the local level, Beach Management units (MBUs) are responsible for mobilizing and sensitizing local people for participation in managing fisheries activities, the intention being to supplement the Fisheries Department's efforts to provide advisory and extension services.

The policy framework for the sector is articulated in the Fisheries Policy, 2004; while The Fish Act, Cap. 197 (2000) of the Laws of Uganda is the principle law that governs the Department of Fisheries. It provides for the control of fishing, fish conservation, purchase, sale, marketing and processing of fish and matters connected therewith. It is supported by several subsidiary regulations that are issued from time to time.

Previously there were fish guards who were government employees at every landing site. In a bid to increase stakeholder participation in lake management, MAAIF helped to set up a Beach Management Unit (BMU) at each landing site. MAAIF supervises the BMUs, and the BMUs are supposed to patrol, inspect fishing gear, and collect data on fish catches, length and weight of fish. The BMUs are required to report back to MAAIF on a monthly basis. However, while some BMUs are effective, the majority are not. Constraints faced by the BMUs include lack of capacity, lack of financial resources for patrolling and monitoring, and poor office facilities. Apparently criteria for forming committees are flawed as they are based on the popular vote (and as the majority of fishers support illegal fishing they will vote for a person that will condone illegal activities). Consequently data collected is inconsistent, and management of the lake is generally poor.

A number of Civil Society Organizations (CSOs) participate in the fisheries in the Nile Basin under the umbrella of the Uganda Nile Discourse Forum (UNDF). The UNDF's vision is to realize sustainably managed Nile Basin resources for the prosperity and good health of the people. The Nile Basin Discourse (NBD) is part of UNDF. The mandate of NBD is to engage in identification and conceptualization of NBI development programmes and policies, increase awareness of the benefits of Nile cooperation and add value to Nile Basin Initiative (NBI) planning, policy, design and implementation of programmes. In 2013 NBD through UNDF undertook a study to obtain baseline data and information relating to the Lakes Edward and Albert Integrated Fisheries and Water Resources Management Project

In the Democratic Republic of Congo the lead ministry is the Ministry of Agriculture and Rural Development in which is placed the Department of Fisheries which deals with law enforcement, while the Service National pour le développement des Pêches (SENADEP) deals with fisheries management.

Other government ministries and departments in DR Congo involved with in fisheries management include the Ministries of Environment, Nature Conservation and Tourism, Energy, Transport, Public Health and Institut Congolais pour la Conservation de la Nature (ICCN). Two local institutions are also involved in fisheries management at local level: Cooperative des Pêcheurs des Virunga (COOPEVI) and Unite de Gestion des Ressources en Pêche.

The Fisheries policy for DR Congo elaborated in 1987 is outdated, similarly the Law on Fishing and Hunting of 1937 is outdated and draft Fisheries and Aquaculture Law developed under the ACP FISH II project financed by the EU is yet to be adopted by the competent deliberative assemblies of the country.

In the DR Congo, Lake Edward falls within the Parc National des Virunga (PNV) and under the management of the Institut Congolais pour la Conservation de la Nature (ICCN). The ICCN is thus one of the lead agencies at National level, engaged in protecting breeding sites (southern and northern parts of the DR Congo side of the lake), controlling net sizes and regulating the number of boats on the lake. ICCN patrols the lake (it has three boats for this purpose), and they also conduct aerial surveillance. Their involvement has also contributed towards prevention of illegal fishing which had led to some recovery in fish stocks. Mention has already been made of UGREP) and COOPEVI. The ICCN enters into agreement periodically with UGREP and COOPEVI to manage fisheries on Lake Edward.

#### **4.2. Management approaches applied**

The fisheries of LEA are open access. On the Uganda side, there are fishing licenses which serve mainly to collect revenue for Local governments and not as a management tool. Revenue collected is not ploughed into the fisheries sector to ensure for example the proper functioning of BMUs. The fisheries in the lakes are managed using mesh size restrictions. This is possible because the various species exploit different niches in the lake and thus are caught by fishermen at different places and times. The goal is to allow for sustained exploitation of the various fisheries. In view of the contribution of the Nile perch to national economies, the Government is seeking to establish Lake Albert, from where the Nile perch was introduced in the 1920s to Lake Victoria, as source of fish for processing for export to EU and other premium markets (UNDF, 2013).

Many fishers are using destructive gear and bad methods including the use of small mesh size nets, the use of baskets, river-damping with nets, use of immature fish as bait for hooks, etc. These methods are not only destructive to the fish stocks but also to wildlife including birds, vertebrates, etc. This usually leads to confrontation with the Uganda Wildlife Authority (UWA). These situations have sometimes resulted in conflicts among fishers and also between fishers and park guards (UNDF, 2013).

In DR. Congo due to excessive effort, Districts around the lakes have a closed access system limiting the number of fishers and annual effort. In addition, each district is given and limited to a specific quota of effort. These quotas of allocated effort at individual level are transferable between fishermen with clearance from the district leadership. Fishing is open all year, with the exception of closed areas in the National Park.

At present there is apparently no structured process for stock assessment, the collection and management of the information and data as both Catch Assessment Surveys and Frame Surveys are not conducted regularly.

## **SECTION FIVE: ENVIRONMENTAL STRESSES STRATEGIES AND TRANSBOUNDARY ISSUES AND CHALLENGES**

### **5.1. Environmental Stresses and Potential Effects on Fish Stocks and Fisheries**

There are four main sources of environmental stresses adversely impacting the two lakes ecosystems, as well as the region's economy and livelihoods. These distinct sources of stresses originate from the Lake, littoral zone (near shore), within the basin (upper watershed), and outside the basin. Cumulatively, they cause degradation of the Lake, reduce its resiliency.

**Stresses within the Lakes** - mainly from unsustainable fishing practices and pollution in the Lake and on Islands (e.g. from fuel and oil spills, solid wastes, and untreated liquid wastes, for example discharge of tailings waste from the Kilembe mines). Pollution reduces fish stocks and diversity and destroys important spawning areas.

**Stresses from outside the basin** - include nutrients transported into the basin as airborne particulates and climate change.

**Stresses from the basin** - include reduced water inflows into the Lake, over abstraction of lake water; inflow of water hyacinth, increased watershed degradation, including soil erosion and loss of vegetation cover; and increased water pollution from industries, livestock, agriculture, and urban runoff. These stresses are altering the hydrological and ecological processes. As a result, they accelerate eutrophication, impact fisheries and navigation and contribute to conflicts over use of resources.

**Stresses on the littoral zone** - result from conversion of shoreline wetlands for urban and agricultural development. Farming along sensitive littoral zone without adequate environmental mitigation measures (e.g. buffering strip, sewage treatment and disposal) increase liquid and solid waste loads into the lakes. In addition, wetland conversions for these purposes result in loss of aquatic habitat and reduced filtering capacity.

### **5.2. Key strategic transboundary issues and challenges**

The key transboundary issues and challenges which affect and could potentially impact on the sustainable exploitation and management of the LEA fisheries are related to inadequate fisheries governance. The main issues are: absence of up-to-date policies, laws and regulatory standards at national level; the non-harmonization of policies, laws, regulatory standards at regional level; low compliance to fisheries laws and regulations and inadequate enforcement; and limited effective involvement of stakeholders in the fisheries management process.

These issues together with the prevalence of poverty and increase in population in the lakes' basin contribute to exertion of excessive pressure on the fishery resources and the basin ecosystems; incidence of illegal, unreported and unregulated (IUU) fishing and poor management practices resulting in declining fish stocks, destruction of critical habitats and the environment, and conflicts among stakeholders.

The key challenges are to correct the imperfections in the fisheries governance and in addition reduce the pressure on the resources; generate appropriate scientific knowledge and incorporate the use of local knowledge to guide resource management; ensure the availability of reliable data and information

to guide management; and develop the human and institutional capacity to manage the complexity of resource uses and pressures, and also to understand and develop mechanisms for adaptation to climate variability and climate change.

These issues and challenges are analyzed and the degree to which they are addressed in the proposed LEAF II Project are highlighted

**Governance Aspects:**

Absence of up-to-date policies, laws and regulations and the absence of harmonized policies, laws, regulations and standards

The starting point for good fisheries management is policy from which should be derived legislations, regulations etc. Of the two countries only Uganda has a fisheries policy that is sound. This statement is based on the fact that global fisheries policy reform takes place in the context of three major governance and policy trends: decentralization, market liberalization and sustainable development (WHAT, 2000; Allison, 2001). Uganda's national Poverty Reduction Strategy Plan (PRSP) is strongly grounded in these macro-policy trends (Balihuta and Sen, 2001) and provides the framework for on-going policy and legal reform in the fisheries sector. Fisheries policy in Uganda emphasizes both development of export-led fisheries for Nile Perch and the need to meet domestic demand for affordable sources of dietary protein.

The principal policy objective is to provide for "sustainable exploitation of the fisheries resources at the highest possible level, while conserving the environment". It is envisaged that aiming for this goal will promote "replacement of individual and family fishing enterprises by larger and more commercial operators". Fisheries policy thus shares the PMA objectives of modernization as a route of poverty, but while the PMA envisages small-scale farmers modernizing without substantial restructuring, the implication is that modernization in the fisheries sector cannot be achieved without structural change. Alongside the modernization agenda, fisheries policy also emphasizes the transfer of management responsibility away from central government and towards communities or community-local government partnerships (co-management). Uganda also has the Fisheries Act.

On the other hand the fisheries policy of DR Congo elaborated in 1987 is outdated and would need to be up-dated. Similarly, fisheries legislation (the law on fishing and hunting of 1937) is also outdated. A draft fisheries law is pending deliberation and approval by the Parliament.

LEAF adequately addresses the need to harmonize the policies, laws and standards of the partner countries and for this the project envisages using the services of technical assistance.

Low compliance to fisheries laws and regulations and inadequate enforcement

Major challenge in the management of the fisheries is the low compliance to fisheries laws and regulations by resource users. Compliance and enforcement levels of the various laws of relevance to the Lakes vary among the countries. In all cases where compliance and enforcement is poor, the causes are more or less the same namely: shortage of manpower, financial constraints, logistical constraints, lack of awareness by the fisheries communities, and inadequacy in the dissemination of relevant information, inadequate capacity and laxity on the part of the enforcement agencies and high poverty levels. These

weaknesses could be addressed through awareness campaigns, improvement in information exchange, greater involvement of the community in management, such as ensuring properly functional BMUs, the institution of participatory MCS, etc. and capacity building through training and logistical support. These are areas where LEAF Project can collaborate effectively with CSOs.

Additional problems of implementing regulations relate to non-deterrent penalties that do not discourage the offender, and would be offenders, from committing a similar offence and varied levels of penalties applied in the two countries. Given the transboundary nature of the LEAB, it is important to reflect the gravity of each offence in respective penalties in a uniform manner. The penalty for an offence should carry the same gravity no matter where it is committed. This would deter offenders from committing particular offences on the basis of the weakness in the penalty in one country as opposed to the other. Furthermore, Incentives must be adopted to support behaviour that fosters the conservation objectives and encourage resource users to go beyond mere compliance with the rules.

#### Effective involvement of all stakeholders in the management process

The many problems and challenges that the fishery faces, especially “over-fishing” and habitat loss, poor data and data management, low legitimacy of regulations and the consequent poor enforcement of regulations can be better solved by fisheries management authorities partnering with local communities, CSOs and the private sector, indeed involving all stakeholders in all the functions and responsibilities of fisheries management. Stakeholders should not merely be consulted to rubber-stamp decisions but should participate. The fisheries management authorities cannot and will never be able to achieve the ambitious object of the sustainable development of fisheries alone. It is believed that the reason effective involvement of stakeholders in the fisheries management process is limited is because such partnerships have to be carefully designed to be appropriate for the situation, as well as accountable and effective. However, knowledge and experiences accumulated over the past three decades allow the identification of the conditions and situations which are good predictors of successful partnerships.

Partnering would among other things permit the making of appropriate regulations that are consistent, harmonized and applicable; permit the monitoring of compliance to regulations by both the management authority and local communities; permit common access to data and data analysis on the status of the resource; permit the effective enforcement of regulations; permit the resolution of conflicts in a timely manner through informal and formal means.

Limited scientific and other knowledge to guide resource management- The absence of scientific information and other knowledge such as local and traditional knowledge to guide management is a major issue and challenge for fisheries management in the lake. There is an apparent lack of information on identification of key commercial species, the size of the fish stock, distribution and movement patterns, population structure, breeding habits, estimates of potential yield, characteristics of fishing gear, catch rates, description of the lake bottom, etc. Research institutions in the two countries have no doubt studied most of the phenomena on the lake. However, the information is not easily shared or made available to the other country. It is important to emphasize that the cooperative management of transboundary fishery resources that are highly vulnerable to various factors requires the adoption of a systematic, inclusive and accelerated process/working style to better understand the abundance and distribution of fish stocks over time.

Scientists in charge of stock assessments, including economists and sociologists must work with managers and other users of fishery resources to develop appropriate methods to collect, manage and use biological, economic and social data and eventually produce information that is as accurate and precise as possible relying, as appropriate, on local and traditional knowledge to fulfill their responsibilities. In addition to undertaking stock assessment, research should also focus more on the definition of management measures. Emphasis should be placed to address gaps in knowledge about the socio-economic aspects of the artisanal and industrial fisheries and to better assess the interactions between the categories of the fishery. In view of the level of available knowledge about the lakes, it is suggested that 50% of the research be demand-driven and 50% fundamental.

The LEAF II Project proposes to undertake some of the biological studies to provide guidelines for fishery conservation, sustainable use, permissible quotas, and proposals for an integrated education programme.

### Reduction of excessive Pressure on fisheries resources and other basin resources

The root causes for the excessive pressure on the resource is poverty and the growing population in the lake basin. This is compounded by the lack of alternate employment, the high demand for fish and the non-selective nature of the market that almost all sizes of fish are acceptable. These conditions have induced fishers to fish both intensively and extensively, and encroaching in waters under the jurisdiction of neighbouring states, adopt poor management practices and engage in IUU fishing. The results are declining fish stocks and conflicts.

It is important to involve stakeholders in the management process, ensure compliance and enforcement but also put in place Conflict Resolution Mechanisms, identify and promote alternate sources of employment, and introduce rights-based management.

Rights-based management is an approach to fishery management that focuses on the rights, together with the responsibilities held by individuals, communities and governments relating to fishing. Rights-based management is an effective way to manage access and harvesting. There are many types of rights approaches and it is important to decide which is appropriate for the particular purpose.

**Alternative sources of livelihoods:** An integrated fisheries management approach<sup>5</sup> usually has two axes: the Vertical axis that refers to everything pertaining to the fisheries and the Horizontal axis which addresses non- fisheries issues (FAO, 1984, Satia, 1993). Usually these non-fisheries issues could include the opening up of feeder roads to fishing communities, building schools, health clinics in or close to fishing communities, community ran supplies shop; the creation of alternative sources of livelihoods through for example market gardening, apiculture, livestock raising, skills empowerment through programmes as knitting, crocheting, literacy and numeracy training, boat building and mending, to reduce pressure on the resources while improving income generating capacity of fishing community and food security and improve the standard of living of fishers. The activities on the horizontal axis are often beyond the competence of fisheries staff. Some the capital works and the provision of social amenities fall within the competence of other government ministries and agencies. Others such as skills empowerment are better handled by CSOs. It is important to collaborate with these agencies and CSOs to ensure they are realized and this emphasizes the need for partnering in the development and management of the fisheries in the Lake basin.

<sup>5</sup>The Integrated Strategy for the Development of Small-scale Fisheries was adopted at the World Conference on Fisheries Management and Development held in Rome in 1984

**Conflict management/resolution mechanism:** Natural resource conflicts are disagreements and disputes over access to, and control and use of, natural resources. These conflicts often emerge because people have different uses for resources. Disagreements also arise when these interests and needs are incompatible, or when the priorities of some user groups are perceived not to be considered in policies, programmes and projects. Such conflicts of interest are an inevitable feature of all societies and are frequent where fishery resources are shared or transboundary stocks. In recent years, the scope and magnitude of natural resource conflicts have increased and intensified due to increase pressure. These conflicts, if not addressed, can temporarily reduce the efficiency of the management regime, escalate into violence, cause environmental degradation, disrupt projects and undermine livelihoods. It is therefore strongly suggested that preferably participatory conflict management and resolution mechanisms be incorporated into the implementation of the project.

LEAF II lays great importance to the involvement of stakeholders in the execution of the project. During the first year of implementation, it is proposed that NELSAP updates its LEAF stakeholder data base and this should include: a stakeholder analysis that should map out the actual stakeholders based on interest in, influence over and importance to the project, identify potential risks and conflicts that may jeopardize the project, possible relationships that can be built on during implementation and design an appropriate stakeholder consultation/participation strategy and plan. In this respect, the Project has backing of the communities. Under ILMP the countries had already recognized that that a genuine commitment to stakeholder involvement is imperative as the only way of ensuring co-operation at all significant levels, promoting sustainable and productive engagement with local environments and involving the private sector (mining and petroleum industry) and locally elected organizations in seeking negotiated solutions to environmental degradation. The Project also envisages to address the issue of alternative livelihoods to fisheries communities especially women and promote co-management and users' rights.

**Fragmented data and information to guide management-** The effective management of the natural resources in the Lakes Edward and Albert basin will depend on the timely provision of key information to planners and decision makers. Presently the lack of reliable information makes it difficult to integrate the activities of the fisheries sector in the national economies of the riparian countries. Apparently Catch Assessment Surveys and Frame Surveys are rarely undertaken and basic information for the improvement of knowledge and understanding of fishery status and trends are lacking or inadequate.

A challenge to the effective collection of information and data is the lack of resources to data collectors and the manual entry of the data several days after collection. Consideration should be given to the introduction of electronic data collection mechanism using Tablets which permits the input of the data virtually instantly. This would require that resources are provided to a central information service, responsible for maintaining a GIS database, a literature reference system and other shared data sources.

In this regard the LEAF II Project envisages among other things, the establishment of a Regional Fisheries Management Information System (FMIS). The FMIS shall be designed to be data driven, with minimum of hard coding involved and the Catch/Effort reports could be obtained at different levels of abstractions, i.e. Country wise, Lake wise, District wise, etc., for any desired valid period. In addition, the project will also support mitigating activities such as Fish Catch Assessment and Frame Survey so as to provide the necessary inputs needed to operate the FMIS. Provision is also made to engage Technical assistance who will provide support for harmonised frame survey of the LEA fisheries and conduct at least one

catch assessment survey each on the two lakes.

### ***Inadequate human and institutional capacities***

Managing transboundary fishery resources requires a portfolio of skills that cut across disciplines (fisheries, political, economic, social and environmental). Even in the strictly fisheries discipline capacity is limited in several areas (science/research, fisheries economics, development, statistics, organizational aspects, etc). In both countries, fisheries offices have inadequate budgets, and are poorly staffed and equipped, which hinder the provision of technical services, build capacity at local community level and to monitor fisheries activities in the lakes. In such a context the need for an on-going and targeted capacity enhancement and development is readily evident.

LEAF II proposes capacity building of stakeholders with greater emphasis on environmental issues. The expected outcome of the training or capacity building will be to raise awareness about environmental, social, health and safety guards amongst staff/workers so as to minimize risks and enhance benefits from the implementation of LEAF activities. In view of the institutional and capacity needs of the two countries in fisheries and aquaculture the need to lay emphasis on capacity building at all levels cannot be over-emphasized.

### ***Destruction of critical habitats and ecosystems***

Several critical habitats as detailed below are being destroyed and this has adverse effects on the sustainability of the fisheries in the lakes, with impacts on the economy and livelihoods of fisheries communities:

- a. Wetlands destruction:** Fringing wetlands and the littoral zones are closely connected to the ecological health of the lake. Development around the littoral zone of the Lakes has resulted in the destruction and/or degradation of fringing wetlands that are sites for fish breeding. Wetlands are also involved in the exchange of nutrients with the Lake and act as filters, trapping incoming sediments and pollutants.
- b. Increased Sedimentation:** Land degradation in the Lake basin is the main cause of the increased sediment loads into the rivers discharging into the lakes. High population growth, coupled with poverty and unsustainable agricultural practices have increased pressure on land. The small scale farmers have resorted to cultivating in areas with steep slopes, riverbanks, forests, and wetlands. Their activities have contributed to increased soil erosion, decreased nutrient retention in soils and wetlands, hence increased mineral and biogenic sedimentation. These unsustainable land use practices, together with high demand for fuel wood, contribute to the denudation of the hill tops. The highest erosion risks are fields cultivated with annual crops, and rangelands on bare hills.
- c. Invasive Aquatic Weeds:** Water hyacinth (*Eichhornia crassipes*) has become a major invasive weed in Lake Albert since the 1990s, and a serious threat to aquatic ecosystems, affecting fish stocks and water quality. The continued nutrient and sediment loading from poorly managed catchments upstream is contributing to increased water hyacinth infestation, persistence, and resurgence of this weed, and emergence of other invasive weeds in some hotspots. Extensive, tightly packed water hyacinth mats along the shoreline impair environmental quality for biodiversity maintenance, fish breeding grounds and nurseries of young fish, inshore feeding zones, and refuge for fish. The interior of extensive mats are normally deoxygenated and or have low levels of light and oxygen, and produce poisonous gases like ammonia and hydrogen sulphide. Water hyacinth contaminates watering points for domestic supply, livestock and game. Mobile mats obstruct access to landing beaches, fishing grounds and transport routes. The aquatic weeds are also a preferred breeding

habitat for the alternative host for Schistosomiasis (bilharzia), namely the Biomphalaria snail, a home for the vector mosquito for malaria, and a haven for snakes. They also pose a physical interference with fishing operations, especially in the bays like Kasenyi- DR Congo, where fish are brought ashore to piers or landing beaches

- d. Forest degradation:** This is caused by encroachment of agriculture and increasing demands of the growing population for fuelwood, charcoal, timber, and construction purposes. Deforestation has been severe over the last few decades, including loss of high altitude forests, riverine forests, and lowland forest/woodlands in national parks and reserves. The loss in permanent vegetation cover has accelerated runoff and increased exposure of soils to sheet and gully erosion.
- e. Oil and gas exploration:** The exploration of oil and gas resources in the Albertine Graben, presents great socio-economic prospects for the Albertine graben and the two countries of Uganda and DR Congo. The Albertine Graben is however of high ecological and biodiversity significance which presents various challenges for environmental management. Oil exploration and extraction and its associated infrastructures could pose major threats to water resources and fisheries. Ecosystem goods and services generated by the LEAF project could be lost if the adverse impacts of this activity are not properly mitigated. The impacts of oil exploration and extraction are primarily expressed through: (i) changes in water, soil and air quality due to chemical, thermal, radioactive and organic pollutants resulting from oil extraction activities; (ii) direct impacts on lake habitats arising from the conversion of wetlands for construction and operation of energy generation facilities and from infrastructure and disruption in sediment flow and ecosystem connectivity; (iii) direct impacts on biodiversity, especially fish species; (iv) indirect impacts of habitat fragmentation and connectivity between hydrographic basins of the two lakes of Edward and Albert, their wetlands and primary forest zones with a high biodiversity component

The LEAF II Project proposes to engage in innovation and knowledge generation activities aimed towards improving the aquatic biodiversity of the LEA through the expansion of the fishing ground and protection of sensitive breeding sites. The project will build on the knowledge acquired from implementation of similar regional projects by NBI in developing effective strategy to i) improve regional capacity to conduct research on the fish biology, taxonomy studies, stock assessment and water quality study ii) outline management steps needed for establishment of protected areas for fish breeding within LEA basin iii) identify capacity needs of the stakeholders especially in raising awareness on environmental, social and health benefits of the activities.

### ***Climate change (Adaptation to climate variability and climate change)***

The two lakes are located within the Albertine Rift, in a transition zone between the high rainfall Congo Basin and the dry Eastern Africa region, which explains the high annual variability of rainfall and Lake Inflows. It also suggests that any future climate change may potentially have a relatively strong impact on the hydrology of the region. Of interest are forecasts of both temperature and precipitation increases. LEAF II envisages to assess how these changes are likely to impact on river flows and the water balance of the two lakes, especially in terms of future Lake water levels (relevant for wetlands, fisheries, Lake transport, and biodiversity), and potential outflows for planned hydropower generation along the Semiliki river (72MW), and planned irrigation (estimated command area 24,000 ha). Water management mechanisms and investments are essential in reducing the cyclical impacts of droughts and floods, and improving overall water resources management and availability. At the regional level, transboundary issues arising from the impact of climate change on the availability of natural resources could be addressed jointly.

## **SECTION SIX: SUGGESTIONS FOR DEVELOPING FISHERIES MANAGEMENT PLAN WITHIN THE INTEGRATED LAKE MANAGEMENT PLAN**

The scope and content of LEAF II Project Preparation Report (PPR) is sound. The LEAF PPR foresees the elaboration of two fisheries management plans for the lakes. Below are suggested strategies, processes, and mechanisms to facilitate the development of fisheries specific management plan within the framework of the integrated Lakes Management Plan (ILMP) of the Lakes. It is strongly suggested that the management plan is premised on the principles of the Ecosystem Approach to Fisheries (EAF) and ensure its effective implementation by Partner States and other stakeholders, donors, non-governmental organizations, etc.

Fisheries is a dynamic sector and presently it is recognized that to ensure the proper management of the sector three concepts – sustainable fisheries, responsible fisheries and ecosystem based approach should be adopted in tandem. Experience has shown that an effective manner of incorporating ecosystem-based management in other transboundary fisheries such as are found in the Benguela Current Large Marine Ecosystem (BCLME), or the Sardinella stocks in the Canary Current Large Marine Ecosystem (CCLME), the Black Sea, etc. (Cochrane et al. 2008, Birane Samb, per. Com) , where transboundary diagnostic assessments had been carried out, is by developing a fisheries management plan on the principles of the Ecosystem Approach to Fisheries (EAF). This is because TDAs do not amplify and prioritize the problems and challenges related to fisheries to permit the elaboration of the appropriate management plans.

First it is important to stress that a fishery management plan (FMP) for transboundary fishery resources should be seen as a negotiated instrument between the fisheries administrations of the concerned Member States and their stakeholders; it provides a clear vision for the fishery, realistic and measurable objectives and other parameters as a road-map for moving the fishery forward on an agreed schedule of shared responsibilities among the fisheries administration and stakeholders.

There are several reasons why it is advisable to work on the basis of a FMP: It provides a blue print for action based on current information; it provides realistic milestones with which to measure achievements and assess results, it fosters successful communication and team work among stakeholders of the international inland water body, it also permits bilateral partners and other donors and NGOs to realistically contribute to the sector on the basis of an agreed programme rather than each organization promoting its own agenda which may not be in line with endorsed programmes, etc.

### **Why use the EAF process and tools.**

The Ecosystem Approach to Fisheries (EAF) has been adopted by the FAO Committee on Fisheries (COFI) as the appropriate and practical way to fully implement the Code of Conduct for Responsible Fisheries. EAF is a risk based management planning process that covers the principles of sustainable development including the human and social elements of sustainability, not just the ecological and environmental components. EAF is also an effective planning framework that facilitates the planning, coordination and prioritization of current and proposed activities, making them clearer by giving a “home” to the many strategies and monitoring programmes that are underway. In addition, EAF helps to develop comprehensive fishery management systems that seek the sustainability and equitable use of the whole system (ecological and human) to best meet the community’s needs and values.

However, the effectiveness of the EAF process and the contribution of EAF to long-term sustainable development of the resources are greatly enhanced by the conduct of an Ecological Risk Assessment (ERA) as an integral and essential part of the process. Ecological Risk Assessment is a means of identifying the ecological risks associated with the management of the major fisheries in a given region, and to prioritize appropriate management responses. As a tool, it is helpful in ensuring cost-effective decisions and actions are taken because it ensures that time, effort and resources are not wasted on pursuing issues, which may appear important but which are generally insignificant in the context of the broader fishery.

As a process, the conduct of the ERA is fundamentally participatory and seeks to build consensus among diverse stakeholders about identifying and prioritizing ecosystem issues and a programme of action. Secondly the ERA process sees the “ecosystem” in its broadest definition, including the biological, social, and economic as well as governance systems. This latter principle is of particular importance given the fact that in fisheries management, many biological recommendations are undermined by the lack of consideration of the social and economic implications or governance systems required to implement these recommendations. The conduct of an ERA also makes it clear that contrary to the concerns of those skeptical of the intentions of EAF, humans are seen as an integral component of the ecosystem in the approach<sup>6</sup>.

A four step process is used to develop FFMP using EAF principles:

- a. Develop a clear description of the fishery, identify high policy goals and the relevant societal values attached to the fisheries;
- b. Identify issues, assets, and challenges; and assess the risks associated with each issue and prioritize these issues and consider the key elements that will deliver successful outcomes. The process is facilitated by using an EAF Log-Frame<sup>7</sup> to provide a snapshot version of all the important elements of the management system (plan). The elements are besides an identification of the issue number and its risk value:
  - i. **Management objectives that provide a link between the principles**, policy goals, major issues and what participants agreed the fishery should try to achieve.
  - ii. **Operational objective(s) that is/are clear**, measurable and directly linked to one or more of management objectives; noting that an operational objective could be applicable to more than one issue.
  - iii. **Management measures**, specific controls applied in the fishery to contribute to achieving the objectives<sup>8</sup>.
  - iv. **Indicators**, variables that can be monitored to give a measure of the state of the fishery at a given time. Each indicator should be linked to one or more reference points and used to track the state of the fishery in relation to those reference points.
  - v. **Reference points**, benchmark against which to assess the performance of management in achieving an operational objective, corresponding to a state considered to be desirable (target reference point) or undesirable and requiring immediate action (limit reference point).

<sup>6</sup> It is important to emphasize that we manage fish mainly through managing people. Indeed, our failure to manage people effectively has turned out to be the main limiting factor in fisheries management today.

<sup>7</sup> The Logical Framework Approach (LFA) was developed in 1969 by the United States Agency for International Development (USAID) as a planning and management tool for designing, tracking and evaluating projects. An important output of the LFA was a Log-Frame (Document) which has since been adopted and modified by several bilateral and multi-donor organizations and NGOs. The Log-Frame used by the participants is that modified by FAO for EAF management plans.

<sup>8</sup> In some cases such as in the US and in Canada the column « Management Measures » is represented by “Strategies”. Strategies here refer to the full set of management measures applied to reach the operational objectives in a given fishery.

- vi. Performance measure**, a function that relates the value of an indicator to its reference point, and that guides the evaluation of fisheries management performance in relation to its stated operational objective.
  - vii. Means of verification**, the sources of information used to indicate accomplishments, in other words sources of information on the indicators. They are usually recorded details such as publications, reports, databases, statistics, surveys, etc.
  - viii. Data requirements**: the type of data/information that would need to be collected to ensure suggested measures could be implemented within the time-frame and in a cost-effective manner.
  - ix. Responsibility**: who or what institution would be responsible for specific management actions or arrangements that will achieve the desired level of performance.
3. Identify and select key elements for the management systems and summarize the elements by component (ecological wellbeing, human wellbeing and governance) to fit into the management plan
  4. Elaborate the Log-frame for the Management Plan

The framework (EAF Log-Frame) which is a major product of the process can be considered an asset. It provides countries elements on which they can establish coherence between national plans and the regional initiative. Table I provides an extract of the log-frame for the management plan of a transboundary fishery.

The development of fisheries management plan implies implementation. It is the successful delivery of the elements at local or fisheries community level that the future of LEAF will be decided. Creating an enabling environment for this to occur is a goal worth pursuing because fishing is a successful enterprise that already contributes substantially to development in the Lakes Edward and Albert basin and has the potential to contribute even more.

Issue #	OPERATIONAL OBJECTIVE	MANAGEMENT MEASURES	INDICATORS	REFERENCE POINTS	PERFORMANCE MEASURES	MEANS OF VERIFICATION	DATA REQUIREMENTS	RESPONSIBILITY
<b>ECOLOGICAL WELLBEING</b>								
<b>Management Objective No. 1: Rebuild over-exploited stocks and protect those stocks that are threatened</b>								
EW 1, 9 & 17	1. Reduce fishing mortality and adopt regional cooperative management approach for Sardinella aurita, Trachurus species, and Ethmalosa fimbriata in the Gambia and Senegal	1. Limits on catches, 2. Protection of spawning areas, 3. Zoning by fleet type, 4. Biological Rest 5. Harmonize size at first capture	Level of catch and spatial distribution	Catch level compared to those recommended by scientists	Reported level of actual catches in relation to recommended level of catches	Stock Assessment reports	1. Catch statistics, 2. Scientific reports 3. Scientific survey data	Scientists, Fisheries Administrations, Fisheries Operators
EW 18	2. Reduce fishing mortality of Sardinella pilchardus in Morocco Zone A+B	1. Limit catches, 2. Protection of spawning areas, 3. Zoning by fleet type, 4. biological Rest	1. Catch level 2. Spatial distribution	Catch level compared to those recommended by scientists	Reported level of actual catches in relation to recommended level of catches	Stock evaluation reports	1. Catch Statistics 2. Scientific reports 3. Scientific survey data	Scientists, Fisheries Administrations, Fisheries Operators
EW 4, 8, 12 & 19	3. Reduce catches of juveniles of Sardinella aurita, Sardinella maderensis, Trachurus sp. And Sardinella pilchardus in Morocco Zone A + B	1. Concerted monitoring system, 2. Mesh size regulation 3. Revision of size at first capture 4. Use of VMS 5. Better control of landings	Level or quantity of juveniles caught	1. Size at first capture 2. Limits of juveniles authorized in the catches	1. Significant reduction of juveniles caught 2. Recommended sizes of fish are caught	Scientific reports with emphasis on demographic structure	1. Trade statistics of catches, 2. Sampling data at landing sites	Scientists, Fisheries Administrations, Fisheries Operators
EW 3, 7 & 11	4. Reduce impacts of illegal fishing on Sardinella aurita, Sardinella maderensis & Trachurus sp.	1. Sensitize operators 2. Strengthen control systems	1. Number of observed infractions 2. Number of complaints by fishers 3. Number of illegal (pirate) vessels	1. Recommended mesh sizes; 2. Authorized fishing zones; 3. Total allowable catch and rejects	Significant reduction in the number of infractions	Reports on violations of regulations	1. Statistics on surveillance missions, 2. Observations	Fisheries Administration (Surveillance Unit) and Operators

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