EAST AFRICAN COMMUNITY

LAKE VICTORIA FISHERIES ORGANIZATION

FISHERIES MANAGEMENT PLAN III (FMP III) FOR LAKE VICTORIA FISHERIES

2016 - 2020

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Lake Victoria Fisheries Organization (LVFO)
Secretariat

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ACKNOWLEDGEMENT

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ACRONYMS AND ABBREVIATIONS

BMU	-	Beach Management Unit
CCRF	-	Code of Conduct for Responsible Fisheries
CDD	-	Community Demand Driven
CIFA	-	Committee for Inland Fisheries of Africa
CPUE	-	Catch per Unit Effort
EAC	-	East African Community
EAFFRO	-	East African Freshwater Fisheries Research Organization
EALA	-	East African Legislative Assembly
EU	-	European Union
FAO	-	Food and Agriculture Organization of the United Nations
FCMS	-	Fishing Craft Management System
FMP	-	Fisheries Management Plan
GDP	-	Gross Domestic Product
ICT	-	Information Communication and Technology
ILO	-	International Labour Organization of the United Nations
IFMP	-	Implementation of Fisheries Management Plan
IUU	-	Illegal, Unreported and Unregulated
LV	-	Lake Victoria
LVBC	-	Lake Victoria Basin Commission
LVEMP	-	Lake Victoria Environmental Management Project
LVFRP	-	Lake Victoria Fisheries Research Project
LVFS	-	Lake Victoria Fisheries Service
LVFO	-	Lake Victoria Fisheries Organization
MCS	-	Monitoring Control and Surveillance
MSY	-	Maximum Sustainable Yield
PPP	-	Public Private Partnership
RPOA IUU	-	Regional Plan of Action for Illegal Unreported and Unregulated fishing
RPOA Capacity	-	Regional Plan of Action for management of fishing capacity
SOP	-	Standard Operating Procedures
USD	-	United States Dollars
VMS		Vessel Monitoring System (Craft Monitoring System for Lake Victoria)

DEFINITION OF TERMS

1. *Catch assessment survey:* A survey that establishes the quantities and value of fish landed in a given area, the contribution of different fish species to the total catches; the contribution of different types of gears and boats to the total catches; the changes of catch rates of different fish species between areas, seasons, gear types and gear sizes; boat types; the trends of fish catch rates and total catches in relation to total fishing effort.
2. *Critical habitats:* The area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. For this case it means fish spawning and nursery grounds.
3. *Decent employment:* 'A fair day's work for a fair day's wage' According to the ILO, decent employment involves opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men.
4. *Ecosystem-based Management:* The FAO (2003) definition is "An ecosystem approach to fisheries (EAF) strives to balance diverse societal objectives, by taking account of the knowledge and uncertainties of biotic, abiotic and human components of ecosystems and their interactions and applying an integrated approach to fisheries within ecologically meaningful boundaries."
5. *Frame Survey:* Total count or enumeration of fishing variables and fish landing facilities that includes fishers, boats, gears, beach facilities and services.
6. *Hydro-Acoustic survey:* is a survey done to determine fish densities, distribution pattern and sizes of individual fish in a population using sonar technology that involves generating a sound pulse and listening for the echo.
7. *Maximum Sustainable Yield (MSY):* The largest average fish catch or yield that can continuously be taken from the lake under existing environmental conditions without compromising the ability of fish stock to replenish itself.
8. *Catch Per Unit Effort (CPUE):* The quantity of fish caught (in number or in weight) with one standard unit of fishing effort; e.g. number of fish taken per 1000 hooks per day or weight of fish taken per hour of trawling. CPUE is considered an index of fish biomass (or abundance). Sometimes referred to as catch rate.
9. *Biomass:* Refers to the total weight of fish in the lake.
10. *Natural trophic structure* means the food chain or feeding relationships among the aquatic organisms.
11. *Ecological balance means:* maintaining interactions between aquatic organisms and their environment (a state of dynamic equilibrium within a community of organisms in which genetic, species and ecosystem diversity remain relatively stable)

EXECUTIVE SUMMARY

The three Partner States; the Republic of Kenya, the United Republic of Tanzania and the Republic of Uganda sharing Lake Victoria have been managing the lake through agreed management plans to ensure sustainability of the fisheries resources. The first Fisheries Management Plan was developed in 2001 and implemented from 2005 to 2008. This was followed with the second Management Plan for the period 2009 to 2014. The lessons from the first two plans were used during the review process to come up with the Lake Victoria Fisheries Management Plan III (FMP III).

The FMP III aims to address the main challenges of the fisheries of Lake Victoria which include: increased fishing pressure as a result of increasing demand and rising prices of fish and fisheries products; inadequate and unsustainable funding to implement research and agreed management interventions; increased illegalities due to weak enforcement; inadequate infrastructure for fish quality and safety, under developed aquaculture to meet the demand of fish and relieve fishing pressure from capture fishery, and other challenges caused by climate change.

Lake Victoria has maintained high fish production since the Nile perch peak productions in early 1990s although the percentage contribution of the major commercial species to the total production and to the total value has been changing over time. The estimated total fish landings from Catch Assessment Surveys from 2011 to 2014 has been about 1 Million tons with a beach value increasing from about US$ 550 Million in 2011 to about US$ 840 Million in 2014. The estimated production of Dagaa for 2011 was 456,721.20 tonnes and increased to 509,598 tonnes in 2014; while Nile perch production was 198,624 tonnes with slight increase to 251,063 tonnes respectively. The value of Dagaa in 2014 at beach level remained relatively low (US$ 135 million) compared with Nile perch (US$ 545 Million) (LVFO-CAS, 2014). The export value of Nile perch has increased further with the new market and high price for fish maws and is estimated at US $300 million. However, this has come with the challenge of illegal processing of fish maws and increased unreported and unregulated fishing and trade. The FMP III has strategies to ensure the Nile perch catches increase, fish maw trade is regulated and the handling and processing of Dagaa is improved to increase its value.

The total biomass (amount of fish in the lake) estimated during hydro-acoustic survey in 2014 was at 2.89 million tons with increase in Dagaa and Nile perch since the last survey in 2011. However, the haplochromines which are the main food component for Nile perch registered a decrease. The hydro-acoustic survey results showed that majority of the Nile perch in the lake are young with only 5.9% above the lower limit

of slot size (50cm, Total Length). FMP III discourages further investment into the harvesting of haplochromines to protect the food for Nile perch and also promotes measures to ensure that more fish grow before they are caught.

The FMP III has a vision to contribute to the sustainable economic growth and reduction of poverty in the East African Community with the goal to ensuring sustainable utilization of fisheries resources to contribute to wealth creation and provide equitable opportunities and benefits in the EAC. The FMP III has the objectives to manage the Nile perch fishery to increase export earnings, Tilapia to promote national and regional trade and contribute to increase per capita fish consumption and Dagaa for food security, improved livelihoods and well-being of communities in the region.

The FMP III aims to address emerging issues in the Lake Victoria fisheries with focus on: introduction of user rights in the management of Lake Victoria; introduction of a domesticated Fishing Craft Management System (FCMS) for Lake Victoria waters; market driven reforms; development and value addition of products; increasing financing to the sector; introduction of fisheries and aquaculture incubation enterprises; installation of beach seine deterrent devices in tilapia breeding areas and Nile perch nursery grounds. The Plan focuses on empowering and supporting primary fisher and aqua producers to invest and own assets and enterprises.

The FMP III emphasizes the need for: development of new technologies; conducting of demand driven research for fisheries and aquaculture; economic valuation of the aqua and fisheries sector; leveraging on Information, Communication and Technology (ICT) in fisheries operations; sharing of intelligence, market information and tele-conferencing; Strategic investment by governments in enabling infrastructure for fisheries and aquaculture growth; establishment of fisheries professional bodies and setting of standards for fisheries training centers of excellence and research institutions.

The FMP III embraces Ecosystem Approach to Fisheries Management to improve the collaborative management of fisheries resources of Lake Victoria basin for the shared benefits of the EAC Partner States. The approach emphasizes harmonization of policies and regulatory standards, use of cooperative management frameworks through regional institutions, involvement of key stakeholders (communities) in the management of the fishery and regular evaluation of contribution of fisheries to the regional GDP.

Aquaculture provides an opportunity for reducing the pressure on Lake Victoria fish stocks but it has several constraints hindering its development. The FMP III provides for strategies to increase availability of quality seeds and feeds and capacity building of technical staff and farmers.

The FMP III provides management goals and objectives for Nile perch, Tilapia and Dagaa with target indicators, reference points and decision control rules with proposed management measures. The plan also indicates the strategic actions and expected outputs.

The FMP III is expected to guide the sustainable management of the fisheries resources and thus contribute to poverty alleviation and improvement of livelihoods which is in line with the EAC's Vision and Strategy Framework for Management and Development of the Lake Victoria basin; *"a prosperous population, living in a healthy and sustainably managed environment providing equitable opportunities and benefits"*.

1. Updating of the Lake Victoria Fisheries Management Plan

The first regional Fisheries Management Plan (FMP) for managing the fisheries of Lake Victoria (LV) was developed in November 2001 (LVFRP/TECH/01/16). This plan was implemented between 2005 and 2008. The plan brought fundamental changes in the management of the Lake Victoria fishery that informed the development of FMP II (2009-2014). Key achievements for FMP I and II included;

1. Establishing a vibrant Secretariat in Jinja, Uganda, that has enhanced the cooperation of Partner States for the effective utilization and management of fisheries and aquaculture resources in the EAC region. The Secretariat has, among others:

   - Facilitated the harmonization of policies, regulations, standards and guidelines; supported capacity strengthening of key stakeholders in fisheries and aquaculture management; and provided technical support to stakeholders;
   - Provided a forum for coordination, interaction and experience sharing among Partner States and other stakeholders around fisheries and aquaculture development.

2. Formation of community based structures for the management and sustainable use of fisheries and aquaculture resources. This consists of 1,069 Beach Management Units, three national Fish Processors and Exporters Associations and thematic working groups which also participate in the planning and decision making process of the organization, thereby enhancing ownership and sustainability.

3. Developed an effective mechanism for quality assurance of the export of fish and fishery products that has guaranteed uninterrupted access to international markets in over 24 countries over the past 16 years. This has resulted in increased exports from USD 51 millions in 1994 to USD 340 million by 2014.

4. LVFO has established itself as an authority and repository for scientific knowledge and information on fisheries and aquaculture for the EAC region through its network of research institutions at Partner States. LVFO is able to conduct annual census, surveys and studies to support science-based planning and decision making.

FMP's are "living documents" that require regular revisions (normally every 5 years). In recent years changes in the fishery have necessitated the introduction of new or alternative management measures. FMP III revises FMP II and incorporates the lessons learnt from the implementation of FMP I and II and adopts a new approach recognizing the need to accommodate the changes occurring in the fisheries of Lake Victoria.

2. Introduction and background information

Lake Victoria, with a surface area of 68,800 km²; and an altitude of 1134 m above sea level, is the largest inland water fishery in Africa. It is shared by the Republic of Kenya (6%), United Republic of Tanzania (51%) and the Republic of Uganda (43%) (Figure 1). It has a catchment of 194, 000 km² shared among the East African Community (EAC) Partner States of the Republic of Burundi (7%), the Republic of Kenya (22%), Republic of Rwanda (11%), United Republic of Tanzania (44%) and Republic of Uganda (16%). Lake Victoria basin has a population of more than 35 million people constituting 30% of the total population of EAC (LVBC, 2009). The Lake plays a major ecological role by supporting a wide range of flora and fauna. The lake also plays an important economic role among the riparian states by supporting a large fishing industry, domestic and industrial water supply, lake transport as well as hydro-electric power generation.

Figure 1. *Lake Victoria Basin showing the drainage and international boundaries*

The Lake has experienced dramatic ecosystem change over time resulting into loss of more than 500 endemic haplochromine fish species. Currently, the Lake ecosystem and its satellite wetlands is home for more than 200 different fish species. However the commercial fishery is dominated by three species; the predatory Nile perch

(*Lates niloticus*), Nile tilapia (*Oreochromis niloticus*) and Dagaa (*Rastrineobola argentea*) constituting over 95 % of total fish catch in Lake Victoria. The fishery provides direct employment for more than 800,000 people. Fish production is estimated at 1,000,000 metric tons per annum (LVFO, 2011) and income generated from the fishery provides food security, and supports the livelihoods of more than three million people (World Bank, 2009). Foreign exchange earnings generated from the Nile perch fishery is about US$ 300 million[1]. The Lake fishery contributes to the GDP of the riparian Partner States as follows– Kenya 2%, Tanzania 2.8 % and Uganda 3% (World Bank, 2009).

Activities resulting from the high population in the basin impacts adversely and stresses the Lake Victoria environment threatening the regional economy and livelihoods. Sources of stress originate from unsustainable fishing practices, increased watershed degradation, pollution, conversion of sensitive shoreline wetlands, reduced water inflows, proliferation of water hyacinth, eutrophication and effects of climate change. These factors cumulatively reduce the ecological resilience of Lake Victoria resulting in the decline in fish stocks and diversity, and destruction of critical habitats that impacts on breeding and nursery areas of fish.

Efforts to manage the fishery of Lake Victoria dates back to late 1920s when the Lake Victoria Fisheries Service (LVFS) was formed and conducted the first fisheries survey (Graham, 1929). During the colonial era in 1947, LVFS was replaced by the East African Freshwater Fisheries Research Organization (EAFFRO). After independence EAFFRO was strengthened with the formation of EAC in 1967 that however collapsed in 1977. The three riparian Partner States, with support from the Committee for Inland Fisheries of Africa (CIFA) established the Lake Victoria Fisheries Organization (LVFO) in 1994. LVFO is an institution of the EAC mandated to coordinate regional fisheries activities on the lake. With the advent of the Lake Victoria Environmental Management Project (LVEMP I) (1997-2005) and Lake Victoria Fisheries Research Project (LVFRP) (1999-2002), scientific information was systematically generated upon which LVFO based many of the key fisheries management decisions. It is also on the basis of this baseline information that the first Fisheries Management Plan (FMP I) for Lake Victoria fishery was developed in 2001, and implemented from 2005 to 2008 with financial support from EU to improve the management of the fishery. FMP II was implemented from 2009 to 2014.

Lessons learned from the two fisheries management plans informed the development of FMP III. The FMP III aims to address emerging issues in the Lake Victoria fisheries with focus on the introduction of user rights in the management of Lake Victoria fisheries, a fishing crafts registration and tracking system for Lake Victoria waters; market driven reforms and development of products to increase financing to

1 Recognising that that the extent of the social and economic value of the Lakes fisheries is not fully quantified

the sector by financial institutions and investment fora; tax concessions and incubation of fisheries and aquaculture enterprises; installation of beach seine deterrent installations in tilapia breeding areas and Nile perch Nursery grounds; support to primary fisher and aqua producers to invest and own at least 30% of assets and enterprises across the fisheries value chain; manage the Nile perch fishery to increase export earnings, promotion of the tilapia fishery to promote national and regional trade and contribute increase per capita fish consumption and Dagaa for food security, livelihoods and wellbeing of communities in the region.

The FMP III further emphasizes on the need for development of new technologies and conducting of demand-driven research for fisheries and aquaculture; economic valuation of the aquaculture and fisheries sector; value addition, leveraging on Information, Communication Technology (ICT) in fisheries operations; sharing of intelligence; strategic investment by governments in enabling infrastructure for fisheries and aquaculture growth; establishment of fisheries professional bodies and setting of standards for fisheries training centers of excellence and research institutions.

The FMP III also embraces Ecosystem Approach to Fisheries management (EAF) and the Code of Conduct for Responsible Fisheries (CCRF), to improve the collaborative management of fisheries resources of Lake Victoria basin for the shared benefits of the EAC Partner States. The approach emphasizes harmonization of policies and regulatory standards, use of cooperative management frameworks through regional institutions and involvement of key stakeholders (communities) in the management of the fishery. Therefore, socio-economic benefits of the fishery will contribute to a broad-based poverty alleviation and improvement of livelihoods by supporting sustainable management of the trans-boundary fisheries resources. This plan is also consistent with the development of small scale fisheries (Cochrane et. al., 2011) and the recently developed small-scale fisheries recommendations of the FAO[2]. This is also consistent with the EAC's Vision and Strategy Framework for Management and Development of the Lake Victoria basin; "a prosperous population, living in a healthy and sustainably managed environment providing equitable opportunities and benefits".

2.1 Current status of the stocks of the main commercial fisheries of LakeVictoria

2.1.1 Biomass Status

Hydro-acoustic survey results had shown a drastic decline in Nile perch from about 1.44 million tonnes in 2006 to about 0.55 million tonnes in 2008 in the biomass (also referred to as the standing stock). However a gradual increase was recorded since 2009 to 1.23 million tonnes in 2014 but with dominance of juvenile (immature) fish with only 5.9% of the spawner biomass (parent stock) above the low limit of slot size

2 Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (FAO, 2014)

(50cmTL) (LVFO, 2014). This poses a threat to the viability of the export industry that depends on larger size classes. For Nile perch, this growth in the fishery stimulated the development of an export industry based on Nile perch, which resulted in a great deal of investment around the lake. In 2008 the Nile perch exports to international market were valued at $320 million but have since been below $300 million. Some of processing plants in the three riparian Partner States have closed (from a maximum of 35 in 2005 to 27 in 2014) while many are operating below their processing capacity. The challenge is therefore to rebuild the spawner biomass by allowing more fish to grow to bigger sizes. The dominance of young fish in the Nile perch stocks which are not permitted to be harvested has caused a shift in effort to Dagaa whose biomass (Figure 2) and catch has been increasing (Figure 3).

The biomass of Dagaa in hydro-acoustic results of 2014, showed an increase from 0.49 million tonnes in 2005 to 1.28 million tonnes in 2014 but a decrease from 439,000 to 380,000 tonnes for haplochromines and others. Data on Nile perch feeding show that the main food for Nile perch of >20 cm TL is haplochromines contributing over 60% of the food items (LVFO, 2014b). This emphasises the need for good management of all species in the lake to ensure stability of the ecosystem and in so doing optimize the economic benefits that accrue from the Nile perch and all other commercial species. Overall the most recent Hydro-acoustic survey (Figure 2) suggests that Nile perch and Dagaa stocks have improved.

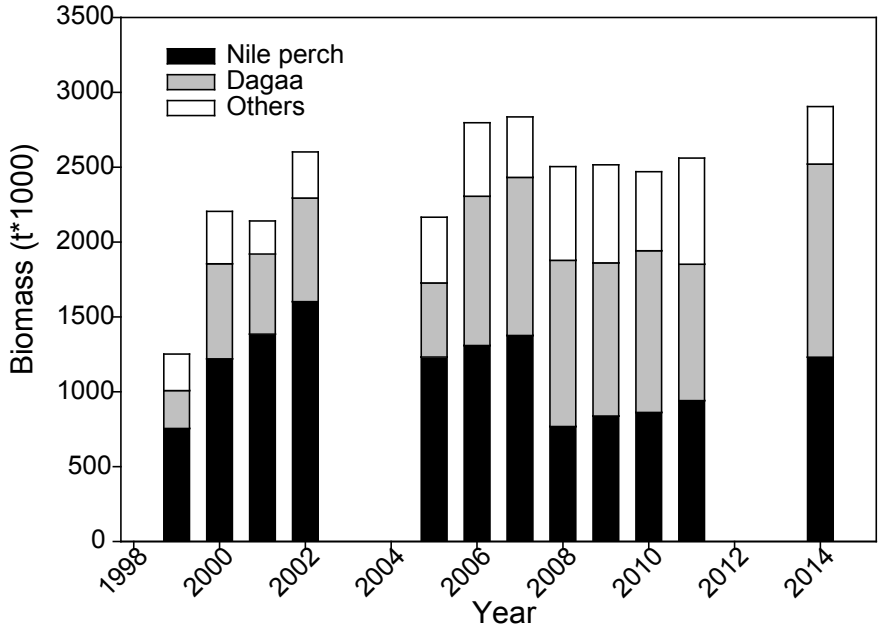

Figure 2. *The relative biomass of fish in Lake Victoria based on acoustic surveys (2000 - 2014). Data from Everson et al. (2013) and Taabu-Munyaho (2014, in preparation).*

2.1.2 Catches of the Main Commercial Species

The trend of the total catch for the main commercial fish species in Lake Victoria is shown in Figure 3. The estimated total catch in 2014 was 919,310 tonnes valued at US $ 840 million at beach. The estimated value of Nile perch at beach level has been increasing from $238 million in 2005 to $545 in 2014, an increase value by 129% over 10 years. The catches however declined from 232,838 tonnes in 2005 to 198,624 tonnes in 2011 but increased to 251,000 tonnes in 2014 reflecting an improvement in the stocks (LVFO, 2014a).

Dagaa landings increased from 453,000 tonnes in 2005 to 509,598 tonnes in 2014; Tilapia decreased from 71,531 tonnes to 59,681 tonnes and haplochromines decreased from 131,258 tonnes to 73,556 tonnes from 2005 to 2014 respectively (LVFO,2014a).

The catch value (landed value) between 2012 and 2014 showed an increase in value from $51 million to $135 million for Dagaa even though there was an overall decrease in the total catch. Similarly for Tilapia there was an increase from $38 million to $107 million and an increase from $17 million to about $20 million for haplochromines. These increases reflect the ever increasing value of fish. However, although Dagaa contributed 55.4% to the total catch in 2014, it only contributed 16.1% to the total value, indicating an urgent need to improve processing, handling, and packaging to increase the its value.

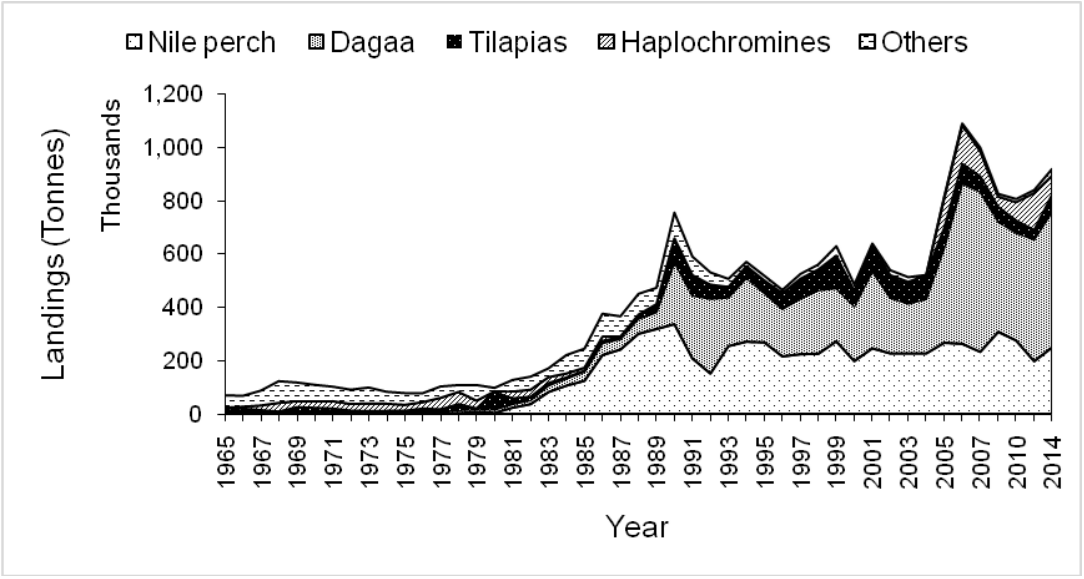

Figure 3. *Trend in the catches of the principle commercial target species in the Lake (Catch assessment survey, 2014)*

2.1.3 Fishing Effort and IUU Fishing

One of the biggest problems in the lake is the increasing fishing effort. Lake Victoria has licensing as the only restriction on fishing effort. Fishing effort has increased rapidly since the mid-1980s due to the explosion of Nile perch fishery. Not only are the numbers of fishers increasing (Figure 4) but also the number of fishing crafts (Figure 5). The fishing crafts increased from 42,519 in 2000 to 70,696 in 2014 (LVFO, 2014c).

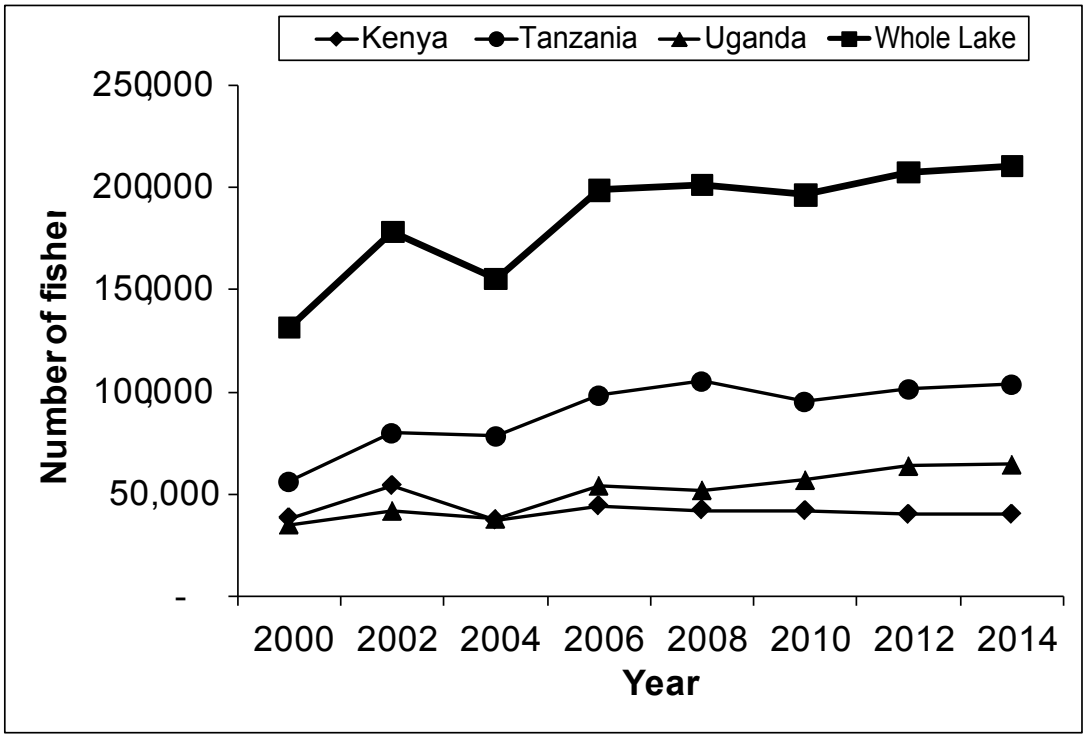

Figure 4. *Trend in the growth in the number of fishers in the communities around Lake Victoria (Frame survey, 2014)*

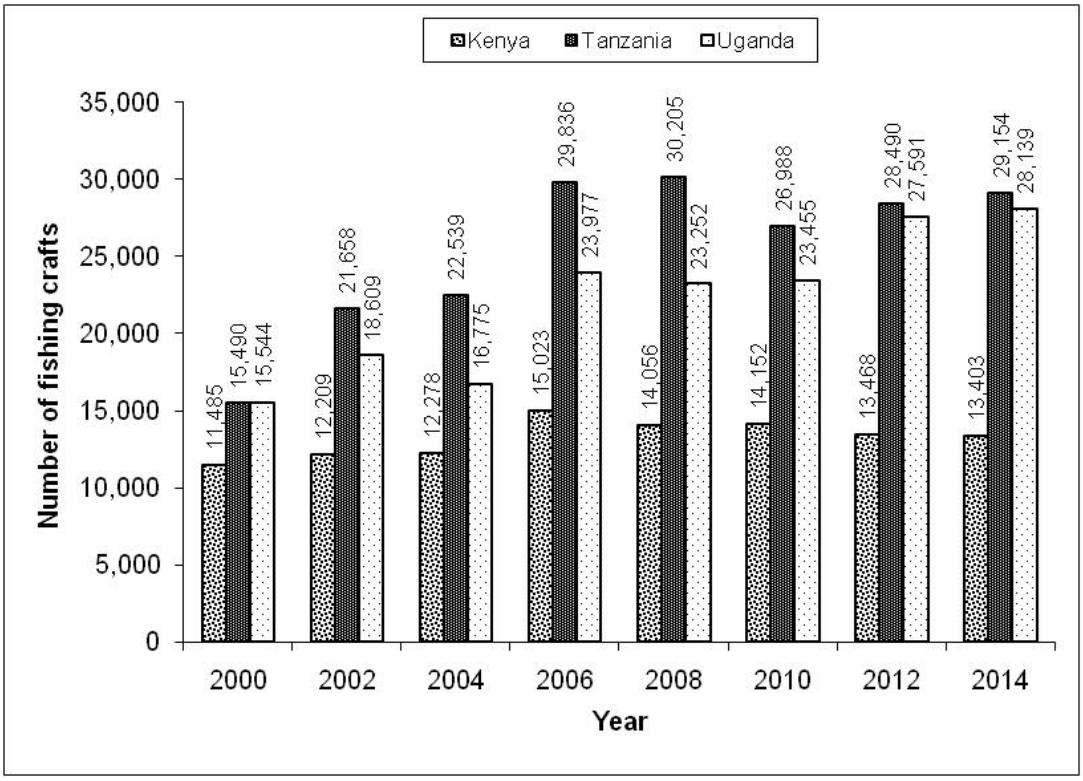

Figure 5. *The increasing number of fishing crafts used by fishers in Lake Victoria (Frame survey, 2014)*

The total number of gillnets has increased from 650,652 in 2000 to 982,400 in 2014 as shown in Figure 6. Long line hooks, has also increased from 3,496,247 in 2000 to 14,244,518 in 2014. But, this increment in long line hooks was mainly recorded in smaller hook size (>10) which are illegal, while the big sizes decreased over time (Figure 7). This indicates a major shift from the usage of big to small hooks mainly to target smaller Nile perch below the lower limit of slot size which comprise higher proportion of biomass and hence increase the problem of overfishing and catching of immature fish. However, it is important to note that IUU fishing remains one of the biggest threats to the fisheries of the Lake (**2014 Frame Survey**).

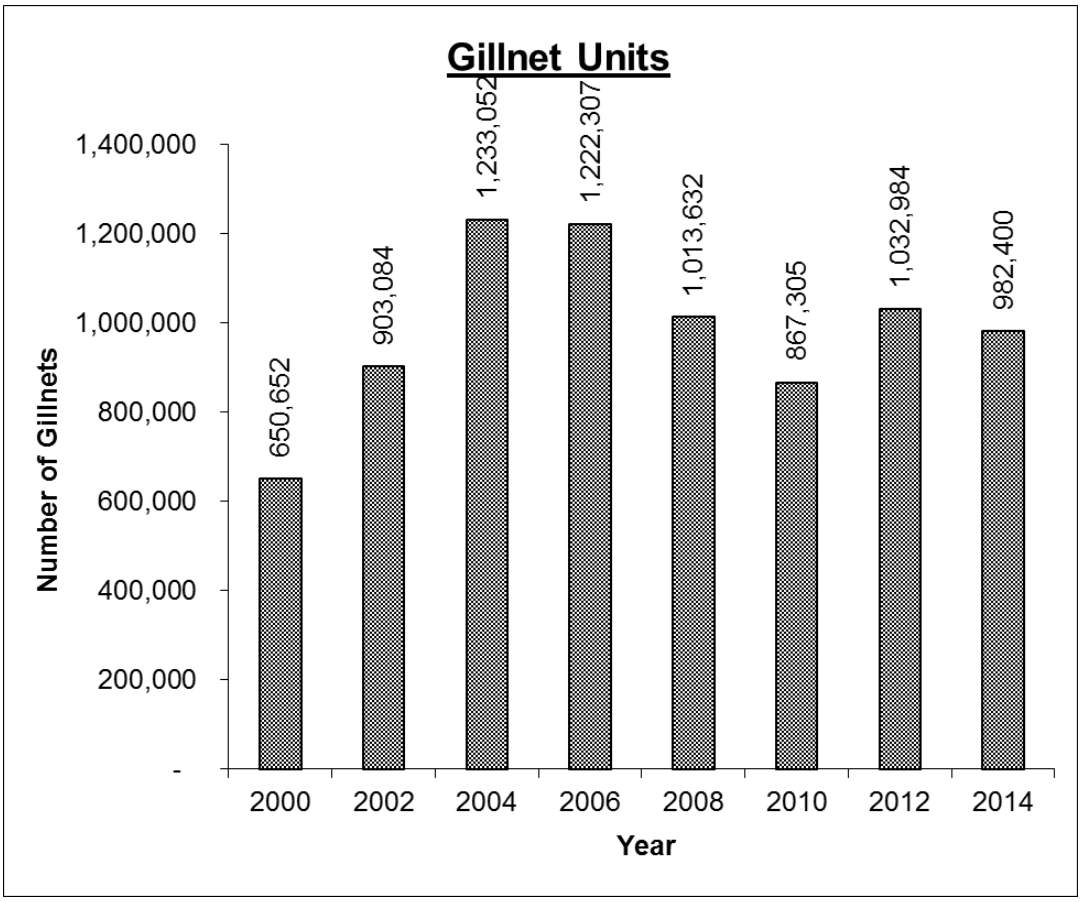

Figure 6. *Trend in the number of gill nets in Lake Victoria (Frame survey, 2014)*

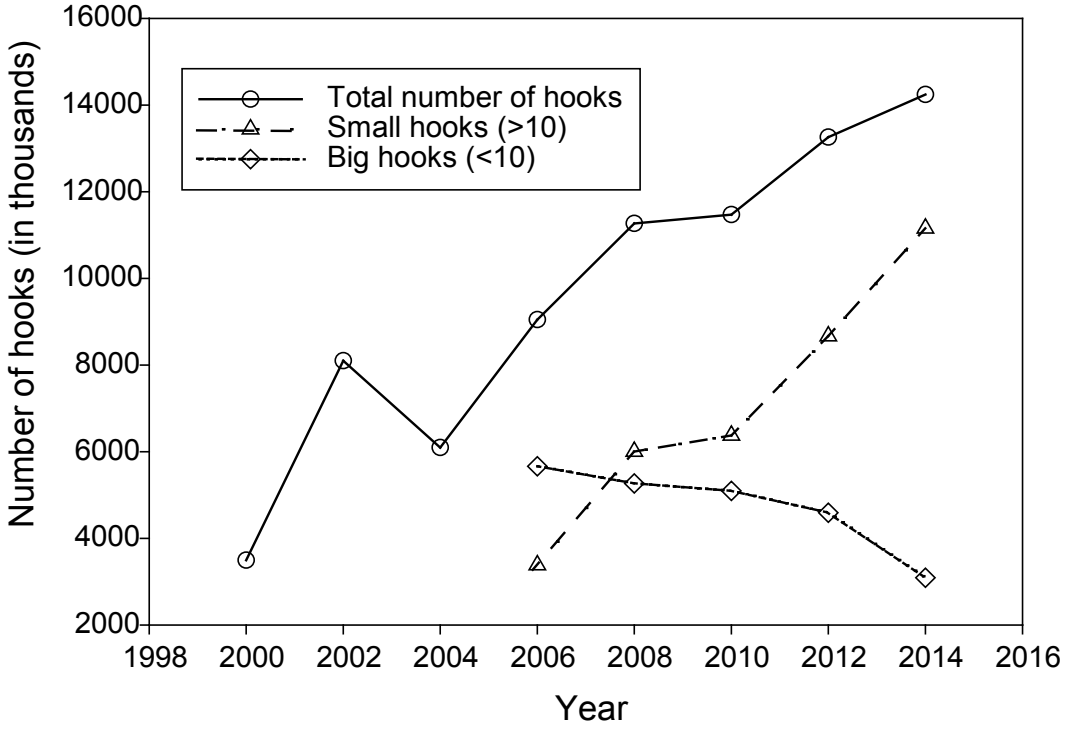

Figure 7. *Trend in the use of longlines hooks in Lake Victoria (Frame survey, 2014)*

2.1.4 Aquaculture

Aquaculture provides an opportunity for increasing fish production and indirectly reducing the pressure on Lake Victoria fish stocks that are on the decline and dominated by young fish. The decline is partly attributed to rapid growth of human population and fast growing regional and international market demand for fish. Therefore aquaculture can help meet the deficit in fish production and contribute to the livelihoods of the EAC communities. The current status of aquaculture production is estimated at 48,790 tonnes for Kenya (Fisheries statistical bulletin 2012), 13,530 tonnes for Tanzania (2013) and 100,000 tonnes for Uganda (2013). Cage culture has been initiated on Lake Victoria on pilot/experimental basis with 1,323 cages in Uganda, 20 in Kenya and 60 in Tanzania for 2013.

2.2 Social and economic context of the fisheries

"Lake Victoria's complex, changing, and interconnected system calls for an adaptive management approach capable of embracing this heterogeneity. Adaptive management requires in large part that stakeholders have a common understanding and knowledge of their system" (Ostrom 2009).

The socio-economic importance of fisheries in the Lake cannot be understated. More and more people are entering the fisheries and there is increasing benefits of fisheries on livelihoods. There have been many studies and efforts in the past to address the social and economic aspects of the lake's fisheries. Nevertheless, the benefits and dependence of the riparian communities around the lake is significant but remains poorly understood. Recent work by Downing et. al., (2014) has helped put the socio-economic, ecological and commercial fisheries aspects in perspective. This study, which includes fisheries managers and scientists from the three riparian countries conclude what has generally been known "Lake Victoria is a complex product of social, economic and ecological processes".

Catches of small Nile perch, Dagaa, and haplochromines feed a regional market, whereas catches of large Nile perch go for export. These different markets convert catches into investment power, which allows the economy to grow (Downing et. al., 2014). This FMP III therefore emphasizes the need to identify and monitor the social and economic dynamics of the fisheries – in particular it recognizes the importance of both the export market (Nile Perch) and the regional and domestic markets for Tilapia and Dagaa. In addition, the impact of IUU fishing needs serious consideration in the management strategy, in addition to effective enforcement and the implementation of individual user rights (moving from the open access system to rights-based management).

The lake's fisheries also have significant inequalities. For example in the Nile perch fishery many agents (middlemen) are also boat owners. Landing site or camp managers employ supervisors and laborers to operate full fleets and arrange credits and loans to ensure a constant fish supply. In general, the socio economic dynamics of the lake sees greater financial benefits to big owners, and much less financial benefit reaches fishers and laborers.

2.3 Governance arrangements

Good governance is essential for effective fisheries management. Successful governance is achieved through an effective and participatory decision-making process. Without good governance, the goal and purpose of FMP III will not be achieved. The governance structures of LVFO are as presented in the Organogram (Figure 8) with the highest policy Organ – the East African Community (EAC) Summit to the grass root structures – the Beach Management Units (BMUs).

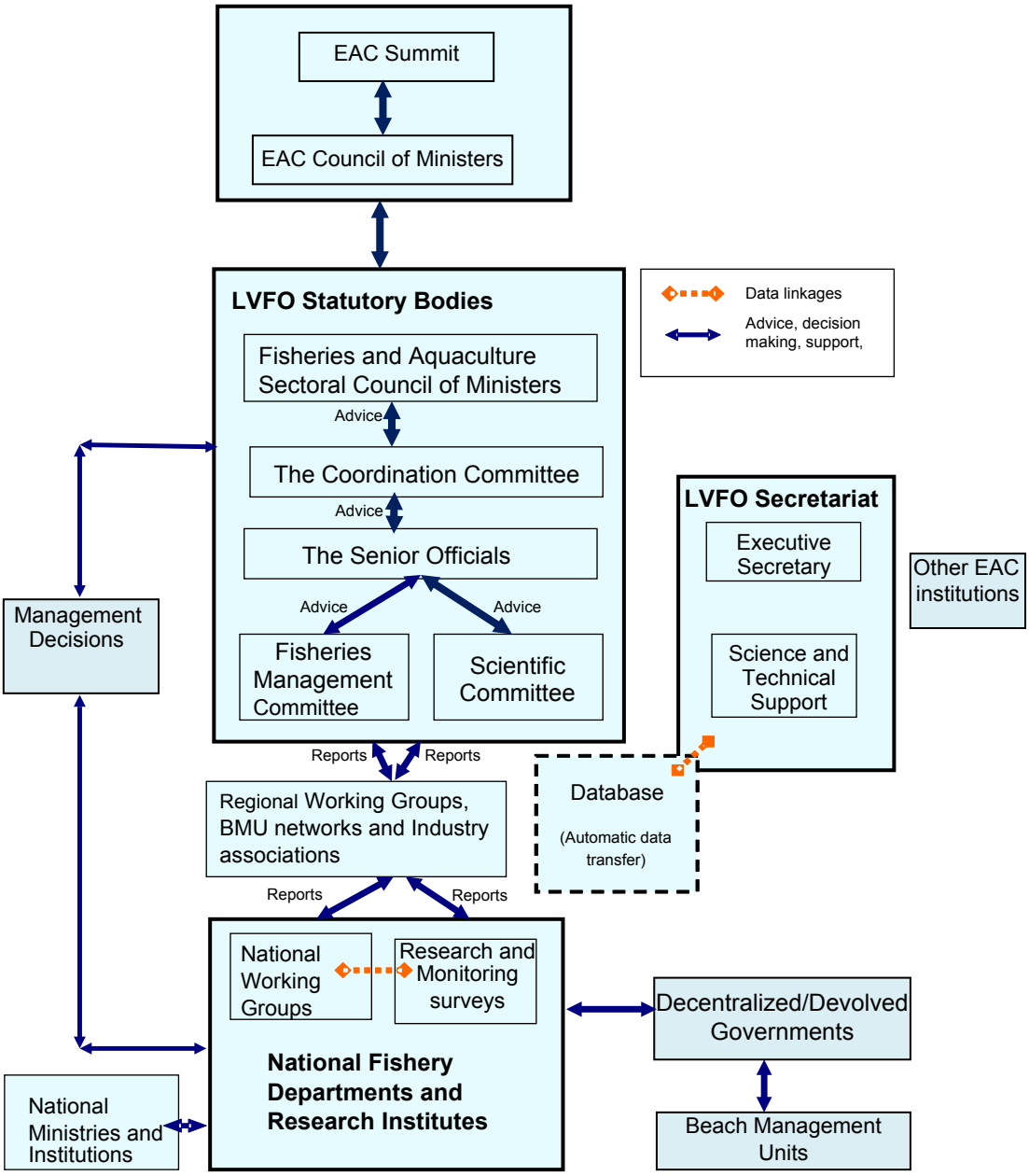

Figure 8. *Organogram presenting the LVFO Institutional Structure and the linkages to the different Policy Organs*

3. Concerns, challenges and opportunities for Lake Victoria fisheries

Table 1. Log frame of Concerns, Challenges and Opportunities in fisheries of Lake Victoria

Concerns	Challenges	Opportunities
Growing Demand and prices for fish and fisheries products	Increase in fishing effort and capacity	Focusing effort in other abundant fish species
	Emerging local and regional market fishery and influencing the stock.	Good prices for fish which presents an opportunity for growth of aquaculture investments
Gutting of Nile perch in fishing grounds for Fish Maws	Increased post-harvest losses and compromising of fish safety and quality	The New and high price for fish maws offers an opportunity for increased value of fisheries and increase the beach level earnings of fishers. However, this activity needs to be well regulated.
Low compliance to fisheries laws and regulations	Limited operational capacity of fisheries enforcement units	Many government agencies with capacity to undertake enforcement that can be well coordinated for synergies.
	Inadequate judicial system in handling fisheries issues and integrity issues	The EALA can be used to harmonise judicial system for fisheries
Stagnated aquaculture development	Underdeveloped aquaculture technology and skills; low quality and inadequate seed and feed.	EAC regional strategy and implementation plan for sustainable aquaculture (2015- 2020) approved and needs to be implemented in order to spur aquaculture growth.
Governance issues	Weak linkages between Central and Devolved/ Decentralised governments and between Devolved/ Decentralised governments. Lack of funding for proposed Fisheries Management Committees at National level Limited capacity BMUs	Formation of inter-governmental associations Involvement of other stakeholders in fisheries management at local level. Strengthen LVFO institutions Strengthen BMU networks
Fragmented data and information to guide management.	Inadequate funds for resource monitoring Limited research agenda setting Weak linkage between research and management institutions	Proposed establishment of the Fish Levy Trust Fund Resource mobilisation strategy for LVFO Existence of LVFO technical and Policy Organs

4. Guiding principles of FMP III

4.1 The Vision and Objectives

The 2016-2020 FMP Vision statement recognizes that Lake Victoria and its basin will continue to be an engine for economic growth and poverty reduction in the region, acting as a central hub, welding the Partner States firmly together in a sphere of cultural, political, social and economic integration and harmony. The focus of the plan is on the improvement of the lives of people in fisheries.

The overarching **Vision** of FMP III is:

"Sustainable utilization of fisheries resources in a sound environment contributing to the Socio-economic growth and wealth creation in the East Africa Community"

The **Goal** of FMP III is:

"Recovery of biomass of Nile perch with Sustainable utilization of fisheries resources of Lake Victoria basin with equitable opportunities and benefits".

The **Objectives** of FMP III are as shown in the Table below:

Table 2. Objectives of Fisheries Management Plan III for Lake Victoria

Area	Management objectives
Socio-economic	**1. To identify and promote at least 10 alternative sources of livelihoods in fisheries and aquaculture sector by 2020**
	1. To increase the percentage of Dagaa catches that goes for human consumption
Biological	2. For Nile Perch: To rebuild the Nile perch stock levels in Lake Victoria from the current (2014) level of 1.2 million tons to 1.4 million tons by 2020 3. For Nile Perch : Apply a Harvest Control Rule (HCR) exploiting no more than 20% of biomass in any one year effectively raising the catch from current (251 000 tons in 2014) to 280 000 tons by 2020 4. For Dagaa: Apply a precautionary harvest control strategy by annually harvesting not more than 70% of the estimated annual biomass 5. For Tilapia: Partner States should use the precautionary approach towards management of Nile tilapia as currently there is inadequate information, specifically on its biomass 6. For Haplochromines: No commercial exploitation should be allowed as they form an important food item for other fish predator fish, specifically Nile perch
Ecological and Environment	7. Identify, gazette and protect at least 20 critical fish habitants in each Partner States area of jurisdiction by 2020 8. Regulate, capture fisheries and commercial aquaculture in the lake to minimize its potential impacts in the aquatic ecosystem 9. Mainstream climate change adaptation and mitigation measures in fisheries and aquaculture 10. Sustainable exploitation of all fisheries while retaining the natural trophic structure and ecological balance as well as a healthy and sustainable environment for fisheries production
Economic	11. To increase wealth generated by Nile perch fishing and related activities by at least 10% through improved regulation. 12. Increase the Lake Victoria annual fish exports earnings beyond 2013 figure of 300 million USD 13. To reduce post-harvest losses from 20% to 10% by 2020 and increase value addition in fish and fishery products thereby increasing the fisheries contribution to the regional GDP 14. Promote the development of sustainable aquaculture farming in the lake. 15. To create incentives and increase financing in target fishing communities
Enabling Environment	16. Provide for harmonized polices, laws and guidelines for effective management and development of the fisheries sector

4.2 Guiding Principles for the Management and development of the Fisheries and Aquaculture

The implementation of the Lake Victoria Fisheries Management Plan 2016-2020 is guided by a series of underpinning principles listed below:

1) *Poverty eradication*: the fisheries sector contributes to poverty reduction and EAC prosperity. Clear and measurable mechanisms of poverty reduction will be incorporated into the sector's strategic and action plans at all levels.
2) *Gender and equity*: fisheries development will include the active participation of women and the youth who will have meaningful representation in decision-making and share in both sector responsibilities and benefits. Clear and measurable mechanisms will be incorporated into the sector's strategic and action plans at all levels to address inequities experienced by women and the poor, in opportunities, power and influence for wealth generation in fisheries.
3) *Community participation*: the management of the fisheries resources will involve a participatory co-management approach based on partnership in decision-making between government, fisheries communities and industry.
4) *International commitments:* the EAC recognizes and confirms its commitments regarding fisheries under international law.
5) *The precautionary principle*: an important element of the FAO Code of Conduct for Responsible Fisheries is the precautionary approach that recognizes the scientific uncertainty inherent in capture fisheries management and species introductions. Fisheries management measures should be based on the best scientific evidence available. Lack of full scientific certainty should not be used as a reason for postponing or failing to take effective action where there are risks of serious or irreversible harm to fish stocks and/or habitats.
6) *The user-pays principle*: the 'user-pays principle' provides that those who use or benefit from natural resource use should contribute towards the costs of managing those resources, for example through the introduction of new and sustainable funding mechanisms for resource management and plough back by government to lower levels.
7) *Public, Private partnership in fisheries activities*: Government should encourage Public, Private Partnerships.
8) *Rights based fisheries management:* LVFO will design negotiated property rights institutions to facilitate the assigning of property rights to the Lake Victoria resource, which will then encourage owners to internalize the effects on sustainability of resource management decisions.
9) *Environmental protection:* of aquatic habitats and water drainage basins and avoidance of adverse environmental impacts of climate change and fisheries and aquaculture activities are fundamentally important to the implementation of this Plan.
10) *Sustainable resource utilization:* LVFO will ensure all management measures are geared towards sustainable utilization of the fisheries of Lake Victoria.
11) *Food security:* Fisheries management and development to contribute to food and nutrition security of EA communities.
12) *Good governance:* Promote participation of all stakeholders with transparency, accountability, effectiveness, coherence.
13) *Ecosystem Approach to Fisheries Management:* The management of the fisheries will integrate ecosystem approach where possible.

5. Fisheries Management Measures

5.1 Nile Perch Management Measures to achieve objectives

Table 3. Management measures in Lake Victoria applicable to Nile Perch for FMP III

Objectives	Management Goals			
	Indicators	**Reference points**	**Management Measures**	**Decision control rules**
Rebuild Nile perch biomass of Lake Victoria from current levels of 1.2 million MT to the historical highest standing biomass of 1.4 million by 2020	Sustainable Biomass	Historical highest biomass of 1.4 Million tonnes	**Controlled access through registration and licensing of all Nile perch fishers using Species Specific Licensing** **Gear Size restrictions** Allow only gillnets 7" Mesh Size and above Hook Size of 4-9 **Fish size restrictions** Slot size of minimum 50cm **Restricted areas** Closed breeding/ Nursery areas Lacustrine protected areas **Gear/ Fishing methods Restrictions** No Beach/boat seines , tuck seines, Monofilament, trawlers, Vertical joining of gillnets and use of chemicals and explosives. **Preventive measures** such as awareness creation. **Placing deterrent objects in breeding/nursery areas to prevent seining** **Apply sanctions and reward schemes**	**If all actions are complied with and 1.4 Million standing stock biomass not attained:** Review the number gears per boat and number of boats, fishing time fishing hours Increase the number of closed areas , broaden the size of closed /protected areas; Total expulsion of persistent offender from the fishery Closed Season for 2 months a year if all other measures fail to yield results.
Raise Nile perch catches from ~250 MT in 2014 to ~ 300 MT in 2020	Nile Perch catch Data Reduce the number of Nile perch below slot size from 40% to 20%	Catches to be about 20% of Absolute Biomass NP number below slot size 20%	**Controlling effort** Restriction on the number of registered boats Restriction on the Number and type of the gears Species/gear specific licensing Restricting landing areas User rights	If the measures are implemented and the Catches exceed 20% of biomass, review the number of registered fishing boats and fishing gears downwards

Objectives	Management Goals			
	Indicators	**Reference points**	**Management Measures**	**Decision control rules**
To increase the Lake Victoria annual fish exports earnings beyond the 300 million USD in 2013	Nile perch Export Values	400 Million USD	-Enforcement of Fish handling and Cold chain standards -Regulation on membership for processing Nile perch and Nile perch products for exports (registration of processing units both artisanal and industrial). -Regulation governing extraction, sale and trade of Fish maws to mitigate discards of NP Landed -Diversification of Nile perch products (value addition) - Enforcement of self-assessment guide	If the target Nile Perch exports are not attained review the licenses of operators and withdraw those not complying along the value chain
Sustainable exploitation of all fisheries while retaining the natural trophic structure and ecological balance of the lake	Biomass estimates of Haplochromines and others Annual Catch data of Haplochromines	0.380 million tonnes 73 MTs	Manage and control effort on key species such as Haplochromine spp. to ensure the sustainability of NP Identification and protection of critical fish habitats	If catch exceeds 5 % of key prey species in target fisheries e.g. for Dagaa, withdraw licenses of offending operators to regulate effort on these species (haplochromines primarily)

5.2 Tilapia Management Measures

Table 4. Management measures in Lake Victoria applicable to Tilapia for FMP III

Objectives	Management Goals			
	Indicators	**Reference points**	**Management Measures**	**Decision control rules**
To raise the catch for tilapia from 60 MT to 90MT and value from US$ 106 to US$ 160 by 2020		Beach weight 60 MT and value US $106 million	Gear Size restrictions; -Allow only recommended -Mesh size of 5" and above; **Fish size restrictions;** minimum size at 25cmTL, **Restricted areas:** Closed/breeding areas, Lacustrine protected areas, **Gear/Fishing methods prohibited** No beach seines, monofilament, trawlers, poisoning, cast nets, tycoon, traps, rafts, foot fishers(harmonized restrictions to be appliedplacing deterrent objects in breeding/nursery areas to prevent seining Restrict use of sex-reversed tilapia in cages and prevent escape from cages to the wild to avoid genetic modification/contamination **Controlling effort:** Restriction on the number of registered boats (use of boat loggers); Restriction on the number and type of the gears; Species/gear specific licensing; Restricting landing areas; Restriction on type and size of boats	In the event these measures do not work and production does not increase to 90MT and value to US $ 160 then: Increase the number of closed areas, and the size of Lacustrine closed/protected areas, review the number of licensed boats and fishing gears and reduce effort

Objectives	Management Goals			
	Indicators	**Reference points**	**Management Measures**	**Decision control rules**
To increase earnings, revenues, income for fisher folk communities, and decent employments by reducing post harvest losses	Earnings, Revenue from Tilapia communities Income of Tilapia fisheries, traders		**Fish handling Standards** Regulate handling equipment, packaging materials and transportation awareness creation on fish quality and safety **Cold chain Standards:** Regulation on membership for Processing, trade and marketing of Nile Tilapia at local and regional levels, Diversification of Nile Tilapia Products Regulate processing methods and technologies.	If post-harvest losses remains > 10%, withdraw licenses from those not complying with set standards along the value chain

5.3 Dagaa Management Measures

Table 5. Management measures in Lake Victoria applicable to Dagaa for FMP III

Objectives	Management Standards		Management Measures	
	Indicators	**Reference points**	**Management Measures**	**Decision control rules**
Sustain the standing stock biomass of Dagaa at levels of 1.28 million tones (2014) but increase catch from 509,600 MT to 900,000MT	1.28 Million tones standing biomass	Standing Stock of 1.28 million tonnes	Species specific licensing	If stocks go below 1.28 million tones, institute gear and fishing method restrictions (total expulsion of persistent offenders from the fishery)
	Annual catch values	Catch of 900 million tonnes	Gear Mesh Size restrictions (Allow only 8 mm Mesh Size and above) with lights Demarcate and zone fishing grounds for Dagaa to reduce conflicts with Nile perch fishers. Training of fishing communities on appropriate fishing technologies	**If Catch exceed 900 MT:** Review the no gears panels per net and number of boats, fishing hours, number of lights Enforce Fishing area restrictions (2km away from the shore) and lake wide closed seasons
Increase the percent of quantity for human consumption from 10% to 30% through reduced post-harvest loses	The percentage of Dagaa catches that goes for human consumption	20% increase in Dagaa available for human consumption	Licensing framework for Dagaa processing (Standards). Awareness creation on the value of Dagaa as food **Fish handling Standards** regulate handling equipment, packaging materials and transportation **Cold chain Standards:** Regulate processing, trade and marketing of Dagaa at local and regional levels, Diversification of Dagaa products	Withdrawal of processing licenses for non-compliance

5.4 Data collection and information sharing

Table 6. Data collection and information sharing

Objectives	Management Standards		Management Measures	
	Indicators	**Reference points**	**Management Measures**	**Decision control rules**
To generate up to date fisheries and aquaculture data and information to guide management	Biennial Frame Survey Biannual Catch Assessment Survey Annual Hydroacoustic survey	2014 survey data for hydro-acoustics, FS and CAS	Hydro-acoustic surveys CAS FS	If no data; use precautionary approach
	Biennial socio-economic surveys	2008 survey data	Socio-economic surveys	
	Annual export data Quarterly MCS data	2014 export data	Market and Trade reports MCS Patrols	

5.5 Human resource and Institutional development

Table 7. Human resource and Institutional development capacity enhancement

Objectives	Management Standards		Management Measures	
	Indicators	**Reference points**	**Management Measures**	**Decision control rules**
To enhance capacity of LVFO institutions, staff and stakeholders in specialized disciplines	Number of trained personnel in LVFO institutions	IFMP I and LVEMP II	Training of staff at PhD and MSc level Short courses, study visits	
	Number of farmers and fishers trained along the value chain	IFMP I	Short courses, study tours and exchange visits, on-farm training, community training	
	Number of Institutions supported to improve the human and infrastruct-ure capacity	IFMP I and LVEMP II	Provide research equipment and materials	Source research outputs from other institutions

6. Implementation Strategy

Table 8. Lake Victoria FMP III Implementation Strategy

Objective	Strategic Actions	Activities	Expected Outcomes
Rebuild Nile perch biomass of Lake Victoria from current levels of 1.2 million MT to the historical highest standing biomass of 1.4 million tonnes Raise Nile perch catches from ~250 MT in 2014 to ~ 300 MT in 2020	Regulation of Nile perch activities and compliance to existing regulations Establishing and supporting functional MCS Units Reducing effort through input control Protection of critical habitats	Create awareness to stakeholders for sustainable resource protection Registration of fishing gear importers and manufacturers Conducting MCS using existing regulation Provide incentives in form of rewards and sanctions. Develop harmonised fishing crafts registration and license registers Registration and licensing of all fishing crafts targeting Nile perch fishers using Species Specific Licensing Institute gear restriction on the number registered boats Introduction of harmonized log books for all boats Introduce domesticated VMS in Lake Victoria for Nile Perch boats Demarcate, gazette and protect fish breeding nursery areas and marine parks	Recovery of Nile perch biomass
To increase the Lake Victoria annual fish exports earnings beyond 2013 figure of 300 million USD	Regulate all post-harvest activities	Enforcement of Fish handling and Cold chain standards. Issuance of processing and Fish Movement Permits in an effective manner. Strengthen boarder controls. Strengthen inter agency collaboration. Establish Regulations and guidelines for fish processors of Nile perch and its products including artisanal processors. Develop regulations governing extraction, sale and trade of Fish maws to mitigate discards of Nile perch landed. Diversification of Nile perch products (value addition) Enforcement of self-assessment guide.	Increased earnings and income

Objective	Strategic Actions	Activities	Expected Outcomes
Sustainable exploitation of all fisheries while retaining the natural trophic structure and ecological balance of the lake	Regulate activities on prey species of Nile perch	Manage and control effort on key species such as Haplochromine spp. to ensure the sustainability of Nile perch. Identification and protection of critical fish habitats. Promote culturing of cat fish as bait for Nile perch. License bait dealers. Regulate the hook and line fishery.	Increased production of all species while maintaining ecological balance
To raise the catch for tilapia from 60 MT to 90MT and value from US$ 106,000 to US$ 160,000	Regulation of Nile Tilapia activities and compliance to existing regulations Reducing effort through input control Establish and support functional MCS Units Protect critical habitats	Registration and licensing of all fishing crafts targeting Nile tilapia fishers using Species Specific Licensing Develop harmonised fishing crafts registration and license registers MCS using existing regulations Demarcate, gazette and protect tilapia fish breeding nursery areas and marine parks. Provide incentives in form of rewards and sanctions. Regulate foot fishers Restrict use of genetically modified tilapia in cages and prevent escape from cages to the wild to avoid genetic modification/contamination; Restriction on the number of registered boats(use of boat loggers); Restriction on the number and type of the gears; Restriction on type and size of boat. Introduction of harmonized log books for all boats.	Recovery of Nile tilapia biomass
To increase earnings, revenues, income for fisher folk communities, and gainful employments by reducing	Regulate all post harvest activities	Enforcement of Fish handling and Cold chain standards. Effective issuance of processing and Fish Movement Permits. Strengthen border controls. Strengthen inter agency collaboration in fisheries management. Institute or review Fish handling	Increased earnings and incomes

Objective	Strategic Actions	Activities	Expected Outcomes
post harvest losses		Standards, Cold chain Standards. Regulate processors and processing methods and technologies. Registration of traders and sensitization of fish quality requirement. Provide infrastructure along the value chain to reduce post harvest losses.	
Sustain the standing stock biomass of Dagaa at levels of 1.28 million tones (2014)) but increase catch from 509,600 MT to 900,000MT	Regulate the fishing effort on Dagaa	Conduct Species specific licensing. Gear Mesh Size restrictions (Allow only 8mm Mesh Size and above) with lights. Identify, map and zone fishing grounds for Dagaa to reduce conflicts with Nile perch fishers. Training of fishing communities on appropriate fishing technologies.	Sustained or increased Dagaa biomass
Increase the percent of quantity for human consumption from 10% to 40% through reduced post-harvest loses	Promote value addition Promote consumption	Licensing framework for Dagaa processing (Standards). Sensitization and awareness on improved processing methods. Develop a campaign strategy and create awareness on the nutritional value of Dagaa. Mount "a fish eat campaign" including training in cooking fish dishes .	Increased consumption of Dagaa
Strengthen and establish enabling and harmonized policies, plans , legislations and guidelines	Harmonise regional guidelines	Develop harmonized regional guidelines for user rights-based management systems. Develop regional guidelines in line with EAC arrangement to facilitate effective participatory fisheries decision making and management at national and devolved/decentralized government. Publish and Roll out of the guidelines at all levels.	Policies, legislation, plans and technical guidelines at all levels developed, reviewed, and harmonized
		Develop and implement regional guidelines to protect all critical fisheries habitats such as wetlands, lagoons, nursery and spawning areas.	
		Develop and implement regional guidelines to protect all critical fisheries habitats such as wetlands, lagoons, nursery and spawning areas.	

Objective	Strategic Actions	Activities	Expected Outcomes
		Develop harmonized guidelines on sport fishing and eco-tourism and implement	
		Develop harmonized guidelines on management and regulation of fish maws	
	Provide regulations and framework for implementation of management measures	Implement user-pay principle (fish levy trust funds)	
		LVFO led Inter-agency development of a concept to facilitate the installation of beach seining deterrent devices (environment and navigation friendly) in critical Tilapia spawning habitats and Nile perch nurseries grounds.	
		Develop and implement systems for management of fishing capacity.	
		Harmonize fisheries management measures.	
		Review and Implementation of Regional Plans of Action for managing Capacity and IUU.	
		Develop NPOA-IUU/Capacity in line with RPOA-IUU/Capacity	
		Develop information sharing platform between and within Partner States that aim at deterring illegalities (Licensing information and list of offenders).	
Enhance Good Governance, effective processes and Institutional framework	Strengthen institutional and administrative processes	Establish a mechanism for linkage between devolved/decentralized and central governments.	Fisheries institutions sustainably financed and operating effectively and efficiently
		Establish network platform/system between the LVFO secretariat and Partner States for information sharing.	
		Develop and harmonize processes, laws and regulations for the operationalization of the fisheries plough back fund (fish levy trust funds)	
		Adopt EAC decision monitoring system and cascade its implementation to decentralized units	
		Partner States to conduct comprehensive performance audit once after every two years and develop a reward scheme	

Objective	Strategic Actions	Activities	Expected Outcomes
Strengthen Human and institutional capacities at all levels	Strengthen human capacities	Develop and implement regional training manuals and curriculum for fisheries and aquaculture human resource capacity development in collaboration with the private sector	Attitudes, skills and knowledge of fisheries stakeholders improved at all levels.
		Implement periodic and scheduled awareness raising activities on fisheries and aquaculture developments including faith-based and cultural-institution community awareness	
		Build adequate human capacities at regional, national and decentralized levels to support fisheries and aquaculture governance and development	
		Establish a platform for networking and associations of technical and non-technical fisheries and aquaculture operators	
		Promote and build the capacity in financial management, entrepreneurship and use of electronic transactions (e-banking, e-data base, e-business/trade) in fishing communities.	
	Strengthen the institutional Capacities	Build adequate institutional capacities at regional, national and devolved/ decentralized levels to support fisheries and aquaculture governance and development	
		Establish and support business incubation at fisheries centers of excellence basing on regional standards	
		Develop annual calendar of activities with regional bearing	
		Finalize and implement communication strategies	
		Develop guidelines on multi-sectoral mechanisms for handling and addressing cross cutting issues affecting the fisheries and aquaculture sector.	
		To promote organizational development and support community networks and organizations that encourage good governance in the sector with emphasis of strengthening capacity at BMU level	

Objective	Strategic Actions	Activities	Expected Outcomes
Ensure coordination of the roll out and implementation of FMPIII	Implement the Fisheries Management Plan	Approvals of the plan	Coordinated and timely implementation of the FMP III
		Regional, national and devolved/ decentralized level launching and sensitization.	
		Monitoring the implementation of the plan at regional, national and devolved/decentralized levels	
Enhance Aquaculture production in the lake and the catchment	Promote , guide and support commercial aquaculture	Promote partnership (PPP) investment in commercial aquaculture with government providing enabling infrastructure and services along the value chain	Improved infrastructure and services for enhanced production, environment, fish health and bio-safety of fish.
		Identify investment segments of the aquaculture value chain for small scale entrepreneurs	
		Map and demarcate suitable sites for cage culture and determine optimum carrying capacity of each area	
		Undertake aquaculture value chain analysis , develop business plans, promote the plans to financial institutions and hold aquaculture investment forums in the Lake Victoria basin	
		Promoting of improved and appropriate technologies in farmed fish handling, processing, preservation, storage and transportation	
		Adopt measures that will facilitate the primary fisheries and aqua producers through buying of shares to own infrastructure/assets across all levels of the value chain to maximize the net benefits from the resource	
Improve living conditions and livelihoods of fishing communities	Improve social and economic status of the fishing communities	Establish a multi-sectoral framework for promoting community-identified alternative livelihood activities and up-scaling successful Community Demand Driven (CDD) intervention in fishing communities.	Fisheries institutions sustainably financed and operating effectively and efficiently
		Setup incubation centres with emphasis on activities for women and youth	
		Promote saving culture and cooperatives	
		Promote sport fishing and ecotourism in the Lake Victoria basin	

Objective	Strategic Actions	Activities	Expected Outcomes
Enhance research along the fisheries value chain (Fisheries resource monitoring and research on fish stocks, environment, socio-economic and trade)	Provide information necessary in guiding the Fisheries Management Decisions	Develop regional protocol on research agenda setting and information sharing to promote demand driven research.	Data and information collected, analyzed packaged, disseminated and used at all levels for fisheries manage-ment and development
		Develop new and existing review resource monitoring SOPs and collect and maintain timely and reliable data on catch, feeding relationships, fishing effort and aquaculture production in accordance with agreed protocols.	
		Harmonize and implement environmental monitoring plan for Lake Victoria (Fish, Water, Sediments) for fish quality and safety.	
	Enhance efficiency in the Fisheries	Develop, Publish and disseminate new technologies and innovations on quality of inputs, efficient production systems, fish seed and feeds used in aquaculture.	
		Establish the economic value of the Fisheries Resource of the Lake Victoria	
Enhance capacity for compliance to fisheries laws and regulations	Establish a functional and responsive MCS Units	Developing a regional fisheries enforcement communication strategy	Fishing effort regulated and access to fisheries resources equitably distributed
		Develop and implement a fishing crafts Monitoring System for Lake Victoria.	
		Support the Regional, national and devolved/decentralized inter agency enforcement units in accordance with LVFO SOPs	
Improve fish productivity, value addition and trade	Guarantee Fish safety and quality	Promote and support measures, management and audit systems to guarantee fish safety and quality for trade and value addition.	Fisheries institutions sustainably financed and operating effectively and efficiently
	Provide market information	Identify niche markets and promote new products for the domestic, regional and international markets.	
		Establish, promote and support market information systems/linkages to increase incomes	
		Develop regional frameworks that will facilitate and guarantee structured participation of the fisheries sector stakeholders in bilateral and multilateral trade negotiations and agreements.	

Objective	Strategic Actions	Activities	Expected Outcomes
	Promote product development	Monitor and evaluate the impact of fish trade on the national food and nutritional security needs.	
		Promote PPP in value addition and diversification of fish products to meet the requirements of the various market segments in the domestic, regional and international markets.	
		Establish regional fish collection and inspection centres	

7. Monitoring and Evaluation Log Frame

Table 9. Monitoring and Evaluation log frame for the implementation of Lake Victoria Fisheries FMP III

Objective	Objective Verifiable Indicators	Verification Sources	Expected Outcomes
Rebuild Nile perch biomass of Lake Victoria from current levels of 1.2 million MT to the historical highest standing biomass of 1.4 million Raise Nile perch catches from ~250 MT in 2014 to ~ 300 MT in 2020	Species specific licensing of Nile Perch conducted by December 2018 Harmonized fishing craft registration and licensing registers developed by December 2018 Use of harmonized log books for all boats introduced by 2018 Domesticated Lake Victoria VMS and maritime security introduced by 2019 MCS conducted and quarterly reports availed to LVFO Inter agency collaboration strengthened for fisheries management by 2018 Fish breeding/nursery areas and marine parks/lacustrine areas demarcated, gazzetted and protected by 2019 Awareness created to key stakeholders in the lake region for sustainable resource protection by 2018 Incentives in form of rewards and sanctions initiated by 2018. Gear restriction of registered boats instituted by 2018 Installation of physical barriers or devices for protection of breeding and nursery grounds by 2018 Fishing gear importers and manufacturers registered by 2018	LVFO reports National reports	Restored fish stocks, increased income, increased fish catches, increased diversification of fish products
To increase the Lake Victoria annual fish exports earnings internationally and regionally beyond 2013 figure of the 300 million USD	Standards for fish handling and cold chain reviewed and enforced by 2018 Processing and Fish Movement Permits harmonized lake wide by 2018 Border controls strengthened for inspection services, data collection by 2018 Regulations and guidelines for fish processors of Nile perch and its products including artisanal processors developed by 2019 Regulations governing extraction, sales and trade of Fish maws developed by 2018 Nile perch products diversified through value addition by 2018	LVFO reports National reports National statistical bulletins	Increased export earnings Increased investment

Objective	Objective Verifiable Indicators	Verification Sources	Expected Outcomes
To raise the catch for tilapia from 60 MT to 90MT and value from US$ 106 to US$ 160	Specific species licensing achieved in Partner States by 2018 Harmonized fishing crafts registration and licensing registers developed by December 2018 MCS conducted and quarterly reports availed to LVFO Tilapia fish breeding nursery areas and marine parks demarcated, gazzetted and protected by 2019 Foot fishers licensed and registered by 2018	LVFO reports National reports National bulletin of statistics	Restored fish stocks, increased fish catches
To increase earnings, revenues, income for fisher folk communities and gainful employments by reducing post harvest losses	Standards for fish handling and cold chain reviewed and enforced by 2018 Processing and Fish Movement Permits harmonized lake wide by 2018 Inter agency collaboration strengthened for fisheries monitoring by 2018 Regulations and guidelines for fish processors of Nile tilapia and its products including artisanal processors developed by 2019 Processors regulate and processing methods and technologies harmonised in 2017	National socio-economic reports	Increased income, increased revenue, increased diversification of fish products
Sustain the standing stock biomass of Dagaa at levels of 1.28 million tonnes (2014) but increased catch from 509,600 MT to 900,000 MT	Species specific licensing conducted by 2018 Gear Mesh Size for Dagaa reviewed and harmonised by 2018 Fishing grounds for Dagaa to reduce conflicts with Nile perch fishers identified, mapped and zoned by 2019. Fishing communities trained on appropriate fishing technologies by 2018	LVFO reports National reports	Maintained Dagaa stock, increased catch

Objective	Objective Verifiable Indicators	Verification Sources	Expected Outcomes
Increase the percent of quantity for human consumption from 10% to 40% through reduced post-harvest loses	Dagaa processors licensing framework developed by 2018 At least 40% of Dagaa production going for human consumption by 2020 A campaign and awareness strategy on the value of Dagaa develop by 2019 Dagaa products diversified through value addition by 2019 An "a fish eat campaign" including training in cooking fish dishes conducted by 2018	LVFO reports National household survey reports	Increased consumption Reduced post, diversification of Dagaa products
Strengthen and establish enabling and harmonized policies, plans, legislations and guidelines	Harmonized regional guidelines for user-rights based management systems developed and approved by 2018 and piloted in all Partner States by 2019	Harmonized regional guidelines for user-rights based management systems; pilot reports	Policies, legislation, plans and technical guidelines at all levels developed, reviewed, and harmonized
	Regional guidelines developed and approved by the Partner States in 2018 published and rolled out beginning 2019	Approved regional guidelines	
	Principal fisheries laws of the Partner States amended to include User pay- principle/plough back by 2019	Partner States Fisheries Laws	
	Regional guidelines on protection of critical habitats developed and approved by 2018 and 15 critical habitats identified and protected in each Partner States by 2019	Partner States Fisheries Annual Reports	
	Concept on beach seining deterrent installations in critical Tilapia spawning habitats and Nile perch nurseries grounds developed and piloted in at least one critical habitat in each Partner State by 2018	Harmonized Concept. Piloted areas and reports	

Objective	Objective Verifiable Indicators	Verification Sources	Expected Outcomes
	Regional harmonized systems for managing fishing capacity in the Partner States developed and approved by 2018 and implemented beginning 2019.	National Partner States Fisheries Annual Reports	
	Management measures in the FMP III harmonized across Partner States by 2018 and enacted in regulations by 2019	Partner State regulations	
	NPOA IUU/ Capacity developed and approved in each Partner States in line with RPOA IUU/Capacity by 2019	Partner State regulations	
	Concept on systems for centralized regional sharing of information on MCS developed and approved by 2018 and implemented beginning 2019	National Partner States Fisheries Annual Reports	
	Regional guidelines on sport fishing and eco-tourism developed and approved by 2018 and implemented in the Partner States by 2019	Harmonized regional guidelines for sport fishing and eco-tourism	
	Regional guidelines for cage culture developed to include restricting use of sex-reversed tilapia in cages and prevent escape from cages to the wild to avoid genetic modification/contamination by 2017	Harmonized guidelines on cage culture	
Enhance Good Governance, effective processes and Institutional framework	Regional guidelines on establishment and operational of riparian districts/counties developed and approved by 2017 and caucus established in each Partner State by 2018	National Partner States Fisheries Annual Reports	Fisheries institutions sustainably financed and operating effectively and efficiently
	Network platform/system developed and operationalized between the LVFO Secretariat and Partner States by 2018	ICT systems at LVFO Secretariat	
	Harmonized regional guidelines on operations and framework for enactment and administration for fish levy trust fund developed and approved by 2017 and enacted in Partner States by 2018	National Partner States Fisheries Laws	

Objective	Objective Verifiable Indicators	Verification Sources	Expected Outcomes
	LVFO decision monitoring system Developed in line with the EAC system by 2017 and approved and implemented in Partner States by 2018	National Partner States Fisheries Annual Reports	
	Regional Fisheries performance audit tool and reward scheme developed by 2018 and implemented beginning 2019	National Audit reports; National Fisheries Annual Reports	
Strengthen Human and institutional capacities at all levels	Regional training manuals for identified gaps developed by 2018 and minimum threshold for fisheries and aquaculture curriculum developed by 2019	Training manuals and curriculum for fisheries and aqua-culture human resource capacity develop-ment	Attitudes, skills and knowledge of fisheries stakeholders improved at all levels.
	Technical staff (PhD 9, MSc. 20, Prosecutors 20, Public Health 20) and 2,000 fishers trained in entrepreneurship, artisanal processing, 15 staff and 100 aquaculture farmers trained in appropriate cage culture practices, 100 farmers trained in seed and feed production by 2020.	National training reports	
	Platform for networking and associations of technical and non-technical fisheries and aquaculture operators established in each Partner States by 2018	Regional, National and Decentraliz ed Fisheries Annual Reports	
	Incubation fisheries centers of excellence established and supported by 2019 and number of businesses at each centre	National Partner States Fisheries Annual Reports	

Objective	Objective Verifiable Indicators	Verification Sources	Expected Outcomes
	Quarterly awareness creation events undertaken at regional, national and Decentralized levels beginning 2018	Regional, National and Decentralized Fisheries Annual Reports	
	Annual calendar of activities with regional bearing developed beginning 2017	Regional, National and Decentralized Fisheries Annual Reports	
	LVFO communication strategies finalized and approved by 2016 and implemented by 2017	ICT materials at Regional, and National levels	
	Human and institutional need assessment at regional, national and decentralized levels undertaken by 2018 and strategies to address the identified gaps developed and implemented by 2019	Regional, National and decentralized levels Fisheries Annual Reports: Need assessment report	
	Regional guidelines and performance monitoring tools developed and approved by 2018 and implemented beginning 2019	Regional, National and Decentralized Fisheries Annual Reports	

Objective	Objective Verifiable Indicators	Verification Sources	Expected Outcomes
	Regional guidelines for fisheries sector led multi-sectoral mechanisms for handling and addressing cross cutting issues with significant bearing in fisheries and aquaculture sector developed and approved by 2018 and operationalized at national, devolved/Decentralized levels beginning 2019	Report on Regional guidelines on multi-sectoral mechanisms; inter-agencies reports	
Coordination of the roll out and implementation of the management plan	Management plan submitted to the council of Ministers for approval by end of 2015	Council Communique	Coordinated and timely implementation of the FMP III
	Launch and sensitization at the Regional, National and decentralized levels by end of 2016	Launch and Sensitization Reports	
	Annual work plan for implementation of the Management plan developed and circulated by end of 2016	National Annual work plan	
	Progress reports from devolved/decentralized, National and regional level as guided by LVFO decision monitoring system submitted annually end of 2017	Council Communique	
Enhance Aquaculture production on the lake and the catchment	At least 3 Partnership (PPP) investment in commercial aquaculture promoted by end of 2018	Investments in place	Increased farmed fish production Increased ICT usage.
	Aquaculture value chain analysis undertaken in Partner States by end of 2017, business plans developed and promoted to financial institutions by end of 2018 and at least 5 aquaculture investment forums in the Lake Victoria basin held by 2020.	Analysis report, business plans	
	At least 4 improved and appropriate technologies in farmed fish handling, processing, preservation, storage and transportation promoted by end of 2019	National Annual Reports, number of fish farms using the technologies	
	Policies that will facilitate the primary fisheries and aqua producers developed and adopted in Partner States by end of 2018 and at least 3 assets acquired by farmers/groups by 2020	Policy document, national laws,	

Objective	Objective Verifiable Indicators	Verification Sources	Expected Outcomes
	At least 10 training sessions on capacity building in financial management, entrepreneurship and use of electronic transactions undertaken in all Partner States by 2019	National Annual Reports, e-banking services in BMU records, Training manuals and reports, financial and mobile institutions involved, FS records	
Improve living conditions and livelihoods of fishing communities	A multi-sectoral framework established by end of 2018 and at least 15 pilot CDDs up scaled by 2020	Multi-sectoral framework report and livelihood interventions in fishing communities	Improved living conditions in fishing communities and Improved framework for livelihood development and promotion
	At least 3 incubation centres established by 2020	Operational incubation centres in place	
	Sport fishing and ecotourism in at least 3 sport fishing/ecotourism clubs in the Lake Victoria basin promoted by 2019	Sport fishing/ecotourism clubs in place	
Enhance Fisheries resource monitoring and research to fis stocks, environment, socio-economic conditions and trade	Regional protocol on research agenda setting developed by end of 2017 and data and information sharing developed by end of 2018	Protocols on research agenda setting and data and information sharing	Data and information collected analyzed packaged, disseminated and used at all levels for fisheries management and development
	New resource monitoring SOPs developed and old ones reviewed by end of 2017 and reliable data collected in accordance with agreed protocols by beginning of 2018	SOPs and survey/ study reports	

Objective	Objective Verifiable Indicators	Verification Sources	Expected Outcomes
	At least 3 new technologies and innovations developed, published and disseminated by 2019	Technologies and innovations developed and in use	
	An environmental monitoring plan harmonised and implemented by 2018	Environmental monitoring plan and national monitoring reports	
	Economic valuation of the Fisheries Resource in the Lake Victoria basin done by end of 2018	Economic valuation report	
Enhance capacity for compliance to fisheries laws and regulations	A regional fisheries enforcement communication strategy developed by end of 2017	National Annual Reports	Increased incomes and revenue
	A VMS for Lake Victoria developed and implemented by 2018	Lake Victoria VMS	
	Regional, national and devolved/decentralized inter agency enforcement units supported by 2018	Regional, national and devolved/decentralized inter agency enforcement reports	
Improve fish productivity, value addition and trade	Regional self-assessment guide developed and operationalised by end of 2018	Self-assessment guide	Increased incomes and revenue
	Niche markets identified and at least 3 new products promoted by end of 2019.	Markets niches and 3 new products promoted	
	Market information systems/linkages established by 2018, promoted and supported by 2019	National Annual Reports	
	PPP in value addition and diversification of fish products to meet the requirements of the various market segments in the domestic, regional and international markets promoted by end 2019	National Annual Reports	

Objective	Objective Verifiable Indicators	Verification Sources	Expected Outcomes
	A study on impact of fish trade on the national food and nutritional security done by end of 2018	Fish trade impact report	
	Regional frameworks on fisheries stakeholder participation in trade negotiations developed by end of 2019	Regional frameworks participation	
	Capacity of fisheries and aquaculture traders enhanced for improved fish productivity, value addition, trade and traceability by 2019	National Annual Reports	

7. References

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