EAST AFRICAN COMMUNITY

LAKE VICTORIA FISHERIES ORGANIZATION SECRETARIAT

FISHERIES MANAGEMENT PLAN IV (FMP IV)

Increasing and Sustaining Production and Value of the Fisheries of Lake Victoria Basin and Aquaculture Resources to Contribute to Blue Economy Growth in the EAC

2021-2026

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ACKNOWLEDGEMENTS

Fisheries Management Plan IV (FMPIV) was prepared to fulfil obligations in Article 114 of the EAC Treaty and Article 2 of the LVFO Convention to harmonize policies for joint economic development among the EAC Partner States. Its preparation was guided by the EAC Principle of Subsidiarity, where issues to be addressed jointly within the EAC system originate from the national level, are agreed upon and harmonized at a regional level, and adopted and implemented at a national level. Consultations were carried out at the national level in Partners States to examine the trends in fisheries and aquaculture and supportive services and identify the issues that needed to be addressed during FMPIV. The draft plan that was generated from the national consultations was discussed at national workshops in each of the Contracting Parties of the LVFO and reviewed by a technical team of experts from the Partner States. It was then presented and received inputs from a regional validation workshop and approval by the LVFO Sectoral Council Ministers for implementation. The stakeholders who provided inputs during the national consultations, national workshops, the technical committee and the validation workshops are greatly appreciated for their inputs.

The cover page illustrates tilapia harvest at a cage fish farm on Lake Victoria (top left); Processed Nile perch maws (top right); Heeps of Dagaa at a fish landing (bottom left), and; Dagaa catch with bycatch of the Freshwater prawn (*Caridina nilotica*) and Haplochromines (bottom right).

ACRONYMS AND ABBREVIATIONS

ABDP	Aquaculture Business Development Program
AU	African Union
AWG	Aquaculture Working Group
BMP	Best Management Practices
BMU	Beach Management Unit
CAS	Catch Assessment Survey (fisheries)
CBO	Community-Based Organization
CCRF	Code of Conduct for Responsible Fisheries
DRC	Democratic Republic of the Congo
D4D	Digital for Development
EAC	East African Community
EAF	Ecosystem Approach to Fisheries
EAFO	East African Fisheries Organization
EAFFRO	East African Freshwater Fisheries Research organization
ECOFISH	Ecosystems Improved for Sustainable Fisheries
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FETA	Fisheries Education Training Authority
FMP	Fisheries Management Plan
FS	Frame Survey
FPEA	Fisheries Processors and Exporters Association
FRI	Fisheries Research Institute
FTI	Fisheries Training Institute
GDP	Gross Domestic Product
GTZ	Deutsche Gesellschaft fur Technische Zusammenarbeit GmbH
HIV/AIDs	Human Immunodeficiency Virus / Acquired Immunodeficiency Virus
ICO	Information, Communication & Outreach
ICT	Information Communication Technology
IDRC	International Development Research Centre
IFAD	International Fund for Agricultural Development
IFMP	Implementation of a Fisheries Management Plan
IUU	Illegal, Unreported and Unregulated
KeFS	Kenya Fisheries Service
KMFRI	Kenya Marine Fisheries Research Institute
LVBC	Lake Victoria Basin Commission
LBDA	Lake Basin Development Authority
LVEMP	Lake Victoria Environmental Management Project
LVFO	Lake Victoria Fisheries organization
LVFRP	Lake Victoria Fisheries Research Project
MAAIF	Ministry of Agriculture Animal Industry and Fisheries

MCS	Monitoring, Control and Surveillance
M&E	Monitoring and Evaluation
MSY	Maximum Sustainable Yield
NaFIRRI	National Fisheries Resources Research Institute
NEMA	National Environmental Management Authority
NGO	Non-Government Organizations
NWG	National Working Group
RWG	Regional Working Group
PESCA	Promoting Environmentally Sustainable Commercial Aquaculture
PFRS	Policy Framework and Reform Strategy
PPP	Public Private Partnership
NPFMP	Nile Perch Fisheries Management Plan
RPOA	Regional Plan of Action
RWG	Regional Working Group
SPS	Sanitary and Phyto-sanitary Measures
SDG	Sustainable Development Goals
SLM	Sustainable Land Management
SOP	Standard Operating Procedure
SSF	Small Scale Fisheries
SWOT	Strengths Weaknesses Opportunities Threats
TAFIRI	Tanzanian Fisheries Research Institute
TRUEFISH	True Fish Farming Story in Lake Victoria Basin
UN	United Nations
WG	Working Group

EXECUTIVE SUMMARY

The East African Community (EAC) with a population of about 200 million which is growing at a fast rate of about 3% per annum needs to increase food production and create jobs for the population. Fish is one of the most nutritious food sources with high-quality proteins, vitamins, minerals and omega 3 fatty acids that contribute to reduction of malnutrition and poverty eradication. The EAC needs about ~4.2 million tons of fish annually to meet the global per capita consumption of 21 kg. However, it only produces 1.7 million tons leaving a deficit of ~2.5 million tons for local consumption alone without considering exports. The EAC has very high potential for increased fish production with large expanses of water comprising the six African Great Lakes, numerous minor lakes, rivers, wetlands, and part of the Indian Ocean. Lake Victoria, the largest of the African Great Lakes, produces about 1 million tons of fish annually and aquaculture has increased rapidly since 2006 to contribute about 150, 000 tons annually.

This Fisheries Management Plan IV (FMP IV) for the period 2021-2026 was prepared to guide the Partner States in contributing to increases in fish production to contribute to food security, nutrition and wealth creation in the EAC. This will be achieved through: Regulating impacts of environment on fisheries and aquaculture (catchment management and lake productivity processes); Regulating fishing effort, capacity, and eliminating Illegal Unreported and Unregulated (IUU) fishing; Sustaining production of individual commercially important fish species (Nile perch, Tilapia, Dagaa, and Haplochromines, among others) and enhancing aquaculture production; Improving fish quality and value; Improving information generation and dissemination; Improving development, harmonization, and application of policies; Building capacity (Infrastructure, Institution mechanisms, Human resources, Funding); Addressing cross-cutting and emerging issues, and; Improving coordination, monitoring, and evaluating.

The impact of catchment activities will be addressed by: Improving knowledge and promoting interventions on the influence of basin activities on aquatic habitat health, productivity, fisheries and aquaculture in collaboration with lead agencies especially the Lake Victoria Basin Commission (LVBC) and the National Environmental Management Agencies in the Partner States. The influence of lake productivity processes on the fish habitat health and productivity will be addressed by: Investigating and documenting the impacts of climate variability and change and proposing adaptation and mitigation measures; Developing an ecosystem model on the relationship between environmental factors and fisheries production; Providing information on pollutants and contaminants and their influence on the food-web, and; Providing information on invasive weeds and their impacts to guide their control.

Fishing effort and capacity will be regulated, and IUU fishing eliminated by: Determining the sustainable number of boats and gears per boat allowable on Lake Victoria; Implementing species-specific licensing; Reviewing the legal framework and strengthening regional frameworks for combating IUU fishing; Enforcing illegalities through MCS, and; Providing information on livelihood options along the value chain.

Increasing and sustaining capture fisheries production will be achieved through monitoring and management of stocks of individual commercial fish species (Nile perch, Dagaa, Tilapia, Haplochromines, and the Freshwater prawn *Caridina nilotica*), and developing aquaculture.

The stocks of Nile perch and exports value will be sustained through: Ensuring that the catch does not drop below 250,000 tons annually; Regulating export of maws especially its impact on large reproductive stages of Nile perch; Issuing species-specific licenses to Nile perch fishers; Reviewing and enforcing the Nile perch slot size; Regulating harvesting of Nile perch prey (Haplochromines and the Freshwater prawn *Caridina nilotica*), and; Determining how environmental factors affect Nile perch stocks through the proposed ecosystem model.

Nile tilapia fishery will be sustained through a precautionary approach to contribute to nutrition and income of local communities through efforts to: Sustain catches above 51,000 tons annually; Enforcing minimum gillnet mesh size and prohibited gears; Ensuring that only Nile tilapia >25 cm are harvested, and; Protecting nearshore breeding and nursery areas (marginal wetlands and sandy shores) of the species.

The quantity, quality and value of Dagaa will be increased to improve nutrition, employment and income, and promote local and regional markets by: Increasing harvest by about 10% annually; Developing appropriate harvesting technologies; Determining the suitable types and sizes of gear; Developing technologies to minimise bycatch; Improving knowledge on infrastructure requirements along the value chain; Improving, handling, processing and marketing; Providing information on nutritional value; Developing high-value products; Providing market information; Implementing species-specific licensing; Developing a policy to guide the development of the species; Increasing awareness on the value of the species, and; Preparing a comprehensive plan for development and management of the species.

Haplochromines and other species will be managed by providing information on the status of recovery and utilization of haplochromines and other resurging species, and preparing a policy on the best options for utilization of Dagaa, haplochromines, *Caridina nilotica* and other recovering species.

A vibrant and robust aquaculture industry will be developed in the EAC to increase aquaculture production through: Improving collection, analysis and dissemination of aquaculture statistics; Establishing aquaculture production zones; Facilitating formation of strong farmers' organizations; Promoting commercial aquaculture; Providing support to review training curriculum and upgrading facilities in training institutions to provide specialized skills; Improving availability of quality brood stock and seed; Improving the availability of affordable quality feed; Strengthening aquaculture extension services; Strengthening biosecurity and biosafety measures; Improving post-harvest handling, value addition and expanding markets for aquaculture products; Strengthening policy, legal and institutional frameworks; Strengthening research and innovations in aquaculture, and; Preparing a comprehensive aquaculture development plan. Value addition, market access and trade in fish of fish and fishery products and socio-economics and livelihoods will be enhanced through: Development of protocols for fish handling, processing, and marketing for each of the key commercial species; Improving enforcement of existing fish quality assurance regulations and protocols, and; Promoting development of appropriate infrastructure for the quality and safety of fishery products.

Research and resource monitoring will be broadened to adequately cover all critical fisheries production areas including: The status of fish stocks; Aquaculture production systems; Postharvest fisheries along the value chain; Lake productivity processes; Pollutants and contaminants, and; Fisheries socio-economics.

Availability and accessibility of fisheries and aquaculture information and data will be improved and ICT promoted through: Operationalising the policy on data and information sharing; Reviewing and operationalizing the ICO strategy and action plan; Establishing a one-stop center of fisheries and aquaculture data in the EAC; Making information under different production areas available to users; Making all public information of LVFO available on LVFO website; Domestication ICT in the LVFO; Increasing awareness and skills, and; Organizing an international conference on the state of Lake Victoria Fisheries and aquaculture to take stock and share available knowledge.

Existing policies will be reviewed, enhanced, and where necessary improved, and new ones developed in areas where they are inadequate or lacking through: Evaluating the extent of adoptions and application of agreed policies; Developing policies in areas of the plan where policies are inadequate or lacking such as on Dagaa, aquaculture, and post-harvest fisheries, and; Providing for monitoring and evaluation of the implementation of agreed instruments.

Compliance with existing laws and regulations will be improved through: Eliminating IUU fishing; Improving mobilization of finances and personnel for law enforcement; Undertaking disciplinary measures on errand and corrupt officials; Enhancing essential law enforcement facilities; Improving the capacity of law enforcement agents; Strengthening co-management institutions, and; Enhancing community participation in law enforcement.

Infrastructure gaps along the value chain will be identified and improved by: Providing information on infrastructure requirements and making recommendations for their improvement.

Institutions mechanisms for development and management of fisheries and aquaculture at national and regional levels will be improved by: Undertaking a functional analysis, improving and harmonising human resources capacity at the LVFO Secretariat and in the Partner States; Realigning Working Groups (WGs) and ensuring that they are available at national and regional level to implement different components of the plan and having Standard Operating Procedures (SOPs) to guide their operations; Reviewing the status of Community based organizations and identifying the requirement for their effective participation; Promoting the involvement of fisheries associations, and; Mobilizing appropriate development partners to support implementation of the plan.

The skills of public, private sector players in fisheries and aquaculture will be enhanced by: Improving human resources capacity in required skills; Supporting the improvement of training curriculum and improvement of training materials/modules at FTIs, and; Developing technical skills in specific areas of fisheries and aquaculture.

Funding mechanisms will be improved by: Documenting the value of fisheries and aquaculture in the economy of Partner States; Developing modalities to improve funding from national government by including aspects of the plan in national budgets; Developing capacity in resource mobilization through project preparation, and; Exploring opportunities by development partners to fund specific aspects of the plan.

The impacts of emerging and cross-cutting issues will be determined and adaptation, mitigation measures developed by: Promoting gender balance in all areas of the plan; Reviewing and revitalizing the HIV/AIDs strategy and action plan of the LVFO in collaboration with lead agencies; Reviewing the impact of Covid-19 on fisheries and suggesting mitigation measures, and; Preparing fishers for calamities through the development of alternative livelihood options.

Coordination, monitoring and evaluation of implementation of the plan will be improved by: Identifying and networking actors nationally, regionally and internationally, and; Establishing a system at national and regional levels to monitor and document the progress of the plan. Implementation of the plan will be evaluated annually by the Partner States and by LVFO Secretariat on the basis of the indicators provided in the implementation matrices.

The total investment to address the different planned interventions of FMPIV over the next five-year period (2021-2026) is estimated at US$ 61 million. The interventions are expected to increase fisheries production in the EAC by at least 500,000 tons over the five-year period.

1.0 BACKGROUND

1.1 Contribution of fisheries to economic growth in the EAC

The current population of the East African Community (EAC) of about 200 million is growing at a fast rate of about 3% per annum. Therefore, the EAC needs to increase food production to feed and create jobs for an extra 3% more people every year. Fish is one of the most nutritious foods with high-quality proteins, vitamins, minerals and omega-3 fatty acids essential for healthy living and contribute to employment and poverty eradication. The EAC needs about ~4.2 million tons of fish to feed the current population annually to meet the global per capita consumption of 21 kg. It, however, produces ~1.7 million tons of fish (1.5 from capture fisheries, and 0.2 from aquaculture) leaving a deficit of ~2.5 million tons for local consumption alone without considering export. The EAC, therefore, needs to increase fish production to avoid depending on fish imports. The EAC has high potential for fish production with large expanses of water comprising of the six African Great Lakes, numerous minor lakes, rivers, wetlands, and part of the Indian Ocean (**Figure 1**).

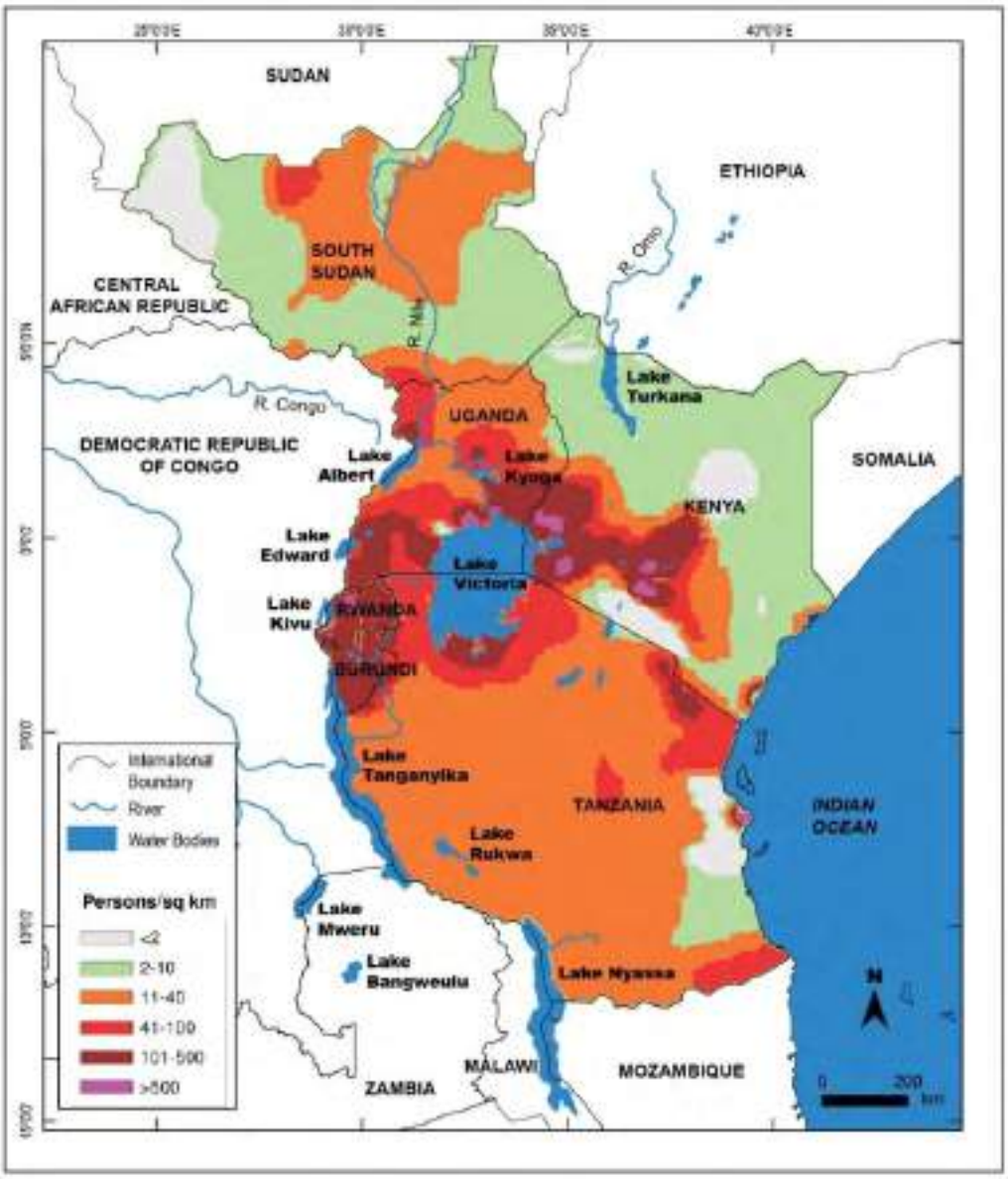

Figure 1: Map of East African Community Partner States (shaded) showing the major water bodies with an indication of the population density.

Both capture fisheries from Lake Victoria and aquaculture have the potential to contribute to the required increase in fish production in the EAC. About 1 million tons of fish are harvested annually from Lake Victoria, generating >840 million US$ at the beach and >300 million US$ in exports. This fishery directly employs about 200,000 people through fishing and 700,000 people along the value chain and supports livelihoods of 3-4 million people. Fisheries production from Lake Victoria increased from 98,250 tons in 1980 to 918,000 tons in 2016 (**Figure 2**) and started to decline suggesting that it might not sustain production if not well managed. Aquaculture production increased from 2,862 tons in 2000 to a peak of 150,363 tons by 2019 which showed that there is capacity to increase fish production through aquaculture.

Lake Victoria is the largest inland tropical fishery both in terms of surface area and fisheries production not only in the EAC countries but globally. The main lake is shared between three countries: Kenya, Tanzania, Uganda; and its catchment of 194, 000 km² extends to Burundi (7%) and Rwanda (11%). The lake has at least 10 major in-flowing rivers (Kagera, Sio, Nzoia, Yala, Nyando, Sondu Miriu, Migori, Mara, and Katonga) and one outflow (the Nile) at Jinja, Uganda. It also has many satellite lakes in its basins that are important sources of fish and in biodiversity conservation.

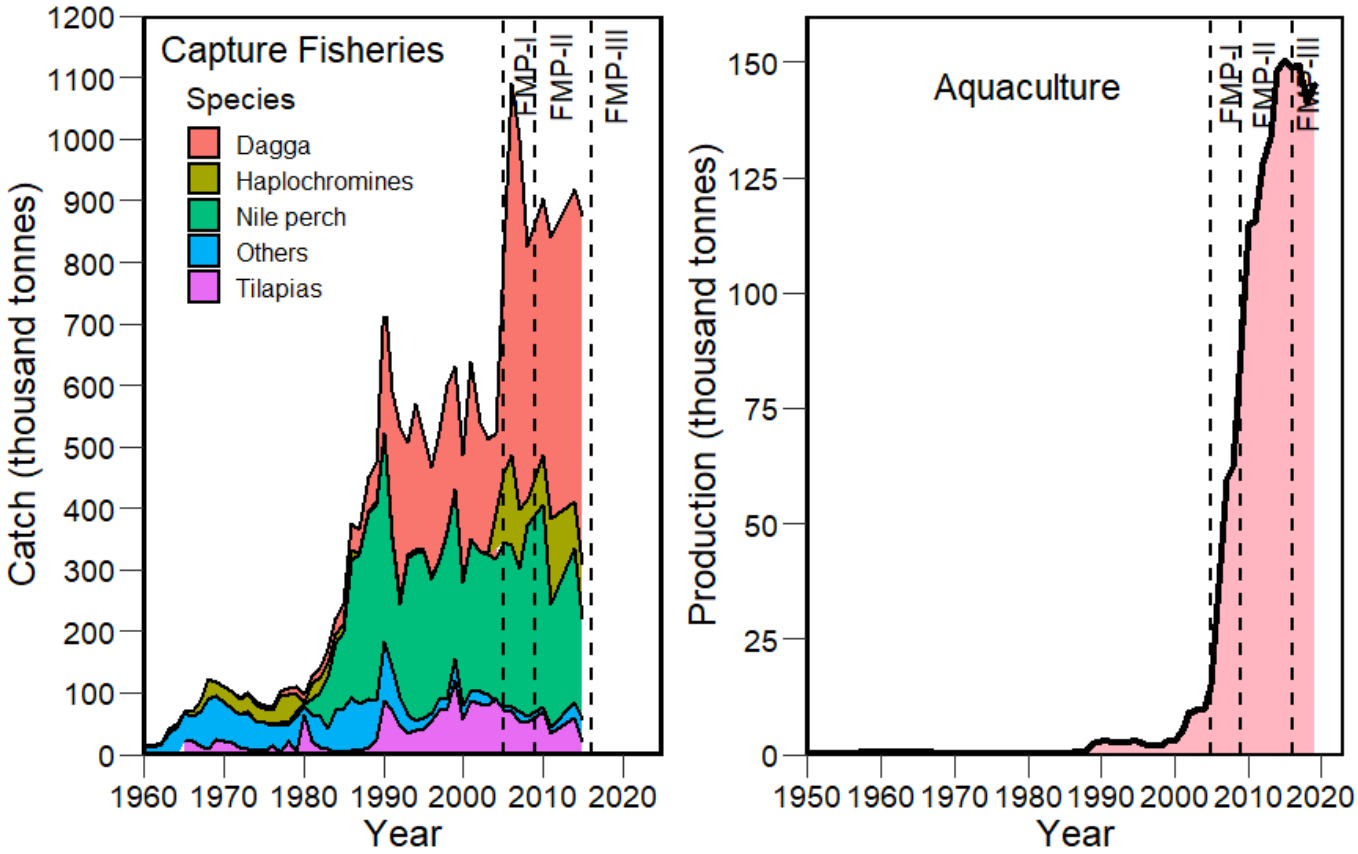

Figure 2. Changes in fish catches from Lake Victoria and annual aquaculture production from the EAC (Annual catches in Lake Victoria based on LVFO statistics and aquaculture production from FAO statistical bulletins)

There are at least seven large towns/cities (Entebbe, Kampala, Jinja, Kisumu, Musoma, Mwanza, Bukoba) along the shores of Lake Victoria, and at least eight major towns/cities in its basin (Masaka, Mbarara, Busia, Eldoret, Kakamega, Kisii, Geita, Biharamuro). The lake basin has the highest population density in the EAC which in some places exceeds 500 persons per km2 making the basin one of the most densely populated areas not only in Africa but globally. This high human population is a result of a high growth rate of up to 3% per annum. Whereas the Lake Victoria Basin has been designated an economic growth zone to be developed jointly by the EAC Partner States, it faces many socio-economic challenges. For example,

about 80% of the people in the basins are youths, mostly unemployed and landless and depend on natural resources, including fish, for their livelihood. The lake is, therefore, not only economically important but is also exposed to anthropogenic threats from the catchment area. The basin has other vulnerable groups especially women who have limited access to natural resources and need special attention in development programs to improve their livelihoods. Nearly 50% of the people in the basin are poor, with many of them having limited access to social services such as sanitation and clean water. There are also high incidences of water-related diseases such as malaria, bilharzia, diarrhoea, and other diseases including HIV/AIDs, all compounded by the Covid-19 pandemic and other calamities such as floods.

1.2 A historical perspective to the management of Lake Victoria fisheries

Due to its shared nature, the fisheries of Lake Victoria have historically been managed through regional cooperation. This role is currently coordinated by the Lake Victoria Fisheries Organization (LVFO), a specialized institution of the EAC mandated to coordinate conservation, development and management of fisheries and aquaculture resources in the EAC. The Partner States of the EAC have committed themselves in *Article 114* of The Treaty to adopt common policies and regulations for conservation, management and development of fisheries resources and to the establishment of common fisheries management guidelines. In fulfilment of this requirement, the Contracting Parties of the LVFO in *Article 2* of the Convention for Establishment of the LVFO have been harmonizing national measures for sustainable utilization of the fisheries and aquaculture resources of the EAC water bodies. Consequently, the LVFO has prepared policies, strategies, plans, guidelines and protocols to guide Contracting Parties in harmonizing their national plans and other instruments to promote common actions for conservation, development and management of fisheries resources. The preparation and implementation of these instruments is guided by the Principle of Subsidiarity of the Treaty, where the development of the instruments is initiated at the national level, harmonized and adopted at regional level, adopted and implemented at the national level.

The LVFO has prepared three fisheries management plans (FMPs). The first fisheries management plan (FMPI) was implemented from 2005 to 2008, followed by FMPII (2009-2014), and FMP III (2016-2020). This FMPIV is a follow up to the previous plans to guide the Partner States in developing harmonized national fisheries management plans for the period 2021 to 2025.

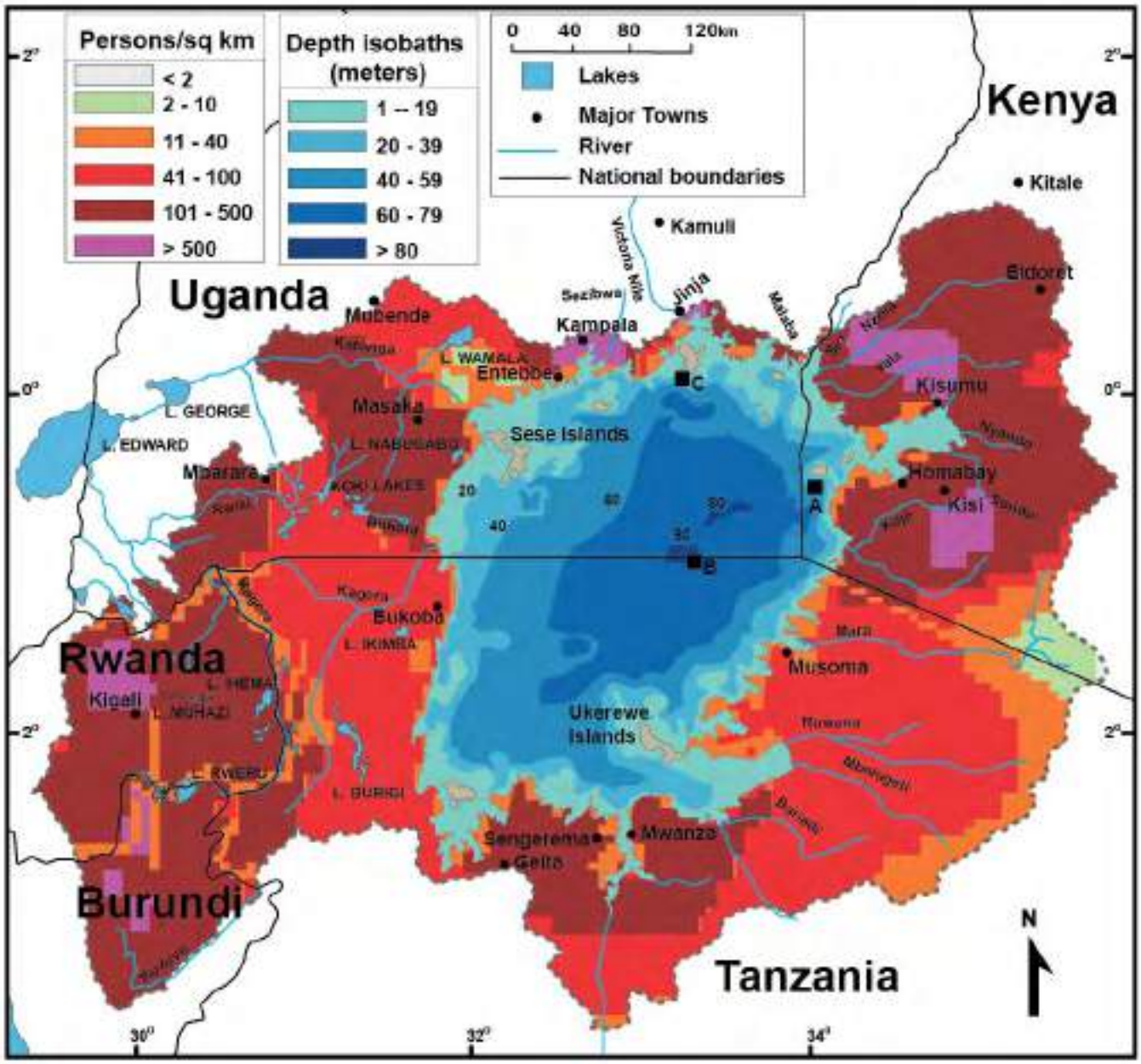

Figure 3. Map of Lake Victoria and its basin including the major rivers, urban centres, an indication of the population density, and depth of the lake

1.3 Main sources of information for preparation of the plan

The FMPIV was developed through a review of literature that guide fisheries development and managementat global, continental, regional and national levels; analysis of available fisheries, environmental and socio-economic information and data, and; stakeholder consultations. The literature included: The UN Agenda (2030); Code of Conduct for responsible fisheries; FAO Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication; The concept of an ecosystem approach to fisheries (EAF) management; AU Agenda (2063); Africa Blue Economy Strategy (2019); Policy Framework and Reform Strategy for Fisheries and Aquaculture in Africa 2014 and the associated Annex on fisheries and aquaculture; The EAC Treaty; EAC Vision 2050; The 6th EAC Development Strategy; The Fisheries and Aquaculture Policy for EAC; The EAC regional strategy and implementation plan for sustainable aquaculture; The LVFO Convention; LVFO Strategic Plans, and;

FMPs (I, II, and III); Other technical documents of the LVFO and the Partner States (Nile perch Fisheries Management Plans I and II; RPOA Capacity and RAO IUU; Fisheries and aquaculture national policies, strategies, and plans for development and management of fisheries and aquaculture. Additional information was obtained from previous and ongoing regional and national fisheries and aquaculture projects such as the ECOFISH, TRUEFISH, LVFO/GIZ and Small Fish Food, the NutriFish project supported by IDRC, and the EU supported project on commercialization of aquaculture in Uganda, and relevant publications that addresse aspects of the components of the plan especially on Lake Victoria fisheries and aquaculture.

Stakeholder's consultations included staff of the LVFO Secretariat and the Partner States. Field visits were made to Uganda, Kenya, and Tanzania, and online consultations were held with Burundi. The institutions consulted in Uganda included: National Fisheries Resources Research Institute (NaFIRRI), The European Delegation, Aquaculture Research and Development Centre, Fisheries Training Institute, and the Directorate of Fisheries Resources. The institutions in Kenya included: Lake Victoria Basin Commission (LVBC); Kenya Fisheries Service (KeFS); Lake Basin Development Authority (LBDA); Kenya Marine and Fisheries Research Institute (KMFRI); The Aquaculture Station in Sangoro; Aquaculture Business Development Program (ABDP) supported by IFAD, and; a cage aquaculture association. The institutions in Tanzania included: Tanzania Fisheries Research Institute (TAFIRI); Zonal and regional fisheries offices in Mwanza; Fisheries Education Training Authority (FETA) Nyegezi; National Fish Quality Control Laboratory; Kirumba Fish Market, and; Gombe Fish Landing site.

The report generated following the literature review and the consultations was presented to national consultative workshops in Kenya, Tanzania, and Uganda, and additional input was provided. The reports from the national workshops were subjected to a Technical Committee of fisheries and aquaculture experts from he Partner States. A draft Plan was presented to a regional validation workshop, revised and reviewed by the LVFO Secretariat, finalized and submitted. It was subsequently presented to the Fisheries and Aquaculture Sectoral Counsil of the EAC for approval.

1.4 Determination of strategic interventions for FMPIV

The strategic interventions in the plan were derived from: The Sixth EAC Development Strategy (2021-2026); Fisheries and aquaculture policy of the EAC of 2018; Draft LVFO Strategic Plan 2021-2026, and; The functions of the LVFO. According to these document The Partner States needed to do the following to increase fisheries production in Lake Victoria and aquaculture in the EAC:

i. Strengthen fisheries management and utilization;
ii. Enhance aquaculture development;
iii. Improve fish quality, trade, value addition and marketing;
iv. Improve fisheries and aquaculture resource monitoring and research;
v. Strengthen generation and dissemination of scientific information;
vi. Improve governance, legislative processes and institutional framework;
vii. Harmonize fisheries policies, plans, legislation, standards, and guidelines;
viii. Improve fisheries law enforcement and control IUU fishing;
ix. Improve fisheries and aquaculture infrastructure;
x. Build human resources capacity;
xi. Improve financing, and;
xii. Address cross-cutting and emerging issues that affect fisheries and the benefits derived from them.

1.5 The conceptual framework

A conceptual framework covering the key strategic interventions was developed as illustrated in Figure 4. According to this framework, an increase in fish production and value would be achieved through the management of human impacts to sustain and increase capture fisheries and increase aquaculture

production through management of the environment, fishing pressure, and improvimg supportive services along the value chain.

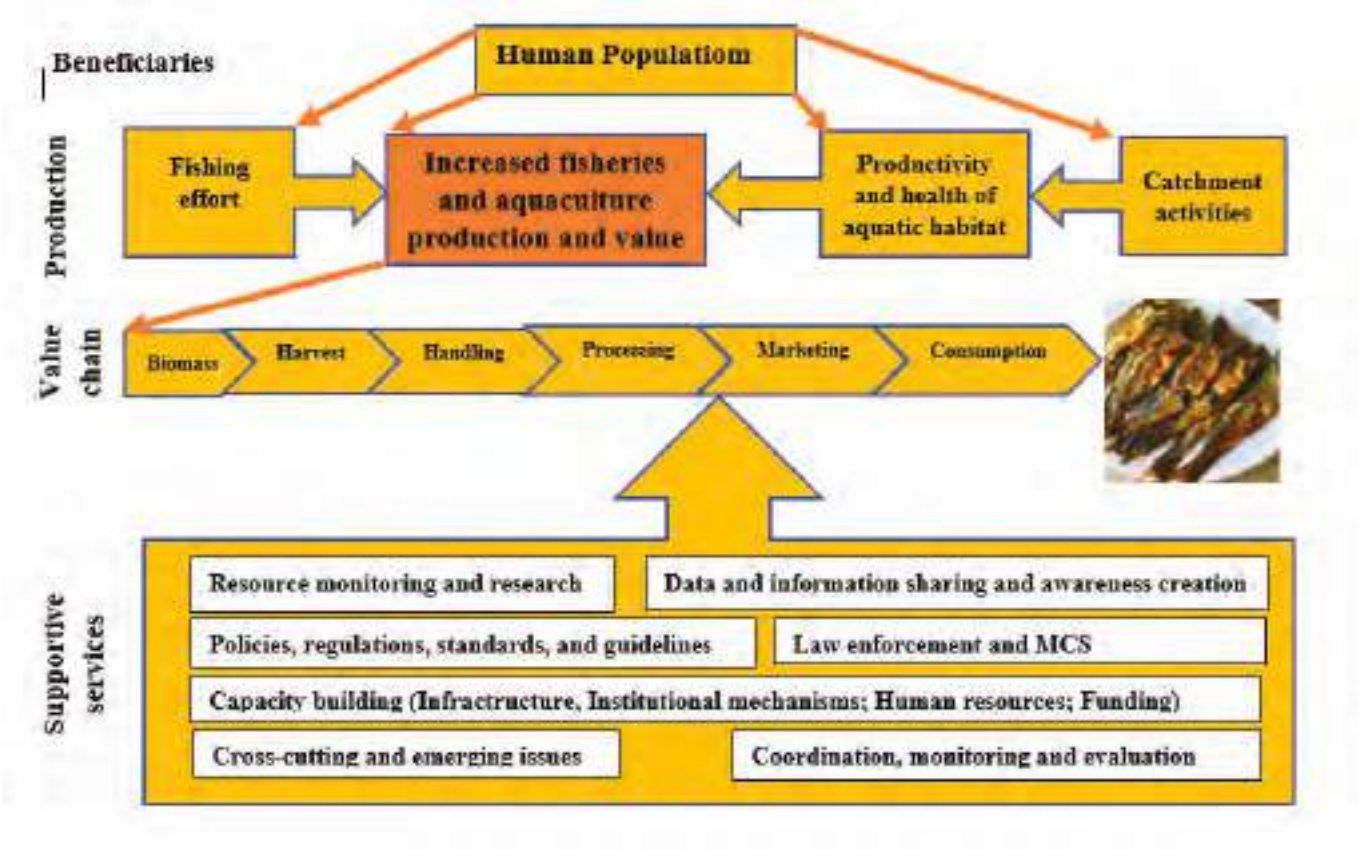

Figure 4: An illustration of the conceptual framework of FMPIV

The strategic interventions each one with one or more components (Table 1) were identified based on strategic areas in EAC guiding documents and the conceptual framework.

Table 1: The strategic interventions of FMPIV

Strategic interventions	Components
1. Regulating impacts of environment on fisheries and aquaculture	
1.1 Provide information on the influence of basin factors on aquatic habitat health, productivity and fisheries	1. 1. Catchment management
1.2. Provide information on the relationship between physical, chemical, biological and environmental factors and fisheries and aquaculture production	1.2. Lake productivity and health
2. Regulation fishing effort, capacity, and IUU fishing	
2.1 Regulate fishing effort and capacity, and eliminate IUU fishing	2.1 Fishing pressure and IUU fishing
3. Improving fisheries and aquaculture production	
3.1 Sustain and increase Nile perch production and exports value	3.1. Nile perch
3.2 Manage the Nile tilapia fishery to sustain nutrition and income of local communities	3.2. Nile tilapia

3.3 Increase the quantity, quality and value of Dagaa to improve nutrition, food security, and income	3.3. Dagaa
3.4.Provide information on recovery and utilization of haplochromines and other species	3.4.Haplochromine and emerging species
3.5.Develop vibrant and robust aquaculture to increase fish production in the EAC	3.5.Aquaculture
4.Improving fish quality, value, and marketing.	
4.1.Enhance value addition, market access and trade of fish and fishery products;	4.1.Fish handling, processing, marketing, consumption
5.Improving information generation and dissemination	
5.1.Broaden research and resource monitoring to cover critical fisheries production areas	5.1.Resource monitoring and research
5.2.Improve availability and accessibility of fisheries and aquaculture information and data, and domesticate ICT	5.2.Data and knowledge management
6.Improve development, harmonization and application of policies, regulations, standards and guideline	
6.1.Improve and enhance application of existing policies and develop additional ones where lacking	6.1. Policies, regulations, standards and guidelines;
6.2.Improve compliance to existing laws and regulations, and eliminate IUU fishing	6.2.Law enforcement and MCS
7.Capacity building	
7.1.Identify infrastructure gaps and make appropriate improvements	7.1.Infrastructure
7.2.Strengthen implementation mechanisms of institutions	7.2.Institutional mechanisms
7.3.Support improvement of fisheries training institutions to enhance the skills of public, private sector players in the fisheries sector	7.3.Human resources capacity
7.4.Improve funding mechanisms;	7.4. Funding
8.Addressing cross-cutting and emerging issues	
8.1. Determine the impacts of cross cutting issues and propose mintigation measure	8.1.Gender; HIV/AIDs, Covid-19
9.Improving coordination, monitoring, and evaluating system	
9.1. Improve coordination, monitoring and evaluation	9.1.Coordinating, monitoring, and evaluating

2.0 SITUATION ANALYSIS

2.1. Introduction

A situation analysis of the trends and status of the identified strategic interventions was undertaken up to the end of FMPIII to determine performance and identify the issues to be addressed in FMPIV.

2.2. Fish habitat productivity and health

The activities in the lake basin influence productivity processes, the health of the lake, and ultimately fish production and its suitability for human consumption. For instance, the production of fishes like Nile tilapia which utilize nearshore habitats are affected by degradation of nearshore habitats and, as has been noted under the component on Nile tilapia where stocks of this species have continued to decline and this can partly be attributed to continuous degradation of nearshore habitats. Many of the activities in the lake basin are under the jurisdiction of other sectors such as agriculture, forestry and land-use planning. There is, however, need for the fisheries sector to collaborate with line competent authorities to address the impact of activities in the catchment area on the health and productivity of the lake. Numerous activities in the lake basin affect the health and productivity of the lake. Over 60% of the people in the lake basin depend on agriculture for their livelihood (OECD-FAO, 2016). Much of the land in the basin has been converted to agriculture and deforestation, wetland degradation and cultivation up to the edge of the lake. There are dams along the rivers flowing into and out of the lakes and these affect biodiversity and migration of riverine species. The lake has major ports and important navigation routes connecting the Partners States. The basin has a large number of large towns/cities along the shores and in the basin. Most of these have poor sanitation facilities and discharge organic, inorganic and plastic wastes which contaminate the lake. There is mining and processing of minerals in the basin such as gold and copper which pollute the lake with chemicals such as mercury. Sand mining is increasing on the lake and poses a threat to the lake and fisheries especially Tilapias.

Previous fisheries management plans have not specifically addressed these issues but have in some cases worked with lead institutions to address them. There are national environmental management authorities that are responsible for management of the environment. The EAC has a Protocol on the environment and natural resources management which commits Partner States to the protection of shared ecosystems. There is a regional organization, the Lake Victoria Basin Commission (LVBC), an EAC institution which coordinates management of the environment of the Lake Victoria basin. LVFO will work with these lead institutions to document and increase awareness of the impacts of catchment activities on fish habitats and production. The Partner States have National Environment Management Authorities (NEMAs) and sector-specific competent authorities in water and forestry. These institutions have regulations for management of the environment including the lake basin. FMPIV will link and work with sector-specific competent authorities to address the impacts of catchment activities of the lake habitat and fish production.

The issues to be addressed under catchment activities include the impact of lakeshore and basin developments (deforestation, wetland degradation, mining, urban development, dams and degradation of fish habitats).

Figure 5 Catchment activities that affect the health and productivity of the lake. deforestation, wetland and shoreline degradation, urban waste and dams expose the lakes to degradation and have to be managed (Ogutu-Ohwayo, File photos)

This management plan was prepared at a time when mass fish kills of Nile perch had just occurred in parts of Lake Victoria in December 2020. The lake had also experienced high water levels which flooded nearshore fisheries infrastructure that affected fishing activities. This emphasizes the importance of including environmental conditions in FMPs. Previous FMPs had limited emphasis on the role of environmental factors in fish production. However, the rapid changes in fish stocks in Lake Victoria after 1980 was preceded by changes in the environment and the habitat of the lake (HECKY ET AL, 2010). Human-induced climate warming intensified around 1970s just before the rapid increases in fish stocks and changes in lake productivity processes and is thought to have induced changes in mixing dynamics which led to nutrient enrichment that triggered ecosystem changes and fishery productivity (HECKY ET AL 2010; OGUTU-OHWAYO ET AL., 2016). The changes in fish stocks matched those of phosphorus, the main production nutrient during this period (**Figure 6**). There was an increase in stratification and anoxia. The concentration of phosphorus doubled, silicon decreased 10 times, and nitrogen became deficient due to the increase in phosphorus. Phytoplankton productivity doubled, algal biomass increased four times, water transparency decreased and algal species composition shifted from dominance of the diatoms to the blue green algae. The zooplankton composition changed from dominance of larger calanoid copepods to smaller cyclopoid copepods and the macroinvertebrate community from Chaoborids to Chironomids and the prawn, *Caridina nilotica* (NDAWULA, 1994).

The lake was, in 1989, infested by the water hyacinth which covered much of the shallow inshore areas and bays which are important breeding and nursery areas and habitat for Nile tilapia (TWONGO 1989). Although it was controlled using biological and mechanical methods, it has remained a permanent component of the lake and affects critical nearshore fish breeding and nursery areas. The Lake Victoria basin has many urban areas, extensive agricultural activities, and some mining activities. Pollution of the lake is increasing due to agricultural, industrial and urban waste. Organic and inorganic pollutants including persistent organic pollutants, heavy metals, arsenic, and plastic wastes that are dangerous to the aquatic ecosystem and human health have increased especially adjacent to urban areas around the lake and their accumulation in fish flesh can render the fish unfit for human consumption. During implementation of FMPIV, available information will be synthesized and LVFO will model the relationship between environmental factors on fish production and productivity by:

a) Generating information on the influence of basin factors on aquatic habitat health, productivity and fisheries and put in place management measures;
b) Documenting the impacts of climate variability and change on lake productivity processes and proposing adaptation and mitigation measure;
c) Generating information on pollutants and contaminants and their influence on the food-web and proposing mitigation measures;

d) Developing ecosystem models on the relationship between environmental factors and fish production, and;

e) Monitoring the distribution of invasive weeds and guiding their management.

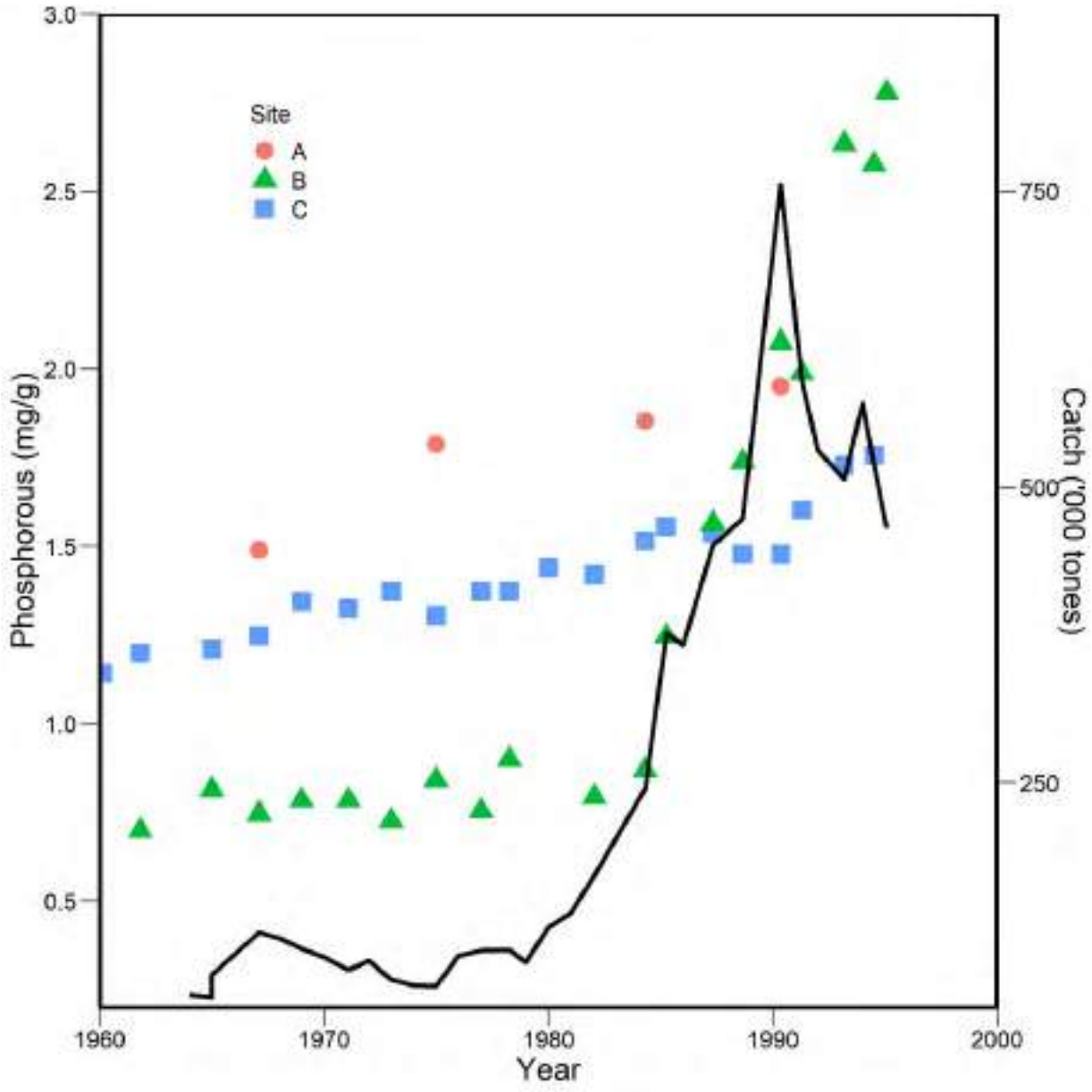

Figure 6. Relationship between phosphorus deposition in sediment and fish production in Lake Victoria [The stations are indicated in Figure 2, phosphorus values adapted from Hecky 2010)

2.3. Overall fish production and value

Fishery production from Lake Victoria increased rapidly between 1980 and 2006 (**Figure 7**) following establishment of introduced species and environmental changes in the lake. The increase in fishery production occurred in two phases: there was a first peak in 1990, followed by a second peak in 2006. This second peak was mainly contributed by the small native Silver cyprinid (*Rastrineobola argentea*) locally known as Omena in Kenya, Mukene in Uganda and Dagaa in Tanzania. Fish biomass in the lake increased from 1.3 million tons in 1999 to 3.2 million tons in 2015. The highest increase was again contributed by Dagaa from 0.25 million tons to 1.40 million tons, followed by Nile perch from 0.75 million tons to 1.23 million tons, and other species (mainly haplochromines) from 0.244 million tons to 0.75 million tons. Acoustic surveys between 2015 and 2020 showed that the biomass of Dagaa, Nile perch and haplochromines increased between 2018 and 2020 (**Figure 8**), suggesting that the fishery still had the

potential to increase and sustain production although this was largely attributed to Dagaa. The fishery of Lake Victoria was initially dominated by the introduced Nile perch, but, subsequently, Dagaa increased to contribute 55.3% of the commercial catches by 2006. Nile perch, Tilapia, and Dagaa contributed most to fish catches and will be the focus of capture fisheries development and management during FMPIV.

Haplochromines after an initial collapse between 1980 and 1990 improved after 2000. These haplochromines were, however, dominated by only a few zooplanktivores that had undergone adaptive radiation to survive and ploriferate under the new conditions (KISHE-MACHUMU, ET AL 2015). Some other native species had started to emerge and provision has been made to allow their stocks to recover to promote biodiversity conservation and ecosystem stability.

Fish catch statistics showed a declining trend in stocks of the major fishes between 2005 and 2014. However, acoustic surveys, undertaken during FMPIII (2016-2020) showed that stocks of Nile perch, Dagaa, Other species (mainly haplochromines) and *Caridina nilotica* increased.

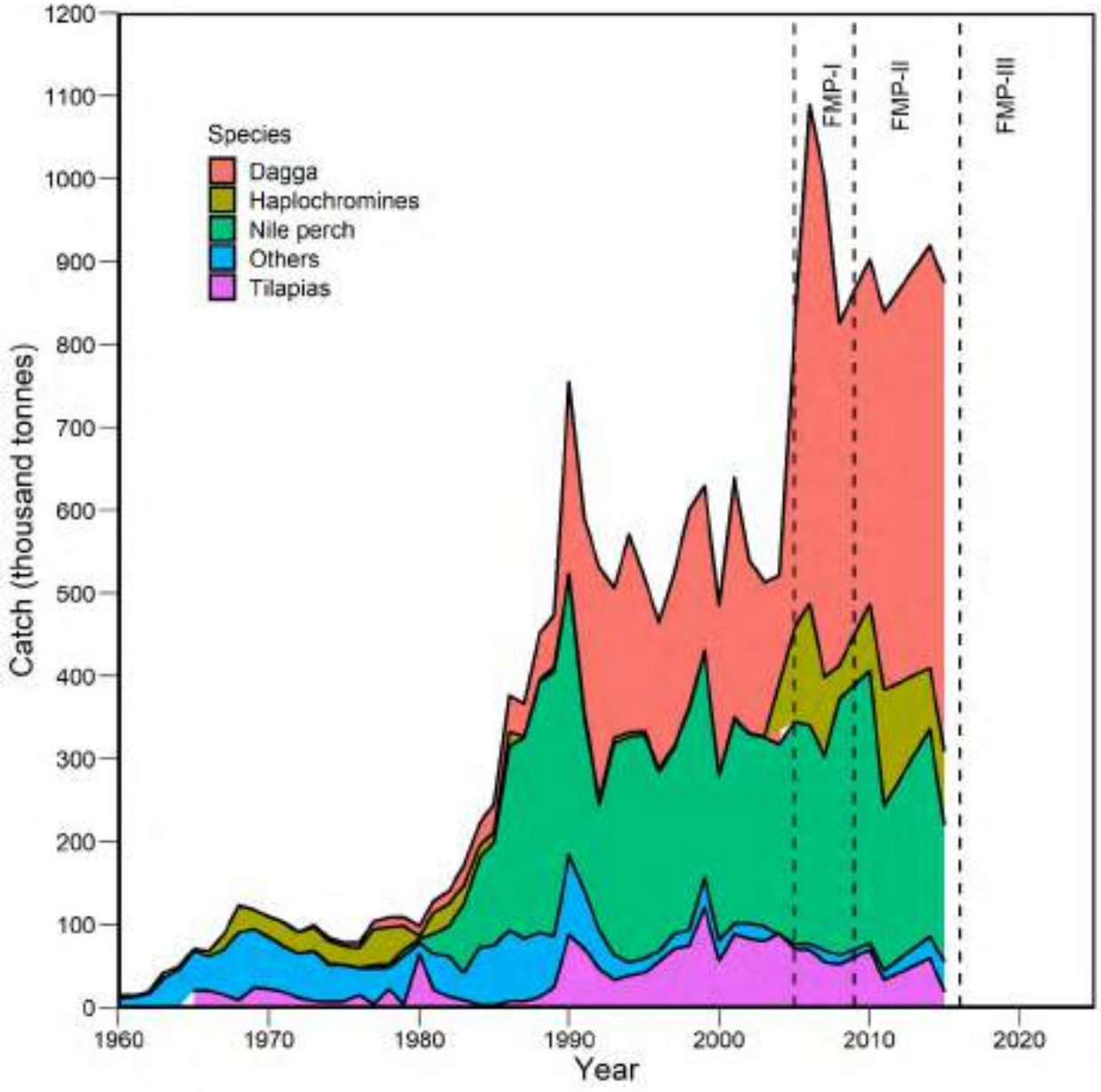

Figure 7: Capture fisheries production in Lake Victoria. The vertical dotted lines in the left panel show the period for the previous three management plans. There was noregional catch data during FMPIII (2016-2020).

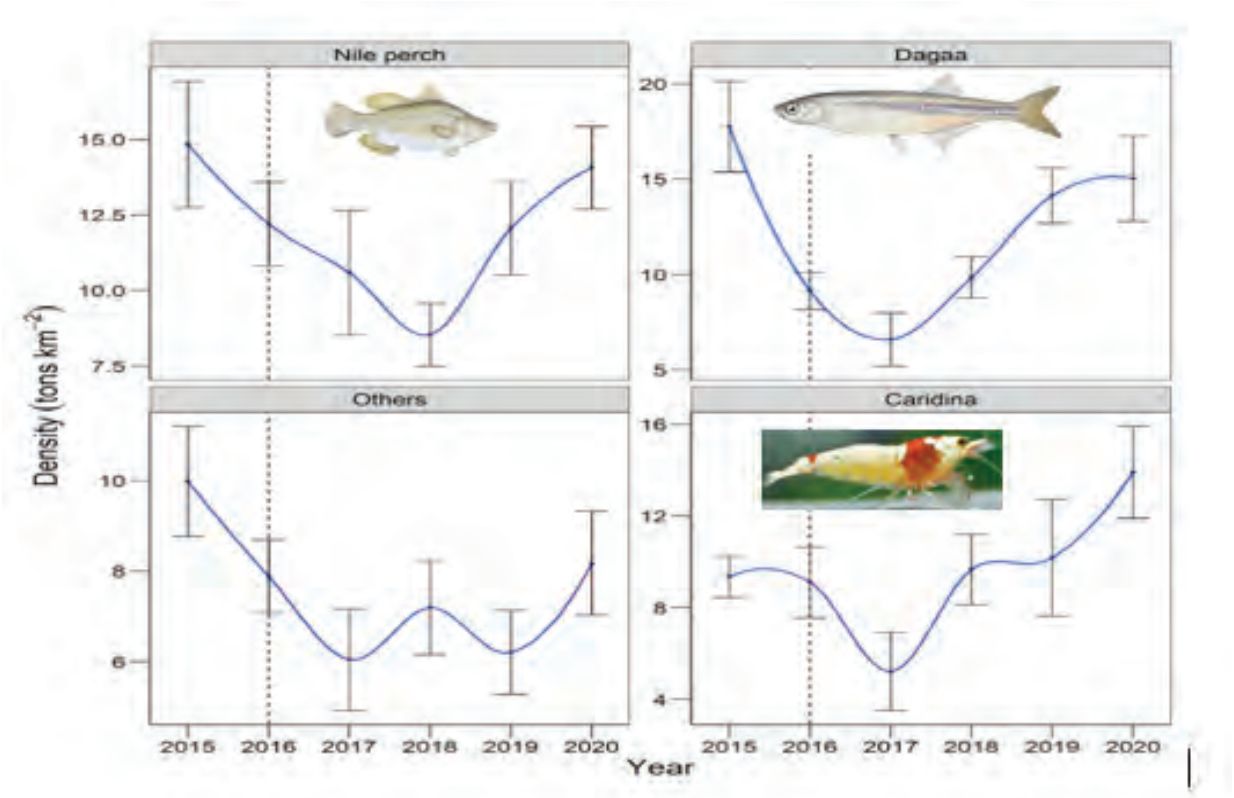

Figure 8: Biomass estimates from acoustic surveys conducted in Lake Victoria between 2015 and 2020. (Based on acoustic survey data of 2020)

2.4. Fishing efforts, capacity, IUU fishing

The fishing effort and IUU fishing increased from the year 2000 onwards (Figure 9). The number of fishers increased with increase in catches to an average of 200,000 fishers by 2016. The number of boats increased to 60,000 especially after 2000. The illegal mesh sizes and gear such as monofilament nets increased. The number of illegal sizes of nets (Gillnets <5 inches, Dagaa nets <5 mm, Hooks >size 10, and Monofilament nets) increased between 2000 and 2015. The number of illegal hooks increased during FMPI and II. Illegal monofilaments nets continually increased. Dagaa nets of less than 5 mm increased. The increase in effort and IUU shows that the fishery is under great pressure and needs regulation. This will be addressed through the following intervention:

a) Determining the sustainable number of allowable boats and gears per boat;
b) Implementing species-specific licensing;
c) Combating IUU fishing;
d) Eliminating illegal types and sizes of gears, and;
e) Promote livelihood diversification.

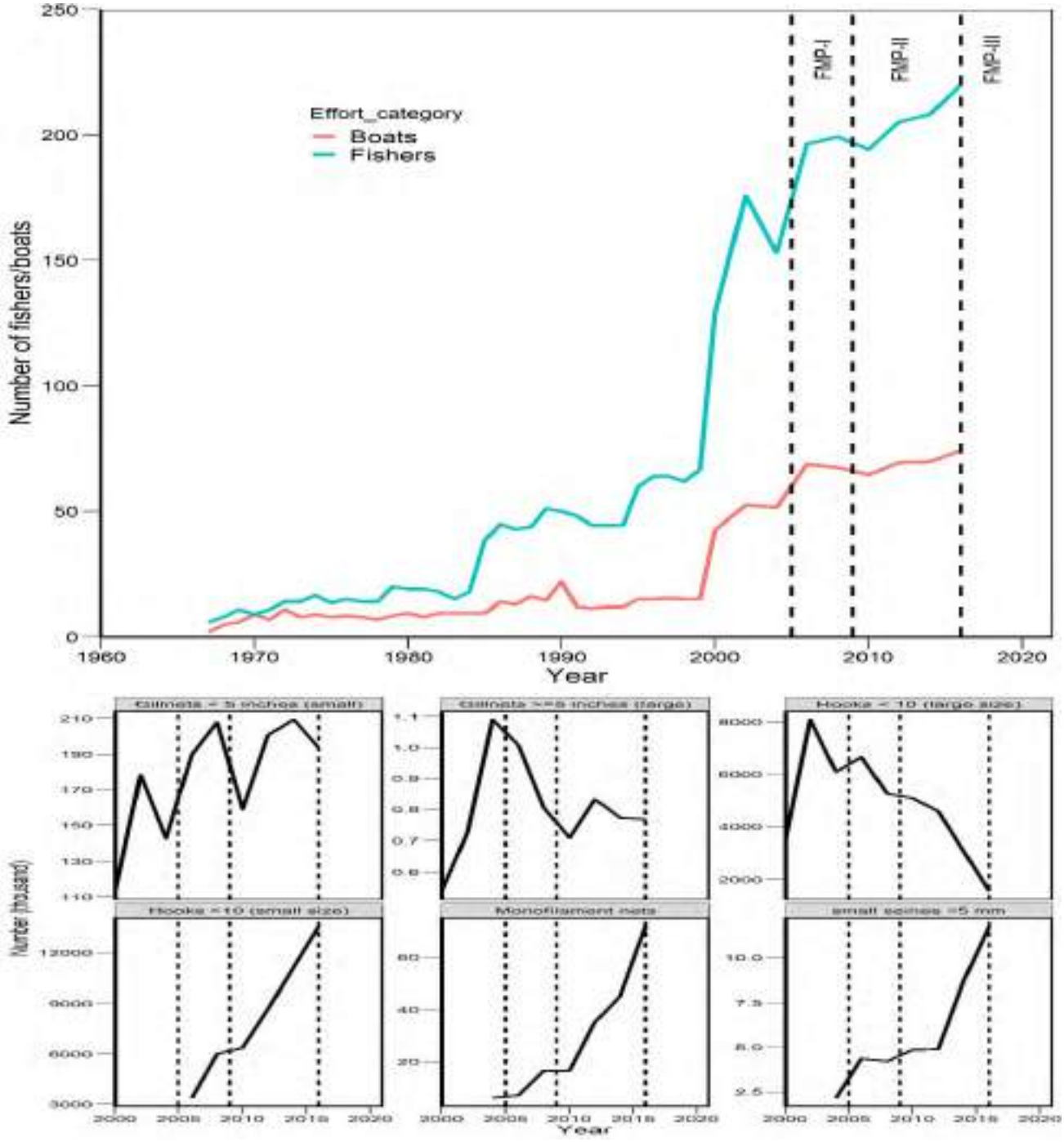

Figure 9: Trends in selected indicators of fishing effort (boats, fishers, gear types, gear sizes) before and during the previous FMPs (during FMPI and II, there was no data for FMPIII) (Graphs from LVFO data).

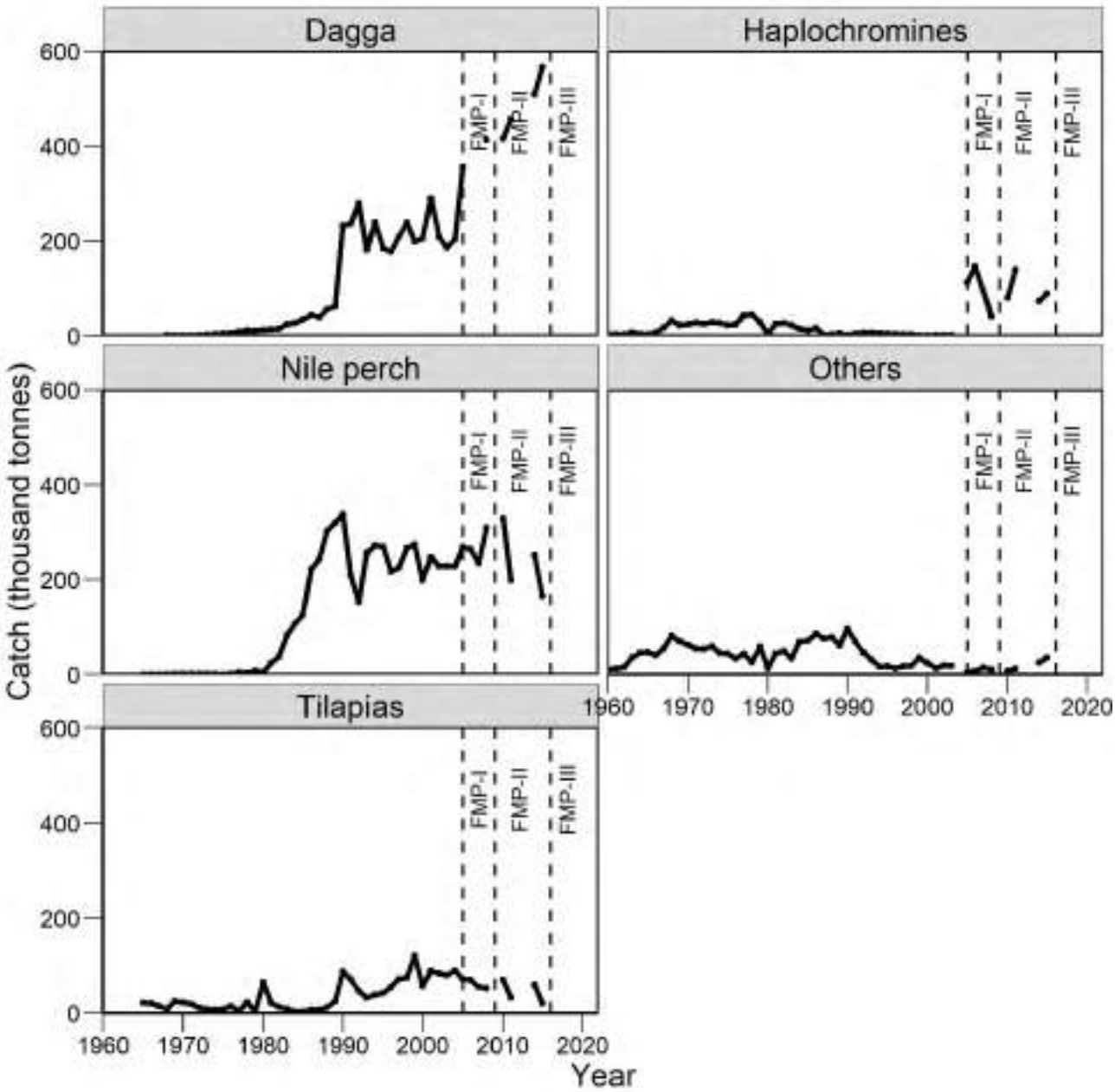

Figure 10: Annual landings of major commercial fish species before and during FMPI and II (vertical dotted lines). There was no data for FMPIII

2.5. Nile perch fishery

Commercial catches of Nile perch increased rapidly between 1980 and 1990 and remained relatively stable at an average of 245,000 tons between 1990 and 2015 (**Figure 10**). The quantity and value of Nile perch fillets exported from Lake Victoria increased between 1992 and 2005 and dropped thereafter (**Figure 11**). The value of Nile perch export only increase through the export of the highly valuable maws whose contribution increased from US$ 35.5 million in 2014 to US$ 52.5 in 2018 (**Figure 12**). Consequently, LVFO has prepared guidelines on extraction, processing and trading of Nile perch maws. Partner States export ~1,747 tons of maws. Price of unprocessed maws locally is ~US$ 150-170 per kg and that of processed maws on the international market is US$ 450-1000. The Partner States have put in place measures to control the quality and value of the Nile perch fishery, as well as fish quality assurance systems to facilitate the entry of Nile perch products to the international markets.

There are several regulations to manage the Nile perch fishery. A slot size of Nile perch to be harvested was set during FMPI at 50-85 cm to regulate capture of immature fish and breeding females. However, the upper slot size of 85 cm has been difficult to enforce and requires review given the increasing importance of fish maws. The minimum size of gill net for Lake Victoria was regionally set at 5 inches and hooks at sizes 4-9 were set for Nile perch but some Partner States set higher sizes of up to 7 inches to protect Nile perch stocks and these should be promoted and harmonized under FMPIV. LVFO has prepared and implemented comprehensive two species-specific management plans for Nile perch and a third one is under preparation. The following actions will be undertaken under FMPIV to sustain productivity and value of Nile perch stocks:

a) Maintaining the catch above 250,000 tons annually;
b) Regulating export of fish maws;
c) Reviewing and enforcing the slot size, and;
d) Regulate harvesting of Nile perch prey.

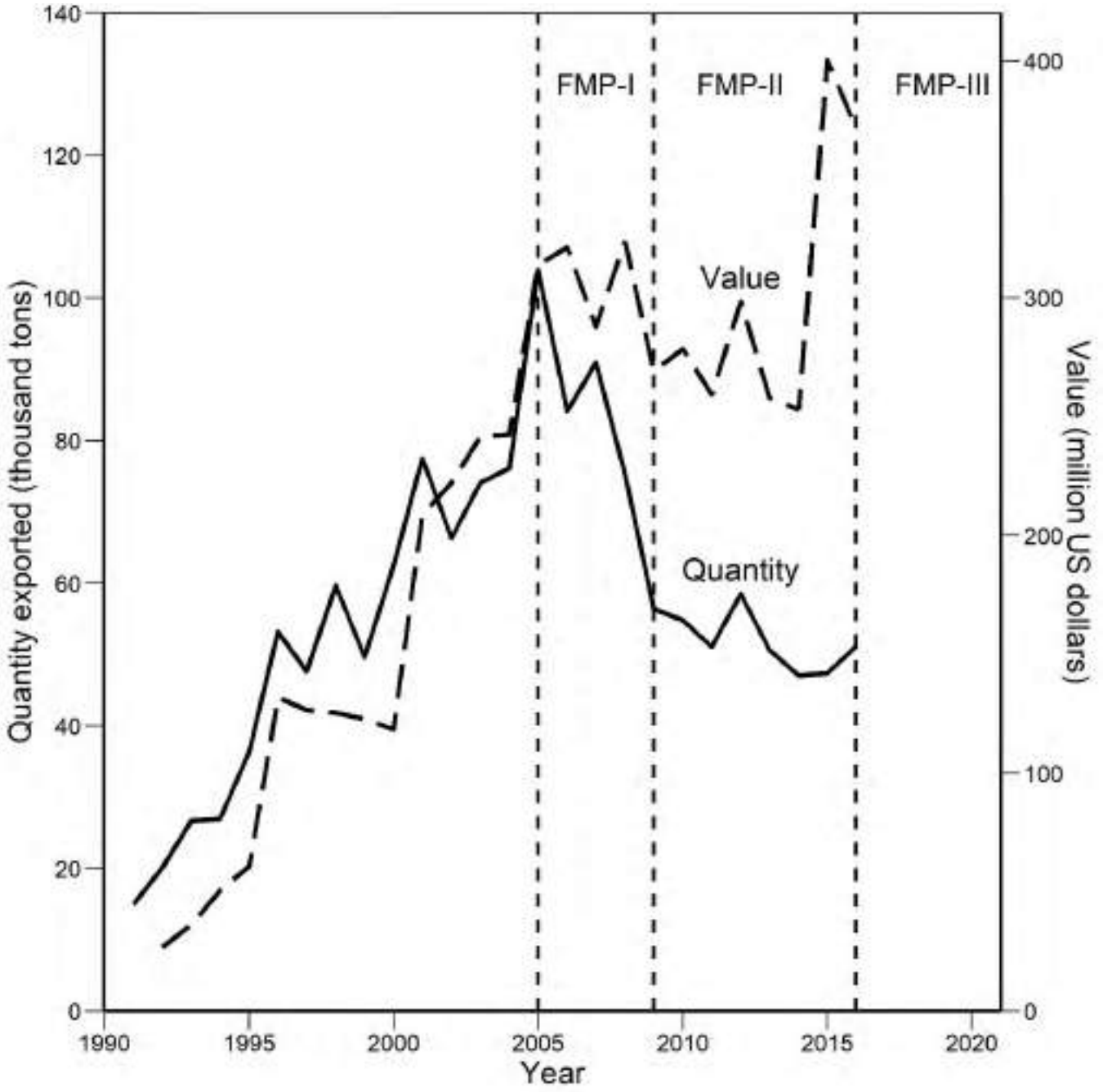

Figure 11: Relationship between the quantity of Nile perch exports and value (Based on LVFO fish export statistics)

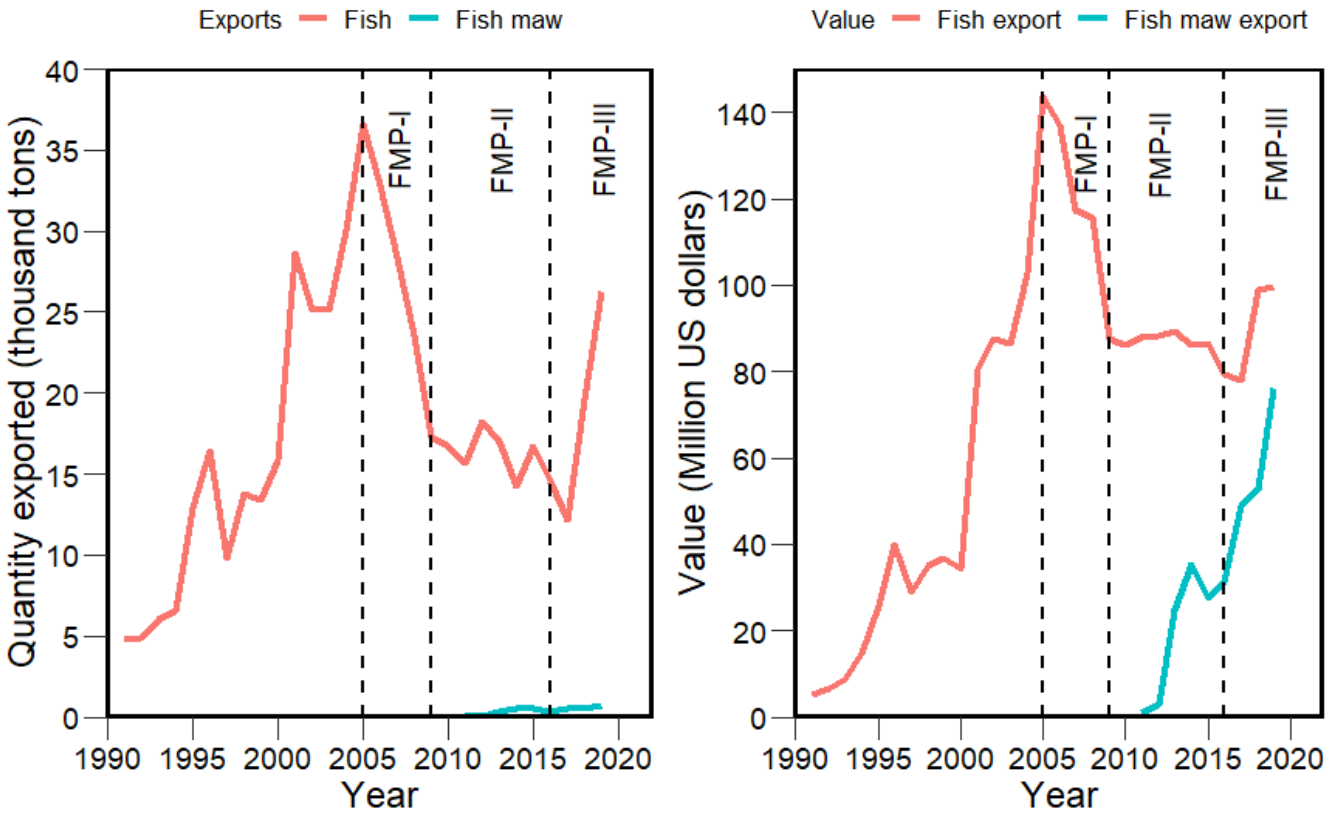

Figure 12. The quantity of Nile perch and maw exports (left panel) compared with the value from exports (right panel) (Based on statistics of the Directorate of Fisheries, Uganda).

2.6. Nile tilapia fishery

Nile tilapia is currently the dominant tilapia in Lake Victoria and was introduced into the lake from the same native habitat as Nile perch. It is restricted to a small strip of the lake of less than 20 m. It breeds in sandy inshore areas and nurses its young is shallow vegetated nearshore areas of the lake (TREWAVAS, 1983). It is the most preferred fish for food in the region and is widely used in aquaculture. Commercial catches of the Nile tilapia initially increased with major oscillations between1980 and 1999 and thereafter declined and have not shown any signs of recovery (**Figure 10**).

There are regulations related to the minimum size of gill nets to be used to catch Nile tilapia to a minimum of 5 inches and the minimum size of Nile tilapia to be harvested to 25 cm (11 inches) Total length. Other illegal gears including beach seines and monofilaments nets mianly target Nile tilapia. Nearshore areas which are the main breeding and nursery areas of Nile tilapia are exposed to environmental degradation from the catchment and there is need to specifically protect them. The main actions that will be undertaken under FMPIV to sustain the productivity of Nile tilapia are as follows:

a) Stabilize the yield above 51,000 tons annually;
b) Prevent harvesting immature tilapia <25cm (11 inches), and
c) Gazette and protect nearshore breeding and nursery areas.

2.7. Dagaa fishery

The overall increase in fisheries productivity in Lake Victoria of up to one million tons annually has mainly been due to the increase in catches of Dagaa. The catches of Dagaa increased rapidly between 1980 and 1990 and remained stable up to 2004 after which it increased rapidly between 2005-2015 (Figure 10), with its contribution increasing to 56% to overall commercial catches from the lake. The landed value of Dagaa

more than doubled from $51 to $135 million during the period 2012-2014 showing that its contribution to the value was increasing.

The contribution of small pelagic fishes has not only taken place in Lake Victoria but has occurred in other Africa lakes and the marine environment. Small pelagic fishes similar to Dagaa have increased in importance to contribute 80% of commercial catches in Lake Albert, 60% in Lake Kivu, 65% in Lake Tanganyika, and 35% in Lake Malawi (Ogutu-Ohwayo et al 2020). These changes became most prominent after the 1970s as climate variability and change intensified (Ogutu-Ohwayo et al., 2016). This is in line with the prediction by FAO (2010) that fisheries will shift to small pelagic opportunistic species as climate change intensifies. Small pelagic fishes have a fast growth rate, high relative fecundity, produce pelagic eggs, and are not habitat restricted. This seems to be contributing to their success under changing environmental conditions. They are therefore becoming the dominant fishes under increasing environmental stress, and are likely to contribute most to future fisheries and need to be targeted in fisheries conservation, development and management to enable them contribute to the eradication of poverty and hunger and contribute to blue economy growth.

Small pelagic fishes like Dagaa have environmental and nutritional benefits. They are fished and processed using solar energy. They are high in protein, and micronutrients including calcium, iron and zinc that are essential for healthy living. They are eaten whole leading to ingestion of all their ingredients. They, therefore, contribute greatly to alleviating malnutrition and hunger especially among the poor communities including malnourished children. Their processing and marketing are dominated by youth and women which promotes equity and improves livelihoods among the less privileged groups. They are, unfortunately, valued less in monetary terms than the larger species like Nile perch. Dagaa is used either for human food or animal feed. Poor handling and processing lead to high post-harvest of up to 40% spoilage which deprives consumers and most Dagaa (~80%) goes into animal feed.

Dagaa from Lake Victoria is extensively marketed in Africa. The major markets are DRC and South Sudan but extends to as far as Zambia, Zimbabwe and South Africa. It, therefore, has potential to contribute to alleviation of poverty and malnutrition on the African continent. These markets are, however, not well documented to optimize and networked to increase their economic and nutritional potential. There have been limited efforts to develop policy to guide harvesting, processing and marketing Dagaa into human food as most previous efforts concentrated on Nile perch. Management aspects of the species such as the minimum mesh size for exploitation of Dagaa have never been regionally agreed upon. There are also other issues related to the bycatch of other species in the Dagaa fishery especially of haplochromines and *Caridina* that need to be addressed.The value of Dagaa and small-food-fish in general have attracted attention to improve nutrition and there are efforts that started under FMPIII to identify, quantify and map patterns of production and distribution of small food fishes. A multidisciplinary consortium of scientists from Norway, the Netherlands, Germany, Kenya, and Uganda are examining: How these small fishes can be best utilized as food; Identifying and describing the harvesting, marketing and utilization patterns of small fish; How the small fishes contribute to food and nutritional security; improving the production processes to achieve better quality and longer shelf life, and: Disseminating the nutritious value of small fish to stakeholders and governance agencies, and analyzing how barriers to sustainable utilization can be resolved. The FMPIV will consolidate these and similar efforts to promote production and value of Dagaa through the following actions:

a) Increase harvest of Dagaa to about 10% annually;
b) Develop harvesting technologies that reduce bycatch and agree on the most suitable types and sizes of gear;
c) Improve capacity in post-harvest handling, processing, and marketing;
d) Develop high-value products;
e) Develop a policy to guide development and utilisation of the Dagaa, and;
f) Prepare a species-specific management plan.

2.8. Haplochromine and emerging fisheries

Haplochromines were the most abundant fish species and formed >80% of the fish biomass in Lake Victoria upto the early 1980s (OKARONON ET AL 1984) before establishment of Nile perch and Nile tilapia. Stocks of haplochromines virtually collapsed following the rapid increases in Nile perch stocks after 1980 to almost zero by 2000. This was attributed to predation by Nile perch and environmental changes (HECKY AT AL 2010). About 200 of an estimated 500 species of haplochromines are believed to have disappeared from the lake. As stocks of Nile perch increased, catches of haplochromines declined from about 30,000 tons in around 1980 to a mere 500 tons in 2000. The biomass of haplochromines dropped from 25 t/km2 to zero between 1980 and 1988 and only started to increase around 2000 and fluctuated between 9.5 and 6 t/km2 over the period from 2015 to 2020.

However, only a few of the haplochromine species were able to recover. These are dominated by two pelagic zooplantivorous species, *Yssichromis laparogramma and Yssichromis pyrrhocephalus* and some detritivores (KISHEMACHUMU ET AL 2015). These were able to increase through altering their life history strategies and adapting to the changing fish habitat conditions. The landed value of Haplochromines increased from US$17 to $20 million between 2012 and 2014. Haplochromines fished for consumption, as bait for the Nile perch fishery, and are the preferred prey for Nile perch. The stocks of the Freshwater prawn, *Caridina nilotica* in Lake Victoria increased with increase in Nile perch stocks and are a major prey especially of juvenile Nile perch. Large quantities of haplochromines and *Caridina* are landed as bycatch in the Dagaa fishery and are sorted in constituent taxa (**Figure 14**) and marketed either as human food or for animal feed. There is no policy on exploitation of haplochromines and *Caridina* in Lake Victoria. FMPIV will develop understand of the dynamics between Dagaa, haplochromines and *Caridina nilotica* and the best options for their utilization through the following actions:

a) Monitoring recovery and utilization of haplochromines;
b) Develop a policy on best options for their utilization of haplochromines and *Caridina*, and;
c) Develop technologies to minimize bycatch of haplochromines and ***Caridina nilotica*** in the Dagaa fishery.

Figure 14: Haplochromines and Caridina nilotica occur as bycatch in the Dagaa fishery (top panel) (A) and sorted into Dagaa (B), Haplochromines (C) and Caridina (D) for marketing (Bottom panel). (Top panel Coursey of Richard Mangeni and Bottom panel file photos of Ogutu-Ohwayo)

2.9. Aquaculture

Globally, aquaculture is the fastest growing animal food-producing sector growing at a 5.8% annually and has outpaced capture fisheries (FAO 2018). It increased from <1 million tons per year in the early 1950s to 110.2 million tons by 2016 with a value of USD 243.5 billion and accounting for half of the world's fish food supply (FAO 2014 and FAO 2018). Therefore, aquaculture has great potential to increase fish

production in the face of dwindling capture fisheries to meet the demand due to the rapidly increasing human population in the EAC. Aquaculture has, unfortunately, received limited attention in previous FMPs. There have been efforts to develop aquaculture by individual EAC Partner States since the early 1950s but production remained low as aquaculture was practiced as a small-scale backyard subsistence venture. Production in the EAC was estimated at only 150,000 metric tons as of 2019 despite the enormous water resources. This is very low compared to countries like Egypt with much less water resources but produces over one million tonnes annually. However, there has been a rapid increase in aquaculture production in all the EAC Partner States with overall production increasing from 2,700 in 2000 to 145,300 by 2019 (**Figure 15**) suggesting increased interest and investment in aquaculture.

The EAC has developed a Fisheries and Aquaculture Policy to guide the development of fisheries and aquaculture (LVFO, 2018) and a Regional Strategy and Implementation Plan for sustainable aquaculture (MICHEL DE SAN 2013). It secured funding from the European Union (EU) and is implementing a regional project (TRUEFISH project) to promote commercial aquaculture in the region. There are efforts by individual Partner States to increase fish production through aquaculture as stocks of capture fisheries can no longer meet the demands of the rapidly increasing human population. Kenya is implementing an Aquaculture Business Development Program (ABDP) with support from the International Fund for Agricultural Development (IFAD) whose goal is to reduce poverty and increase food security and nutrition among rural communities. Uganda is implementing a project to Promote Environmentally Sustainable Commercial Aquaculture in Uganda (PESCA) with support from the 11th European development fund. Tanzania is embarking on implementing Agriculture and Fisheries Development Program to promote sustainable fish production systems from aquaculture while Burundi has developed a comprehensive strategy for developing aquaculture.

The most significant development in aquaculture in the region has been cage fish farming. It started in Eastern Africa in 2004 and by 2017 there were at least 7000 cages on Lake Victoria, 400 on Kivu, 50 on Nyasa, and 10 on Tanganyika (MUSINGUZI ET AL , 2019). This is partly due to relatively high productivity of cages compared to pond fish farming. LVFO has developed a policy and best management practices for cage fish farming. The FMP IV will build on the potential and increasing interest in aquaculture to expand its production and productivity in the EAC region by taking the following actions:

a) Improving collection and dissemination of statistics;
b) Establishing aquaculture production zones;
c) Facilitating formation of strong farmers' organizations;
d) Improving access to Development Finance institutions;
e) Improving availability of quality brood stock and seed;
f) Identifying and promoting new aquaculture species;
g) Improving availability of affordable quality feed;
h) Strengthening aquaculture extension services and improving skills of farmers;
i) Strengthening biosecurity and biosafety measures; and;
j) Preparing a comprehensive aquaculture development plan.

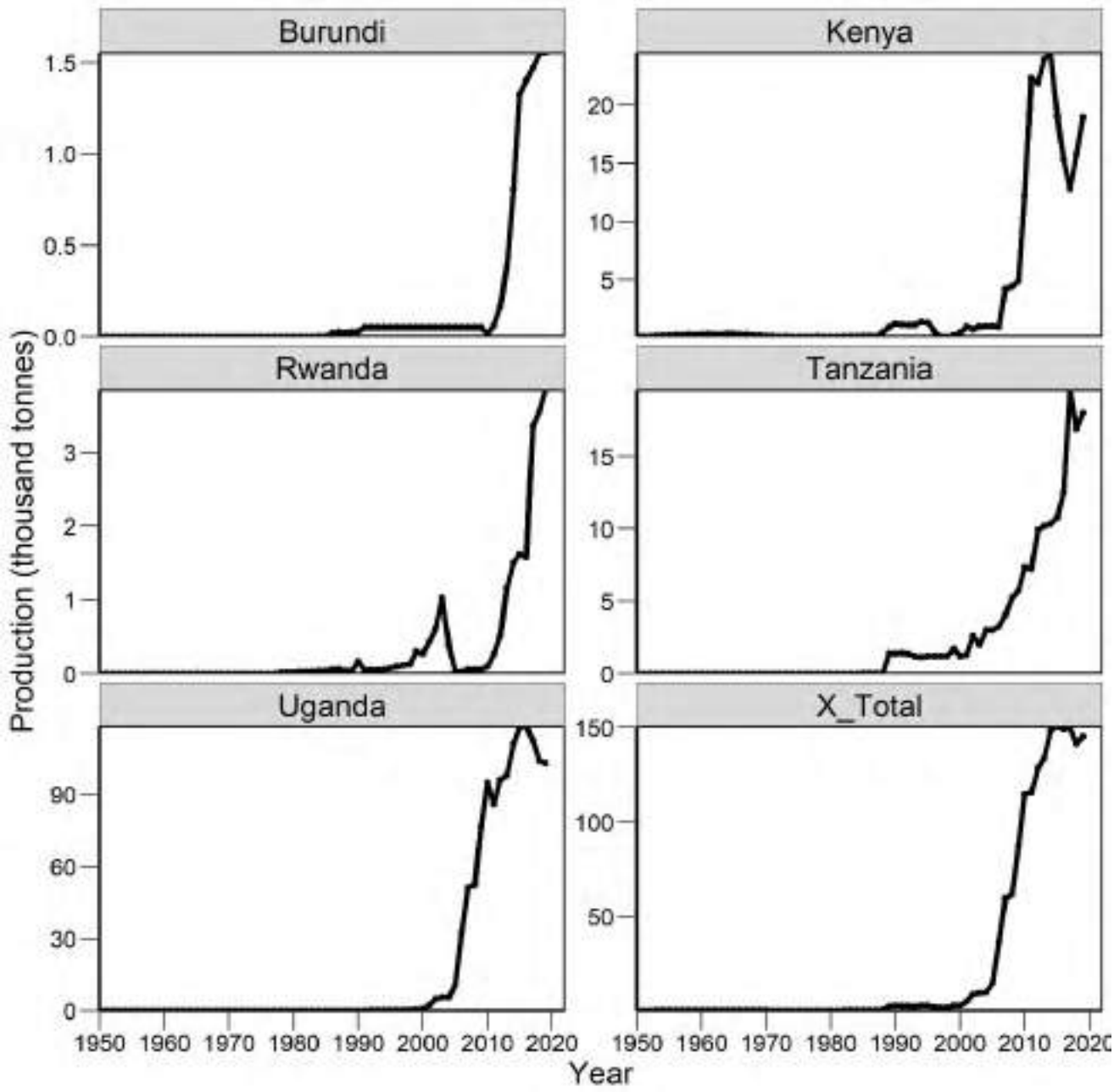

Figure 15: Aquaculture production has increased in all the Partner States of the EAC especially from 2000 onwards suggesting increased investments in aquaculture (Data from FAO statistics bulletins)

2.10. Fish quality, value, utilization and marketing

Fish is highly perishable and spoils quickly if not well preserved after harvest. The LVFO Partner States have put in place systems to improve fish quality especially in response to the requirement of the international fish export markets. They developed landing sites, established laboratories to undertake microbiological and chemical tests, and established inspectorate services. The EAC has a Sanitary and Phyto-Sanitary Protocol to ensure food quality and safety including fish and East African Standards and code of practices for fish handling, processing and distribution of fish and fishery products. Individual Partner States have put in place infrastructure and cold chain facilities to preserve the quality of fish to particularly guarantee access to international markets especially for the EU, particularly during the Nile perch export boom.

All the LVFO Partner States have specific officers designated as fish inspectors, as well as statutory instruments for fish handling, processing and storage of fish and fishery products. Despite these efforts, fish continues to be handled in a very unhygienic manner which reduces its value. Most of the previous efforts were intended to facilitate access to the international market, especially for Nile perch. There have, however, been limited efforts to address other fish species especially the Dagaa, which currently contributes most to fish catches and is becoming increasingly important as a source of highly nutritious food especially for the poor and malnourished children. Improvement of fish quality and value under FMPIV will build on existing protocols for fish quality especially for the Nile perch export to develop protocols for the other fish species especially Dagaa and for aquaculture. Specific emphasis will be made to develop protocols for handling, processing and marketing to improve the quality and diversification of products in the Dagaa value chain to make the fish more suitable for human consumption and to promote a cold chain for aquaculture products through the following actions:

a) Developinh fish quality protocols and standards where they are inadequate or absent especially in Dagaa and aquaculture value chains, and;
b) Improving enforcement of existing fish quality assurance and standards;

2.11. Resource monitoring and research

Reliable, up-to-date data and information are a prerequisite for effective conservation, development and management of fisheries and aquaculture. There are well-established fisheries research and academic institutions in most of the Partner States. These institutions have routinely collected information on fish stocks, the fish habitat and socio-economics of fisheries and aquaculture. However, to meet the goal of this plan, and monitor its progress, up-to-date information will be required to monitor progress in fish production, improvement in quality and value of fish, socio-economics, marketing, income, and nutrition.

LVFO has developed Standard Operating procedures (SOPs) that are applied to collect information and implement management actions in many of the fisheries and aquaculture research and management thematic areas. There are, however, some areas such as lake productivity processes whose SOPs have never been completed and adapted for use and there are those with no SOPs.

The SOPs have been applied to collect data and information in fisheries, aquaculture, environmental, socio-economic, post-harvest fisheries, and to implement management actions. However, data collection has not been consistent among manjor disciplines of fisheries development and management especially environment, socio-economics, fish quality and marketing and these need strengthening given the growing importance of environment and marketing issues. Data collection has also not been regular making it difficult to interpret trends. The FMPIV will target improvement in information and data collection systems and collection and making available information and data to improve delivery especially of the components of the plan addressing production and value through broadening research and resource monitoring to cover:

a) Lake productivity processes;
b) Pollutants and contaminants;
c) Fish stocks;
d) Aquaculture;
e) Fish quality, value and marketing;
f) Fisheries socio-economics and livelihoods, and;
g) Developing Standard Operating Procedures (SOPs) where they are lacking.

2.12. Data and information sharing, and awareness creation

Accessibility to information is important in building the skills of producers and service providers. Considerable information has been generated on the fisheries of Lake Victoria and aquaculture in the EAC but much of it remains inaccessible, and in forms that are not easily understood by end-users. The LVFO has published many operational documents but most of them are not easily accessible even on the LVFO website. A policy on data and information sharing is being developed and will be completed during the life

of FMPIV. LVFO drafted an Information and Communications Outreach (ICO) strategy and action plan as far back as 2002 but has never been operationalised. LVFO has traditionally organized stakeholder workshops and at least one international workshop once every five years to share information but this has not taken place for over five years. ICT has revolutionised the way information is collected, packaged and disseminated but this has not been fully domesticated in the LVFO. FMPIV will increase availability, accessibility of information and data through the following actions:

a) Operationalizing the information and data sharing policy and the Information Communication and Outreach (ICO) strategy and action plan;
b) Establishing an EAC fisheries and aquaculture information and data center;
c) Sharing available public information on LVFO website;
d) Domesticating ICT in the LVFO, and;
e) Organizing an international conference on fisheries and aquaculture in the EAC to take stock of available information.

2.13. Policies, regulations, standards and guidelines

One of the main avenues for the EAC to widen and deepen cooperation is to have harmonized policies and programs among the Partner States in political, economic, social and cultural fields, research and technology, defence, security and legal and judicial affairs, for mutual benefit of the people of East Africa (EAC, 2001). The LVFO contributes to this by harmonizing national measures for the sustainable utilization of the fisheries and aquaculture resources of the EAC water bodies and developing and adopting conservation and management measures. Development of policies and programs is addressed in accondance with the EAC Principle of subsidiarity where national instruments / ideas of the Partner States are developed at a national level, harmonized at a regional level and the harmonized instruments adopted and implemented at a national level. Through this arrangement, LVFO has developed policies, strategies, guidelines, plans and other instruments in specific areas of its mandate to guide harmonized conservation, development and management of the fisheries of Lake Victoria and aquaculture in the EAC. These include, among others:

i. Standard operating procedures (SOPs);
ii. Regional Plan of Action to prevent, deter and eliminate Illegal, Unreported and Unregulated (RPOA-IUU) fishing on Lake Victoria and its basin;
iii. The Regional Plan of Action to control fishing effort (RPOA-Capacity);
iv. Strategy and Action Plan for Monitoring, Control and Surveillance (MCS) of Fisheries on Lake Victoria;
v. Guidelines on the harmonization of BMUs on Lake Victoria;
vi. Information, Communication and Outreach Strategy for Lake Victoria Fisheries;
vii. Human Resource Development Strategy and Action Plan for Lake Victoria Fisheries;
viii. Resource mobilization strategy;
ix. Fish Levy Trust Fund studies;
x. HIV/AIDS in the Fisheries Communities of Lake Victoria: A Strategic Action Plan;
xi. Regional Operations Manual For Monitoring, Control and Surveillance (MCS) of Fisheries On Lake Vicoria;
xii. Harmonized guidelines for establishment and management of fish breeding and nursery areas in lake Victoria;
xiii. Regional fisheries guidelines for species-specific licensing for lake Victoria;
xiv. Guidelines for the monitoring control and surveillance of the fisheries of Lake Victoria;
xv. Harmonized EAC Guidelines for Trade in Fish, Fishery and Aquaculture Products and Inputs in Regional and International Trade;
xvi. Harmonized fisheries and aquaculture border inspection manual for the EAC;
xvii. Guidelines for establishment and operation of cage fish farming in the EAC;
xviii. Guidelines on Extraction, Processing and Trading of Nile Perch Maws in East Africa, and;
xix. Draft regional guidelines for the certification of fish seed and fish feed in the EAC.

These policies and instruments provide more detailed guidelines in addressing issues of the fisheries sector in the EAC. They have enabled the fisheries sector across the EAC to work together in the conservation, development and management of fisheries and aquaculture. The effectiveness in implementation of the

instruments has, in some cases, not been effective and need improvement and additional ones are required in areas where they are inadequate or lacking. For instance, there are areas of FMPIV that are critical in increasing fish production such as Dagaa, aquaculture, post-harvest fisheries that require new policy considerations. There is a need for a review of the status of implementation of different instruments by the Partner States, and identify those that need improvement and to develop instruments in priority areas where they are lacking through the following actions:

a) Provide policy guidance in areas where policies are inadequate;
b) Evaluate the performance and relevance of existing policies;

2.14. Law enforcement and Monitoring Control and Survelance (MCS)

The EAC Partner States have harmonized several laws and regulations towards the conservation, development, and management of fisheries resources of Lake Victoria and aquaculture. There are, for instance, regional plans to deter and eliminate IUU fishing and a regional plan of action to control fishing capacity. There are institutions to carry out law enforcement in Partners States comprising competent authorities and law enforcement agencies. Community-based institutions, were specifically formed and legally authorized to work with other government agencies in enforcing fisheries regulations. Despite the availability of these tools, there is persistent IUU fishing which has been attributed to inadequate resources, skills, and integrity of enforcers. These will be addressed through following actions:

a) Eliminating IUU fishing through MCS and awareness creation;
b) Improving facilities for law enforcement;
c) Training law enforcement agents, and;
d) Strengthening co-management institutions.

2.15. Infrastructure

Considerable efforts have been put in the development of fisheries and aquaculture research and management infrastructure including offices, laboratories, research vessels, patrol boats, outboard motors, and laboratory equipment. The Partner States developed fish handling sites and cold chain facilities at key landing sites and markets. They established laboratories for checking fish quality mainly in response to the requirements by the international markets especially the EU to meet fish export quality standards. There are, however, still major infrastructure gaps especially in emerging priority production commodities and areas to addressed under FMPIV especially Dagaa, aquaculture, and post-harvest fisheries. The emphasis under FMPIV will be on improving infrastructure in these priority areas. FMPIV will build on existing efforts by governments and the private sectors to put in place infrastructure for commercialization of aquaculture such as hatcheries and feed mills, improving the quality of Dagaa along the value chain, and assessing and maintain existing infrastructure through:

a) Assessing and providing information on infrastructure requirements and identify gaps;

2.16. Institutional mechanisms

LVFO has an elaborate institutional structure (Figure 16) to perform its functions from the grass root at the national level to the summit at the EAC regional level. There is a Secretariat to coordinate activities of the Organisation. There are organs of the organisation which receive, discuss and approve agreed actions for implementation. There are national institutions to generate management information in fisheries, aquaculture and implement agreed actions. There are technical thematic Working Groups (WG) at national and regional level implement LVFO activities. There is a functional analysis of this structure to align it to the current situation.

The Partner States formed community lake management institutions such as Beach Management Units (BMUs) / Landing site Committes and there are Fish Processors and Exporters and other associations at national and regional levels that contribute to community community participation in conservation, development of management of fisheries and aquaculture. There are CBOs and NGOs involved in the development and management of fisheries at regional and national levels. These institutions have not been

well coordinated to effectively work together in development and management of fisheries and aquaculture resources and FMPIV plans to improve this through the following actions:

a) Operationalizing the functional structure of the LVFO that is under review;
b) Strengthening and harmonizing technical expertise at national and regional levels;
c) Re-organizing Working Groups (WGs) and streamlining their functions;
d) Identifying and networking relevant actors and strengthen community participation, and;
e) Developing Standard Operating Procedures (SOP) where they are lacking or inadequate.

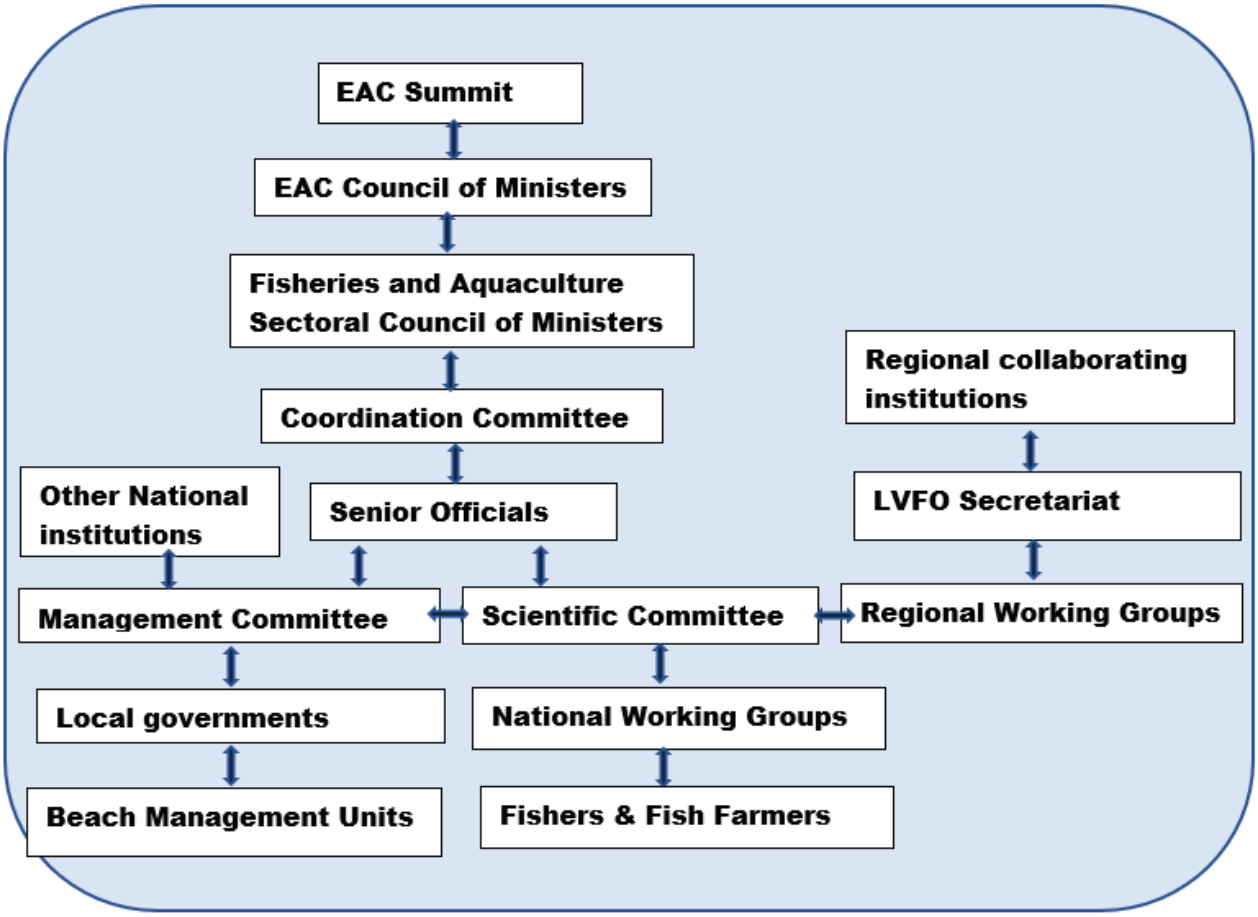

Figure 16: The institutional structure of the LVFO

2.17. Human resources capacity

Improvement in fisheries production will require scientists, managers, extension agents and producers along the entire value chain with appropriate production skills and training institutions with appropriate curriculum. Many of the people working in the fisheries and aquaculture have not had training in specialized skills in fisheries and aquaculture. There are fisheries training institutions, universities, polytechnics and vocational training institutions in the Partner States that offer specialized training in fisheries and aquaculture but much of the training is not of applied nature. The curriculum offered by some of these institutions are not adequate to provide the required skills for increased fish production and value addition. FMPIV will contribute to improvement of skills and training cariculum through the following actions:

a) Provide support to improvement of the capacity of fisheries training institutions (FTIs) and their curricula;
b) Support train extension agents, fishers and farmers in specific fisheries and aquaculture skills;

2.18. Funding

Limited funding is a major constraint to the development and management of fisheries and aquaculture in the EAC Partner States. This is partly due to the under-valuing of fisheries and aquaculture which leads to inadequate allocation of funds in national budgets. This has led to underfunding of the fisheries sector and heavy dependence on development partners. Partner States initiated a process of applying the user-pay principle to develop sustainable funding mechanisms through generating funds from the lake through a fish levy but this was not successful. The funding mechanism for fisheries under FMPIV will be improved through the following actions:

a) Lobby for improvement of funding from national governments;
b) Develop capacity in resource mobilization through project preparation, and;
c) Mobilize and lobby development partners to provide resources for implementation of the plan;

2.19. Cross-cutting and emerging issues

There are several cross-cutting and emerging issues that affect fisheries production, value addition, and livelihoods of fishery-dependent communities. Most recent challenge is that will be targeted during FMPIV is that Covid-19 pandemic and other calamities such as floods. Other cross cutting issues include: Gender balance among fisher communities along the value chain; The incidences of certain diseases especially as HIV/AIDs and water-related diseases such as bilharzia which are rampant among fisher communities. These will be addressed through the following actions:

a) Specifically, review and document the impact of Covid-19 on fisheries and other calamities on fisheries and fishers and propose mitigation measures;
b) Provide for gender disaggregated involvement in implementation of the plan, and;
c) Review and revitalize the LVFO - HIV/ AIDs strategy and action plan in collaboration with lead agencies.

2.20. Coordination, monitoring and evaluation

There was evidence from the consultations during preparation of FMPIV that a number of stakeholders were either not aware of the purpose of FMPs and did not, use them to guide preparation of their national fisheries and aquaculture plans. FMPIV will increase awareness of the purpose of the plan among the Partner States. It will identify key stakeholders who should use the plan in the preparation of national plans and sensitizing them on how to do it. The different stakeholders will be linked to LVFO Secretariat and trained on how to use the plan in the preparation of their respective individual plans. This will will be achieved by:

Intervention

a) Identifying actors who address issues of the plan at national, regional and international level and and networking, and;
b) Establishing a system to synthesize progress of planned actions and national and regional level.

3.0 PERFORMANCE OF FISHERIES MANAGEMENT PLAN III

3.1. Review of Fisheries Management Plan III

It had been planned that only the performance of FMPIII would be reviewed to determine what had so far been achieved so as to identify what would be done under FMPIV. However, as indicated in the situation analysis, the transformation of the Lake Victoria fisheries and the environment to the current state started around 1980 while the documented FMPs for Lake Victoria started in 2005. Transformation of the fish habitat and fisheries from around 1980 to the time of implementation of FMPI (2005-2008), FMPII (2009-2014) and FMP (III 2016-2020) was therefore considered in evaluation of what had happened before FMPIV to provide a more holistic picture. Moreover, there were major gaps in data available during FMPIII, which limited the use of FMPIII as the main reference point for interventions under FMPIV. The review of what took place before FMPIV provided the trend and status in the fisheries and the ecosystem.

The status, trends, issues, and interventions that had been addressed under each of the components during and before FMPIII are discussed under the situation analysis. The status of implementation of the interventions under each component before and during FMPI and II were assessed to provide information on the status up to the end of FMPII and what was specifically planned and done under FMPIII. This analysis provided information on the performance of the different components of the Lake Victoria fishery, aquaculture, the fish habitat, and supportive services from the time that the fishery transited to the current state after 1980 and guided identification of the interventions to be addressed under FMPIV.

The issues and interventions under FMPI and II and before were categorized under the components where they fitted best to determine the interventions that had been undertaken in previous plans and those that had been carried forward to subsequent plans. Similarly, the review of FMPIII was categorized into the same component and the same format was used in the evaluation of the performance of FMPIII and development of FMPIV to facilitate comparison the progress made from the previous to current, and future situations.

Assessment of FMPIII, concentrated on the extent to which the issues and interventions that were planned under the different components under FMPIII were addressed, the achievements made, the challenges encountered, the lessons learnt and the available opportunities. The intervention under FMPIV were determined from an assessment of the achievement made, the challenges met, the lessons learnt and the opportunities that were available. The issues and interventions that were still relevant from previous plans and needed to be carried over, and additional ones to be addressed under FMPIV, were identified. The performance of the planned interventions under FMPIII and the status of those that have not been specifically planned under FMPIII but had been part of previous efforts are presented in matrices 3.15 to 3.32 below under the different component of the strategic areas.

3.15.Catchment activities

Issues under FMPII and before	FMPIII interventions	Achievements	Challenges	Lessons	Opportunities.	Plan under FMPIV
Increased contamination of the lake and aquaculture facilities from the catchment	No specific plan under FMPIII but LVBC and Partner State institutions address these issues	LVBC and Partner States to addressing these issues	Many regulations not implemented	Required cross-sector collaboration	There are institutions in place for addressing the issues	Document impacts of catchment activities on the lake and aquqculture facilities

3.16. Productivity and health of the aquatic habitat

Issues under FMPII and before	FMPIII Intervention	Achievements	Challenges,	Lessons	Opportunities.	Plan under FMPIV
Impacts of climate variability and change	Generate information on the impacts and suggest adaptations and mitigations.	Publications produced for African lakes	Area still new with limited information and data	Generate and document information	A topical issue requiring attention	Generate data and document impacts and adaptation and mitigation measures.
Influence of physical conditions, nutrients, algae and invertebrates on fish stocks.	Generate information on lake productivity processes	Information and data collected but not consolidated	Limited consolidation of information from different sources	Consolidate existing and collect new information	Routine activities of LVFO research institutions	Network scientists, collect, analyse, package, and disseminate information
Pollutants and contaminants and their effects on fish stocks and consumers.	Identify key pollutants and contaminants and their impacts	Limited publications produced	Limited attention paid to pollutants.	A major threat needing attention	Increasing interest due to potential impact	Monitor pollutants and contaminants and their sources and put in place control measures.
Impact of invasive weeds on lake productivity processes and fisheries.	Monitor and control invasive weeds especially water hyacinth	Monitoring and control continued	Re-occurrence of the weed and emergence of new ones.	Sustaining monitoring and control	Effective control measures are available	Monitor invasive weeds and implement control measures.

3.17. Fishing effort, capacity and IUU

Issues under FMP II and before	FMPIII interventions	Achievements -	Challenges	Lessons	Opportunities	Plan under FMPIV
Excessive fishing effort	Maintain No of boats <60.000 and fishers at <200,000	Introduced user right through species specific licensing	How to apportion species specific licenses not clear	Difficult to regulate effort due to open access	Guidelines on species specific licensing available	Enhance implementation
Presistance of illegalties and IUU fishing	Enforce illegalities and IUU fishing	MCS conducted to reduce illegalities	Persistence of IUU	It is difficult to eliminate illegalities	Systems for eliminating IUU are available	Continue MCS to further reduce IUU fishing
Introduce fishing rights	Implement species specific licensing	Guidelines on species specific licensing were produced	Apportionment of rights between species difficult	Apportionment of rights difficult	Commitment by Partner States to introduce user rights	Continue species specific licensing

3.18.Nile perch

Issues under FMP II and before	FMPIII interventions	Achievements -	Challenges	Lessons	Opportunities	Plan under FMPIV
Sustaining Nile perch stocks	Maintain the catch at an average of 250,000 tons annually.	No CAS done but acoustic showed increase in stocks	Emergence of maws export is a threat to large size fishes	MCS improved biomass	Increase in Nile perch biomass and export of maws	Ensure catches do not fall below 250,000 tons annually
Regulating export of maws	Regulate export of maws to increase value of exports above US$ 300 million annually	Export of maws increased and guidelines on export produced	Potential negative effect of export of maws on Nile perch fishery	Address impacts of export of maws	High value of maws and effect of enforcement	Regulate export of maws while regulating impact on Nile perch stocks
Use of illegal gears and methods	Eliminate illegal gears and methods	Increased law enforcement contributed to increase in Nile perch biomass	Persistence of illegal gears and methods	Sustaining MCS had positive effects of stocks	Availability of regulations and enforcement agencies	Enhancement of MCS
Harvesting immature Nile perch	Enforce slot size of 50-85 cm	See above	As above	As above	As above	Review and enforce slot size
High fishing effort targeting Nile perch	Issue species specific licenses	Partially implemented	Determination of number of licenses to issue	Need to determine level	Commitment to regulating effort	Issue specific license
Sustaining Nile perch prey	Regulate harvesting of Haplochromines and *Caridina nilotica*	Haplochromine and *Caridina* biomass and catches increased	Competing uses of Nile perch prey	Reduction of prey will affect Nile perch stocks	Increase in stocks of preferred prey	Regulate harvesting of Haplochromines and *Caridina nilotica*

3.19. Nile tilapia

Issue under FMPII and before	FMPIII interventions	Achievements	Challenges,	Lessons	Opportunities	Plan under FMPIV
Persistent decline in catches of Nile tilapia	Stabilize the yield at about 70,000 tons annually	No data available for FMPIII	Catches continued to decline	Difficult to stabilize at 70,000 tons	Resilience of the species	Apply precautionary approach to manage stocks
Persistance of illegal gears and methods especially monofilament nets.	Enforce agreed minimum gillnet mesh size and eliminate illegal gears	Use of illegal gears were enforced	Persistence of illegalities	Difficult to eradicate illegalities	Evidence of reduction in illegalities	Continue enforcement and awareness creation
Harvest of immature fish >25 cm (11 inches)	Only harvest Nie tilapia >25 cm (11 inches)	The minimum size at harvest was enforced	Persistenceof illegalities	Difficult to eradicate illegalities	Increased MCS	Sustain MCS
Excessive fishing effort	Apply species specific licensing	Application of species-specific licensing started	Slow adoption of species-specific licensing	Variability in adoption by Partner States	Commitment to harmonization by Partner States	Promote species-specific licensing
Degradation of nearshore breeding and nursery areas	Protect breeding nursery areas	Demarcation and protection of areas started.	Demarcation all areas difficult	Different adoption rates by Partner States	Availability of guidelines	Demarcation and protection of breeding and nursery areas.

3.20. Dagaa

Issues under FMP II and before	FMPIII interventions	Achievements	Challenges	Lessons	Opportunities	Plan under FMPIV
Optimization of the continuous increase in stocks of Dagaa	Increase annual harvest of Dagaa	Acoustic survey showed increase in biomass	Limited capacity improve quality of Dagaa	Potential to increase catches	High stocks of Dagaa	Increase harvest by 10% annually
Inefficient harvesting technologies	Improve harvesting technologies	Progress made to improve technologies by existing projects	Conflicts with fishers of Nile perch and high bycatch of other fishes	Population structure changing	Availability of options that can be improved	Improve harvesting technologies
Suitable mesh size for harvesting Dagaa	Agree on suitable mesh size for harvesting Dagaa	Recommendations from RWG available	Failure to agree on most suitable gear size	Changing population structure	Availability of data on gears	Agree on suitable mesh size for harvesting Dagaa
Bycatch of other species in Dagaa fishery	Reduce bycatch of other species in Dagaa fishery	Some data available	Close interaction between Dagaa and the bycatch taxa	Need to use available information	Needs further research	Develop technologies to reduce bycatch
Poor handling, processing, marketing and utilization	Improve handling processing, market-ing and utilization	Considerable amoung of information available	Persistence of poor handling and processing	Limited appreciation of improving quality	Existing effort to improve handling and processing	Improve handling processing, market-ing and utilization
High post-harvest losses (>40%);	Reduce post-harvest losses	Efforts to reduce losses in place	Persistence of poor post-harvest systems	Limited appreciation of improvements	Existing efforts to reduce losses	Sustain efforts to reduce post-harvest
High amount >80% going to animal feed rather than human food	Increase proportion used as human food	Increasing appreciation and use of Dagaa for human food	High demand from the feed industry	There is potential for utilization as food with improve in quality	The increasing efforts to improve quality.	Increase the proportion used as human food
Lack of information on nutritional value of Dagaa	Demonstrate nutrition value	Some information on nutritional value available	Limited sharing of available information	Demonstrate and increase awareness	Improvement and application	Demonstrate and increase awareness
Limited product diversification	Develop products for the market	Efforts to develop products in place	Limited appreciation and demostration of new products	Limited willingness to change food	Avenues such as child nutrition available	Develop products with market demand
Lack of market information	Generate and provide market information	Some information being collected	Capacity to gather data from multiple sources	Synthesize and provide available information	Available information and systems	Generate and provide market information
Need for species specific licensing	Implement species specific licensing	Efforts started	Decision on beneficiaries	Beneficiaries are known	Fishers specialize	Implement species specific licensing
Lack of policy on Dagaa.	Develop policy on Dagaa fishery	Efforts started	Rapid changes in the fishery	The need for a clear policy	Increasing interest in small pelagics	Develop a policy on Dagaa fishery
Limited awareness on importance of Dagaa fishery	Improve awareness on Dagaa fishery	Considerable information available	Deciding on most suitable awareness materials	Package and share information	Increasing availability of information	Package and share information

3.21. Haplochromine and emerging fisheries

Issues under FMPII and before	FMPIII interventions	Achievements	Challenges	Lessons	Opportunities	Plan under FMPIV
Conservation of haplochromines and other native species	Regulate exploitation the haplochromines and other native species	Some data generated	Lack of policy to regulate exploitation	Need to evaluate and regulate the stocks	Recovery of some taxa	Monitor resurging species and develop management policy
Multiple uses of haplochromines and other species.	Develop best options for utilization of haplochromines and other species	Some data obtained and some native species	Determing best utilization options	Continuing adjustment in stocks resources	Ecosystem approach to fisheries	Develop a policy on utilization of haplochromines and other species
Increased by-catch of haplochromines *Caridina nilotica* in the Dagaa fishery	Develop modalities to reduce and management of by-catch	Increase in by-catch in the Dagaa fishery	Difficulty in avoiding by-catch	Monitor recovery	The multiples uses of resurging species	Generate information on management of by-catch

3.22. Aquaculture

Issues under FMPII and before	FMPIII Intervention	Achievements	Challenges,	Lessons	Opportunities.	Plan under FMPIV
Inadequate aquaculture production	Increase aquaculture production	Aquaculture production increased in all Partner States	Limited skills and inputs for commercial aquaculture	Need technical interventions to stimulate production	Increased fish demand	Increase aquaculture productions by 20% annually
Inadequate organization of farmers	Organize farmers into producer organizations and zones	Intervention started in some Partner States	Sparse distributions of farmers makes groupings difficult	Existing production zones can form basis	Existing regional and national efforts	Build on existing regional and national efforts
Limited commercial aquaculture business models	Identify and work with existing model institutions and farmers	There is an increasing number of land and lake-based models	Limited willingness of some model farmers to share experience	Existing model farmers can be used to share experience	Availability land and lake-based models.	Develop a database model farmers and institutions and work with them.
Inadequate, costly and poor-quality feed, seed and brood stock	Establish modalities for seed, feed and broodstock improvement	There was an increase in public and private sector players	Quality and quantity still inadequate	Poor quality seed and feed still a hinderance to production	Availability of local species and ingredients and producers	Promote local seed and feed production
Inadequate infrastructure	Invest in commercial infrastructure	Public and private infrastructure increased	Infrastructure is still inadequate but increasing	Inadequate infrastructure affects production	Increase in infrastructure development	Promote further increase in infrastructure
Inadequate centers of excellence in aquaculture	Identify and support improvement of centres of excellency	Assessed existing centres of excellence	Programs, curriculum and skills are weak.	Need relevant programs, curriculum, human resources skills	Availability of programs, curriculum, and personnel	Improve programs, curriculum and human resources capacity
Unskilled extension agents and farmers	Enhance capacity of research, training	Some training was conducted for	No of extension agents and farmers	Need to increase the number of skilled	Availability of training institutions,	Increase the number of extension agents

Issues under FMPII and before	FMPIII Intervention	Achievements	Challenges,	Lessons	Opportunities.	Plan under FMPIV
	and management institutions	extension agents and farmers.	requiring training is large.	extension agents and farmers.	technical staff and interested farmers	and aquaculture farmers trained.
Inadequate reliable statistics	Improve systems to collect reliable statistics.	FAO statistics were accessed.	FAO statistics have been questioned and need improvement	Need to improve collection of statistics.	Institutions to collect statistics but require SOPs	Undertake a survey to provide baseline statistics for EAC.
Inadequate financing	Develop modalities to increase investments in aquaculture	EU and IFAD providing funding for national and regional projects	Aquaculture regarded as a risky venture by financiers	Explore opportunities for funding	Existence of public and private sector financing institutions	Explore and document available opportunities for funding aquaculture
Bio-safety and bio-security concerns	Develop effective bio-security measures	There are ongoing efforts on bio-safety and security	Diseases are likely to emerge and should be monitored	Need a bio-security protocols	Availability of measures that can be adapted	Develop bio-safety and security protocols for EAC
Undefined and unstructured marketing channels	Define marketing channels	No specific plan but the private sectors has developed some	Need clear marketing channels to optimize benefits	Build on existing marketing channels	Define existing national and regional markets	Identifyand expand existing marketing channels
Inadequate policy legal and institutional frameworks	Improve aquaculture policy	EAC and national policies on fisheries and aquaculture available	Lack of a specific regional policy on aquaculture	Need specific regional policy on aquaculture	Available policies at national and regional	Develop a specific EAC policy on aquaculture.

3.23.Fish quality and value

Issues under FMPII and before	FMPIII Interventions	Achievements	Challenges,	Lessons	Opportunities	Plan under FMPIV
Lack of fish quality protocols and standard for Dagaa and aquaculture.	Develop fish quality protocols for Dagaa and aquaculture	There are ogoing projects in value addition targeting of Dagaa	Limited adoption of sanitary and phyto-sanitary requirements	Need to increase awareness on sanitary and phyto-sanitary requirements	Availability of existing reference sanitary requirements.	Develop fish quality protocols for all major species
Limited infrastructure for fish quality assurance	Develop appropriate and affordable infrastructure	Considerable infrastructure continued to be developed	Some of the infrastructure developed have been innapropriate	Need to assess appropriateness and affordability available infrastructure	There is demand for high quality products	Develop and promote appropriate infrastructure for Dagaa fishery
Limited capacity in value addition and product diversification	Develop demand driven value addition products	Value addition products developed by national projects.	Some products not demand driven readily adopted.	Assess markets and popularize products before rolling out	The increased demand for fish as a healthy food.	Develop and promote appropriate fish products

3.24.Resource monitoring and research

Issues under FMPII and before	FMPIII Intervention	Achievements	Challenges,	Lessons	Opportunities.	Plan under FMPIV
Limited up-to-date information on fish habitat health and productivity.	Collect limnological data and environmental information	Limited information collected on the fish habitat conditions.	The influence of the fish habitat on fisheries has not been included in previous FMPs	Lake productivity processes influence fisheries production and should be factored in FMPs	Data routinely collected by research institutions	Develop ecosyst model on lake productivity processes and fisheries production
Inadequate data of status of fish stocks	Undertake Frame surveys, CAS Hydro-acoustics and biological surveys to provide data on the stocks	Only acoustic surveys were conducted lake-wide but some Partner States undertook some surveys	Trends in fish stocks are key to management and should be collected regularly.	Effective fish stock data collection most effective when coordinated centrally.	Availability of NWG, RWGs and SOPs for collection and analysis of data	Conduct frame surveys, CAS, and hydro-acoustics surveys, analyses and prepare reports on fish stocks
Inadequate information for commercialization of aquaculture	Organize aquaculture production systems and inputs especially seed and feed	Some Partner States developed systems and implemented programs in aquaculture	Inadequate systems to organize farmers, and provide them with skills and inputs.	Aquaculture production will improve if operated as a commercial venture	There is increased interest in aquaculture	Enhance aquaculture production by organizing farmers, and providing them with inputs, skills and markets
Limited information on post-harvest fisheries	Provide information on post-harvest fisheries	Sanitary and phyto-sanitary systems were developed and are in place implemented especially for Nile perch.	Dagaa, the most abundant species lacks adequate post- harvest guidance to increase value	There is need for information on post-harvest fisheries to improve the value of the highly perishable fish commodity.	There are ongoing efforts to provide information to improve quality of Dagaa for human consumption.	Develop technologies to improve fish quality and safety.
Limited socio-economic information on fisheries and aquaculture.	Provide socio-economic information especially on the contribution of fisheries and aquaculture to the economy.	Socio-economic scientists at FRIs provide information but not adequate to demonstrate the value of fisheries and aquaculture.	There is inadequate socio-economic information to justify the value of fisheries and aquaculture to the national economies.	There is need to provide socio-economic information to demonstrate the value of fisheries.	Fisheries are highly valuable and there is potential to increase production but this needs to be demonstrated with data	Determine socio-economic importance of fisheries to the national economy and livelihoods.

3.25.Data, information sharing and awareness creation

Issues under FMPII and before	FMPIII Intervention	Achievements	Challenges,	Lessons	Opportunities.	Plan under FMPIV
Lack of an information and data sharing policy	Develop a data policy sharing policy	The information and data sharing policy is under preparation.	Data sharing has always been a challenge	Harmonization measures requires reliable data	Availability of data and information and technical staff	Develop and information and data sharing policy.
Delay in completion and operationalization of the Information Communication and Outreach (ICO) strategy and action plan	Operationalize the ICO strategy and action plan	LVFO has a draft ICO strategy and action plan which should be reviewed and operationalised	Delay in finalizing the ICO strategy and action plan has limited information sharing	An ICO strategy and will provide guidance on information sharing	The Partner States have normally shared information and data	Review and operationalize the ICO strategy and action plan
Limited sharing of available information	Share available information through print and electronic media	LVFO has shared some of the available in print and electronic media	Much of the information produced is not easily accessible.	Limited sharing of information leaves stakeholder un-informed	The dissemination could be improved through digital systems.	Upload all key available information on LVFO website.
Limited availability and access to information	Package and disseminate available information	Considerable information has been collected but is in forms not easily accessed and used	Indequate sharing of information	Package, share and make information available to stakeholders	Considerable amount of information and data is available	Package available information on different components of FMPIV
Limited use of ICT in LVFO activities	Domesticate ICT in LVFO	Digital systems are widely applied as a fast, efficient and easily accessible system of sharing information.	Digital systems have not been widely used in addressing fisheries issues.	Application of digital systems will improve transmission and access to information.	Increased use of online applications will greatly increase information access	Domesticate ICT in LVFO systems
Failure to publish the African Journal of Tropical Hydrobiology and Fisheries	LVFO host the journal but has not been published regullarly	Some manuscripts have been pubished online	LVFO does not have a system to publish the journal	Publication of a journal requires a dedicated competent person	Availability of a critical mass of technical staff in the LVFO system.	Explore modalities to improve publication of the journal
Periodic organization of and international conference on fisheries and aquaculture	LVFO normally convened an international workshop to share information every five years but has not done so for over ten years	Three international conferences have been held previously on the state of Lake Victoria Fisheries and aquaculture	This should be institutionalized to take place at least once every five years	There is need to to take stock of available information on Lake Victoria and aquaculture regularly	This has been done before and has attracted a wide range of regional and international audience	Prepare a conference on the state of the Lake Victoria fisheries and aquaculture.

3.26.Policies, regulations, standards, and guidelines

Issues under FMPII and before	FMPIII intervention	Achievements	Challenges,	Lessons	Opportunities	Plan under FMPIV
Inadequate adoption and application of available instruments	Assess adoption and application of agreed instruments	Partner States have adopted and implemented agreed instruments	There are some variances in application of the instruments among Partner States	The variations as enshrined in the EAC Principle of Variable Geometry can be a hindrance to effective policy implementation	The commitment by the Partner States to harmonize development and management of fisheries resources	Evaluate the extent of adoption and application of agreed instruments by the Partner States
Lack of regional instruments in some critical areas of fisheries production such as Dagaa, aquaculture, post-harvest fisheries	Develop regional instruments to guide development of all critical areas of fisheries production	Some Partner States have instruments which can be harmonized into regional instruments	Need to agree on how long it takes for an agreed instrument to be adopted by a Partner State	The process of development, approval, and adoption of instruments is sometime long	There is some data and national instruments which can be applied to develop harmonized polices where lacking	Develop and harmonize instruments for critical areas of the plan especially Dagaa, aquaculture and post-harvest fisheries.

3.27.Law enforcement and MCS

Issues under FMP II and before	FMPIII interventions	Achievements -	Challenges	Lessons	Opportunities	Plan under FMPIV
Enforce fisheries regulations and compliance	Conduct MCS, Implement RPOA-IUU, implement a vessel tracking system, Share of intelligence	Law enforcement was undertaken variably with some Partner States involving different law enforcement agencies	Different law enforcement systems subjecting lake users to different systems	Implement agreed MCS guidelines	MCS is thought to have had some positive impacts in recovery of Nile perch stocks but needs to be harmonized	Review modalities for harmonizing law enforcement.
Controlling over-capacity	Undertake species specific licensing; Register and license all fishing crafts; Introduce Fishing Craft Management System (FCMS)	Guidelines for species specific licensing were developed, adapted and implemented by some Partner States and fishing crafts registered and licensed	There is no system to allocated capacity between species and Partner States	Need to develop modalities for assigning effort between Partner States	There is interest by Partner States to control effort	Develop modalities for allocating effort between Partner States.
Eliminating illegal fishing gears and methods	Enforce illegal fishing gears and methods	Efforts were made to eliminate illegal gears and methods	Persistence of illegal gears and methods.	Elimination of illegalities is difficult to eliminate	Sustaining of law enforcement by Partner States.	Enhance eliminations of illegal gears and methods
Protecting critical fish habitats	Demarcate, gazette, and protect fish breeding and nursery areas	Some breeding and nursery areas have been identified and demarcation stated.	Limited capacity to effectively protect critical fish habitats.	Critical habitats are important in survival of juvenile fishes and should be protected.	Initiation of demarcating and protecting critical habitats is a good step forward.	Demarcate, gazette, and protect more critical habitats.

3.28.Infrastructure

Issues under FMPII and before	FMPIII interventions	Achievements	Challenges,	Lessons	Opportunities	Plan under FMPIV
Fisheries research and management infrastructure	Ensure availability of appropriate infrastructure to effectively implement research and management activities	Key infrastructure including offices, laboratories, research and patrol vessels have been developed	Inadequate resources for running and maintenance of infrastructure	Operation and maintenance should be factored in infrastructure development	Utilization and sharing of existing infrastructure	Assess available infrastructure and identify gaps
Aquaculture	Develop appropriate aquaculture infrastructure	Governments and the private sector established ponds, hatcheries and feed mills	Available infrastructure not adequate to spur commercial aquaculture	Public and private sector should assess and develop appropriate infrastructure	The increased interest and investment in commercial aquaculture	Undertake a needs assessment of infrastructure for commercial aquaculture.
Limited post-harvest fisheries infrastructure	Improve fish handling, processing and marketing infrastructure	Fish landing, handling and cold chain facilities developed but mainly for Nile perch fishery.	Limited infrastructure to improve value high yields of Dagaa, aquaculture, and Nile perch maws.	Develop infrastructure for Dagaa, aquaculture products, and Nile perch maws	There is increased investments in the three high priority products.	Develop post-harvest infrastructure targeting Dagaa, aquaculture and post-harvest fisheries

3.29.Institutional mechanisms

Issues under FMPII and before	FMPIII interventions	Achievements	Challenges,	Lessons	Opportunities	Plan under FMPIV
Strengthening regional coordination by LVFO a Secretariat	Effectively coordinate implementation of the plan at regional levels	Coordinate various activities of the organization.	Inadequate staff at LVFO Secretariat to coordinate all activities of the LVFO	There should be staff to coordinate all components of the plan	There is a mass of technical staff in the region	Undertake a functional and institutional analysis to streamline staff requirements
Strengthening coordination and implementation at national level	Ensure effective implementation of activities at national level	Partner States have staff but not adequate and not harmonized among Partner States	Need to harmonize staff in specialized areas between Partner States	Need staff to effectively address all components of the plan	There is a regional mass of experts in most areas of LVFO operations.	Harmonize expertise across Partner States in key operational disciplines.
Strengthening coordination and implementation by Local government institutions	Ensure effective implementation of activities at local level	Local governments addressed issues as part of their regular mandate	Inadequate link locally, nationally and regionally.	Strengthen the link between local, national and regional levels.	Existence a mass of experts and management systems	Strengthen linkages between regional, national and local government agencies.
Strengthening national fisheries research institutions (FRIs)	Effective provision of technical information to guide management	FRIs have technical some staff to undertake research and generate information	Some institutions do not have staff in all critical areas of the plan	Need to have staff to address all critical areas of the plan	Availability of a regional mass of scientists who can be employed	Undertake functional analysis to ensure availability of staff in critical areas

Issues under FMPII and before	FMPIII interventions	Achievements	Challenges,	Lessons	Opportunities	Plan under FMPIV
Improving human resources capacity of Fisheries Training Institutions (FTI)	Ensure availability of qualified staff to train farmers and extension agents	FTIs have professional staff to conduct targeted training	Inadequate staff to conduct targeted skills training.	Need expertise for skills training in fisheries and aquaculture	Availability of FTIs in Partner States with professional staff to conduct training	Undertake needs assessment to align staff expertise to skills requirements.
Strengthening and realigning thematic WGs	WGs to implement specialized areas of the plan	Most WGs have not been active due limited coordination and resources.	Limited involvement of WGs in implementation of the plan	Align and reactivate NWG and RWG to implement the plan	NWGs and RWGs are available for areas of the plan but require re-alignment	Review and align activities of the WGs
Promoting community participation in development and management of fisheries and aquaculture.	Promote community participation in development and manage	BMUs were variably active in with their roles taken over by other agencies in some Partner States	Inadequate facilitation of co-management institutions	Develop modalities for facilitation and improvement of performance of co-management	There are co-management institutions but require coordination and facilitation	Review coperations of BMUs and identify areas need strengthening
Fish processors and exporters associations (FPEA) support	Support the value chain and self-policing	FPEA remained active amidst declining stocks of Nile perch	Declining stocks of Nile perch	Exploit emerging opportunities of fish maws.	Fish maws have emerged as a high value Nile perch product.	Explore available opportunities for FPEA to stay in business
Engaging fisheries and lake development and management associations	Support various activities along the value chain	A number of fisheries associations remain active in the sector.	Lack of a database on the different associations and their roles.	Develop a database on fisheries associations and their roles	Associations have play and important advocacy role in fisheries	Develop a database of associations involved in fisheries development and management and their roles.
Promoting collaborating	Strengthening collaboration with other sector player such as from water and environment	LVFO worked closely with environmental agencies including LVBC	Inadequate sharing of information on activities and their outcomes	Engage collaborators, identify areas and means of collaboration	There are many collaborators with interest in Lake Victoria issues.	Identify key collaborators and their contribution to implementation of the plan
Engaging development partners	Supporting activities of LVFO	EU, GIZ, ECOFISH, TRUEFISH and others supported implementation of FMPIII	Inadequate coordination of involvement of development partners in the plan	Development partners with interest in the plan need to be guided on their involvement.	There are many development partners interested in issues of Lake Victoria	Identify key development partners who can contribute to implementation of the plan.

3.30.Human resources capacity

Issues under FMP II and before	FMPIII interventions	Achievements -	Challenges	Lessons	Opportunities	Plan under FMPIV
Lack of suitable standards for fisheries training, research and management institutions	Set standards for fisheries research and training centers of excellence	A number of SOPs and guidelines have been developed	The SOPs are mainly operational and not used in broad training	Need to translate available materials in appropriate training manuals	There is information in the different areas covered by the plan which can be adapted and applied	Set standards for fisheries management, research, and training centers of excellence.
Lack of appropriate training materials	Develop training manuals for fisheries and aquaculture	Some training materials have been developed	Not all aspects of the plan are covered	Need to cover all areas of the plan	There are existing materials which can be built upon	Undertake a need assessment and develop appropriate training materials fish fishers and farmers
Limited expertise of the people working in fisheries and aquaculture	Undertake training at different levels of the fishery value in available technologies	Some training has been undertaken but is not well documented	Not all areas are covered and trainings undertaken are not documented	Need to document training undertaken and identify gaps	There are some training institutions and materials	Improve technical capacity of extension agents, fishers and farmers and other sector players.

3.31.Funding

Issues under FMP II and before	FMPIII interventions	Achievements -	Challenges	Lessons	Opportunities	Plan under FMPIV
Under valuation of the fisheries and aquaculture sector	Fisheries continued to contribute to income employment and food security	The value of all the major commercial species of Lake Victoria increased.	The value of the fisheries has never been adequately documented to given them priority in the national plans	There is need to provide information on the value of fisheries to justify it being highly prioritized	Fisheries increasingly important in poverty reductions and nutrition	Provide information on the importance of fisheries to food security, employment and income
Limited funding to the fisheries sector by Partner States	The fisheries sector continued to receive inadequate funding	Development Partners provided funds for some of the priority activities	National government many times do not have resources to increase the budget	Limited funding affects service provision.	The increasing importance of fisheries justified increase in budgetary provision	Lobby for increased budgetary provision national budgets
Lack of a system for mobilisation of resources	Components to make resource mobilization part of	Some of the priority areas such as Dagaa and aquaculture has attracted funding	Limited experience in resources mobilization.	There is need to develop capacity in resources mobilizations	There are high priority areas that can attract funding	Develop systems at national and regional levels for

Issues under FMP II and before	FMPIII interventions	Achievements -	Challenges	Lessons	Opportunities	Plan under FMPIV
	their operational framework					mobilisation of resources.
Application of the user pays principle	Review and operationalize the Fish Levy Trust Fund	Generation of funds from fisheries was initiated by has never be accomplished	The funds may have to be remitted to the national treasury	It is difficult to directly use funds collected from the sector.	Generation of revenue strengthens lobbying for funding	Review and operationalise the Fish Levy Trust Fund.
Mobilization of development partners	Development partners were engaged in funding fisheries and aquaculture	Lake Victoria has enjoyed donor support	Retaining of development partners	Develop a system of attracting and retaining development partners	High interest in the Lake Victoria due to its international importance	Mobilize a critical mass of donors with interest in Lake Victoria

3.32.Cross- cutting and emerging issues

Issues under FMPII and before	FMPIII intervention	Achievements	Challenges,	Lessons	Opportunities	Plan under FMPIV
Promoting equity and gender balance	Promote gender balance in all aspects of fisheries and aquaculture	Considerable effort was sustained in promoting gender in fisheries	Priorities continue changing needing adjustment.	Gender roles in fisheries have normally been advocated	Gender is accommodated in current fisheries issues	Enhance gender and equity in the key aspects of FMPIV
High incidence of HIV/AIDs among fishers	Review and promote HIV/ AIDs strategy and action plan in collaboration with health sectors	Considerable investments have been put in containing the spread of HIV/AIDs	There seems to be relaxation which can increase spread	HIV/AIDs remain a challenge among fishers and there should be no complacency	There is much awareness and availability of treatment	Review the status HIV/AIDs in fishers and revitalize the LVFO strategy.
Covid-19 and its effects on fishers	Review the impact of Covid-19 on fisheries and suggest mitigation measures.	Some technical information documents have been prepared on impact of Covid-19 on fishing communities	Covid-19 is spreading and mutating and it is important to monitor its impact on fishers	The impacts of the Covid-19 pandemic needs to be monitored and mitigation measures put in place.	There responses from global to national levels including vaccination	Document the impacts of Covid-19 pandemic on fishing communities and propose mitigation measure.

4.0 FISHERIES MANAGEMENT PLAN IV (FMPIV)

4.1. Developing of Fisheries Management Plan IV

FMPIV addresses the issues and interventions identified in the review of FMPIII. It covers the interventions that continued from FMPIII and before, and those suggested through stakeholder consultations, which are presented according to the components. Each fish production commodity was, as much as possible addressed using a value chain approach as in the conceptual framework. Each component addresses: Issues; Intervention; Activities; Indicators of progress; Actors, and; budget.

4.2.Vision, Mission, Goal and objectives

The vision, mission and goal of the plan were developed in line with similar the global, continental, regional, and national levels in relation to capture fisheries and aquaculture.

Vision

A competitive, sustainable and profitable fisheries and aquaculture industry in the EAC.

Mission

Support conservation, sustainable management and development of fisheries and aquaculture value chain

Goal

Increase and sustain production and value of the fisheries of Lake Victoria basin and aquaculture resources to contribute to blue economy growth in the EAC

Objectives

i. Regulate impacts of environment on fisheries and aquaculture;
ii. Regulate fishing effort, capacity, and IUU fishing;
iii. Increase and sustain production of commercially important fish species;
iv. Increase aquaculture production;
v. Improve fish quality, value, and marketing;
vi. Improve generation and dissemination of information and data;
vii. Improve, development, harmonization and application of policies, regulations, standards, and guidelines;
viii. Build infrastructure, institutions, human resources capacity and funding, and;
ix. Address cross-cutting and emerging issues.

4.3.Stakeholder analysis

Table 4.1. The key stakeholders and beneficiaries of the managemtn plan and their roles

Stakeholder	Interests and roles
Partner States	Provide funds and implement the plan
Fisheries and aquaculture sectoral Council	Past fisheries policy decisions for implementation
Contracting parties of the LVFO	Implement the plan for the benefit of its citizens
LVFO Secretariat	Coordinate implementation of the plan
Fisheries management institutions	Coordinate implementation of management measures
Fisheries research institutions	Generate and disseminate management information

Beach management units	Co-manage the fisheries
Fisheries Training Institutions	Conduct training
Working Groups	Prepare SOPs and implement activities of the WGs
Fishermen and Fish farmers	Produce and sell fish
Fish processors and traders	Process and market fish
Fish consumers	Availability and accessibility to high protein food
Development partners	Provide resources and implement the plan
Private Sector, CBOs, NGOs	Advocany and implementation

4.4. SWOT Analysis

Table 4.2. Some of the strengths and weaknesses from within the LVFO system that will affect its implementation and opportunities and threats from outside the LVFO system that should be noted to guide putting in place mitigation measures.

STRENGTHS	**WEAKNESSES**
▪High capture and aquaculture fisheries potential; ▪Established institutional mechanism; ▪Some infrastructure; ▪Critical mass of technical staff; ▪ Established programs;	▪Unbalanced research and limited management information ▪Inadequate adoption, application, and enforcement of instruments; ▪Inadequate human resource, infrastructure, and funding
OPPORTUNITIES	**THREATS**
▪Global interest in Lake Victoria; ▪High demand for fish; ▪Extensive aquatic systems with high fish production potential;	▪Declining capture fisheries production; ▪Slow adoption of aquaculture; ▪Fish habitat degradation; ▪Poverty and malnutrition

4.5. Guiding Principles

Preparation of FMPIV was, among others, guided by the following principles:

a) **Gender and equity:** Less advantaged groups especially women, youth, and marginalized groups will be targeted in all relevant areas of the plan to promote equity in development and management of capture fisheries and aquaculture to enable them improve their livelihood.

b) **Co-management:** The public, private sector, civil society and fisher communities will work together in development and management of fisheries and aquaculture.

c) **Public Private Partnership (PPP):** PPP will be promoted in development and management of the fisheries and aquaculture resources.

d) **International commitments:** The plan will accommodate global, continental, regional and national policies, strategies and plans, provisions and requirement for conservation, development and management of fisheries, aquaculture and the environment.

e) **Precautionary approach:** Development and management of fisheries and aquaculture will be based on the best available science but where this is not possible a precautionary approach will be applied to avoid delay in action.

f) **User-pays principle:** Those who benefit from fisheries and aquaculture will contribute to the costs of conservation, development and management of fisheries and aquaculture.

g) **Rights based fisheries:** Rights-based fisheries will be applied in controlling access and reduce over-capacity and IUU fishing in capture fisheries through species specific licensing.

h) **Ecosystem Approach to Fisheries:** The interactions between ecosystem, economic, social, and

environmental factors will be considered in the design and implementation of the plan.

i) **Small scale fisheries guidelines:** Small-scale fisheries guidelines will be applied in conservation, development and management of the fisheries.

j) **The principles of subsidiarity and variable geometry:** These EAC principles of subsidiarity and variable geometry will be applied in the design and implementation of the plan while ensuring that no Partner State is left behind.

4.6. Implementation matrix of FMPIV

The issues identified in the situation analysis and the interventions identified from review of FMPIII and stakeholder consultations are summarized in implementation matrices below under the different components of the strategic intervention outlined in Table 1.1The objective addressed by each compoents is given.

4.7. Catchment activities

Objective: To understand the influence of basin factors on aquatic habitat health, productivity and fisheries and promote appropriate interventions.

Issues	Interventions	Activities	Indicators	Lead Actors	Budget (US$)
Increased contamination of the lake and aquaculture production systems from the catchment.	Improve knowledge on impacts of contaminants from the catchment on aquatic productivity and health to guide interventions	Document potential impacts of catchment activities on the lake habitat health, productivity and fisheries.	Report on impacts of land use practices on the fish habitat and stocks	Research and monitoring WG & NEMAs	**240,000**

4.8. Productivity and health of the aquatic habitat

Objective: To understand the role of physical, chemical, biological factors and climate change on fisheries and aquaculture production

Issues	Intervention	Activities	Indicators	Lead Actors	Budget US$
Impact of lake productivity processes especially, climate variability and change on fisheries and aquaculture productivity and habitat health	Generate information on impact of physical, chemical and biological factors including climate variability and change on aquatic habitat health fisheries and aquaculture	Generate information on the influence of physical and chemical factors on fisheries and aquaculture production and recommend management measures	Surveys, Technical reports. publications.	Research and monitoring WG	**50,000**
		Document the impacts of climate variability and change on lake productivity processes and propose adaptation and mitigation measure	A report on impacts of climate variability and changes with adaptation and mitigation measures.	Research and monitoring WG	**270,000**
		Generate information on pollutants and contaminants and their influence on the food-web and propose mitigation measures;	Surveys, technical reports, publication.	Research and monitoring WG	
		Develop ecosystem models on the relationship between environmental factors and fish production	Technical report, publications.	Research and monitoring WG	**270,000**
		Monitor the distribution of invasive weeds and guide their management	A report, surveys, publication.	Research and monitoring WG	**2,400,000**

4.9. Fishing effort, capacity, and IUU fishing

Objective. Regulate fishing effort and capacity, and eliminate IUU fishing

Issues	Intervention	Activities	Indicators	Actors	Budget US$
Excessive fishing effort	Determine the sustainable number of boats and gears/boat allowable on the lake and introduce fishinf rights; Implement species specific licensing;	Undertake research to determine maximum no. of boats allowable on the lake as per MSY; Implement species specific licensing; Limit the maximum number of boats per person and gears per boat; and Develop supporting policies	Report of the number of licenses issued for different species MSY; Maximum number of fishers and boats established; Policy/regulations on fishing rights; Database on licensed boats/fishers	MCS – WG Research Institutes Fisheries management institutions MCS –WG Fisheries institutions	**1,000,000**
Presistance of Illegal Unreported and Unregulated (IUU) fishing	Review the legal framework and strengthen regional framework for combating IUU fishing and illegalities;	Undertake MCS to combat IUU fishing Awareness raising Information sharing Regulate fish maws business	Report changes in illegal fishing gears and methods	MCS – WG	**10,000,000**
Limited liveli-hoods options for fisheries	Provide information on livelihood options along the value chain	Undertake studies to identify livelihood diversification	Report on livelihood diversification options	Socio-economic WGs	**200,000**

4.10. Nile perch fishery

Objective: Sustain the Nile perch production and exports value

Issues	Intervention	Activities	Indicators	Actors	Budget US$
Declining Nile perch catches	Maintaining the catch above 250,000 tons;	Eliminate harvest and trade in immature Nile perch.	Catches of Nile perch sustained	Fisheries management Stock assessment WG	Covered under CAS
Increase of export of maws	Regulate export of maws;	Develop national regulations on export of maws	National regulations on export of maws	Consultant with policy, WG	**150,000**
Harvesting immature Nile perch	Review and enforce the slot size;	MCS, Research	Report on size of Nile perch in fishery	Fisheries Research and management institutions	**20,000**
Nile perch food being fished commercially	Preserve Nile perch prey by regulate harvesting of Haplochromines and *Caridina nilotica;*	Determine implications of exploiting prey on Nile perch stocks	Report on implication of exploiting Nile perch prey	Fisheries Research and management institutions	**20,000**

4.11. Nile tilapia fishery

Objective: Management the Nile tilapia to sustain nutrition and income of local communities.

Issues	Intervention	Activities	Indicators	Actors	Budget
Persistence decline in catches and stocks of tilapia	Stabilize the yield above 51,000 tons annually;	Undertake Frame survey and CAS to monitor catches	Report indicating trends in annual catches	Stock assessment WG	Covered under CAS and Frame survey
Harvest of immature tilapia less than 25 cm (11 inches);	Enforce harvest of mature Nile tilapia >25 cm (11 inches)	Conduct MCS to prevent harvest of immature tilapia and increase awareness	Report showing reduction of immature Nile tilapia along value chain.	Monitoring control and surveillance (MCS); WG	Covered under MCS
Degradation of critical nearshore breeding nursery marginal wetlands and sandy shores	Protect nearshore breeding nursery areas (marginal wetlands and sandy shores) Install monitoring devices such as radars	Gazette and protect nearshore breeding and nursery areas	Reports showing increase in the areas of critical habitats mapped and protected	Fish biology, ecology and biodiversity & Fisheries policy and regulations	**500,000**

4.12. Dagaa fishery

Objective: Increase the quantity, quality and value of Dagaa to improve nutrition, food security, income, and promote the local and regional market

Issues	Intervention	Activities	Indicators	Actors	Budget US$
Optimization of stock potential to increase catch	Increase harvest of Dagaa Dagaa to about 10% annually	Conduct Catch Assessment Survey (CAS)	Percentage increase in catches CAS report	Stock assessment WG	Covered under CAS
Inefficient harvesting technologies with bycatch of other species	Develop appropriate harvesting technologies for harvesting Dagaa	Determine suitable mesh size and number of panels for harvesting light sources, and number of nets per boat, fishing areas and season	Technical report on gear selectivity for Dagaa	Dagaa RWG	**190,000**
High post-harvest losses in the Dagaa Value chain	Improve capacity in post-harvest handling, processing and marketign	Build capacity of actors along the value chain	No. of fish handling infrastructure established and actors trained along the value chains	Fish quality WG	**30,000**
Lack of information on nutritional value of Dagaa	Provide information on nutritional value of Dagaa	Package information on nutritional value of Dagaa;	Technical report on nutritional value of Dagaa by 2022	Fish quality assurance WG	**30,000**
Limited product diversification	Develop other products of Dagaa	Commission PPP competition on product development	Technical report on new products of Dagaa	Fish quality assurance, safety, product development and marketing	**80,000**

Issues	Intervention	Activities	Indicators	Actors	Budget US$
Inadequate market information;	Provide market information on Dagaa	Generate and provide market information	Report on national and international market of Dagaa	Socio-economics WG	**200,000**
Lack of policy on Dagaa	Provide a policy to guide development of Dagaa fishery	Develop a policy on development, management and utilization of Dagaa	A policy document of the Dagaa fishery	Dagaa WG	**40,000**
Limited awareness on economic importance of Dagaa	Increase awareness on the value of Dagaa;	Undertake socio-economic study on the importance of Dagaa Develop and share awareness materials on awareness of Dagaa	Number and types of awareness materials and events	Information, communication and outreach	**400,000**
Lack of a comprehensive management plan for Dagaa	Provide a comprehensive plan for development and management of Dagaa	Prepare a species-specific management plan for Dagaa	Species specific management plan for Dagaa by 2022	Consultant with RWG - Dagaa	**50,000**

4.13. Haplochromines and other fisheries

Objective: Provide information on the status of recovery and utilization of haplochromines and other resurging species

Issues	Interventions	Activities	Indicators	Actors	Budget
Inadequate information on recovery and utilization of haplochromines and other resurging species	Provide information on the status of recovery and best options for utilization of stocks of haplochromines and other resurging species	Undertake Catch Assessment on the resurging species such as Synodontis, etc. Determine role of haplochromines and other resurging species in biodiversity, fishery and as Nile perch prey	Report on the status of haplochromines stocks and their utilization annually from 2021-24	Fish stocks assessment and Fish biology and ecology WGs	**640,000**
Lack of a policy on utilization of Dagaa, *Caridina nilotica*, and haplochromines	Develop a policy developed on the best options Dagaa, haplochromines and Caridina.	Develop the policy	Policy on utilization of Dagaa, Caridina nilotica and haplochromines	Fisheries Policy WG	Covered under Dagaa policy

4.14. Aquaculture

Objective: Develop vibrant and robust aquaculture to increase fish production in the EAC.

Issues	Intervention	Activities	Indicators	Actors	Budget ($)
Unreliable aquaculture statistics	Improve collection, analysis and dissemination of aquaculture statistics of the EAC	Develop data collection tools	Data collection tools	Aquaculture WGs, National Aquaculture management institutions, aquaculture organizations	**600,000**
		Develop National and Regional Aquaculture Information System	National and Regional Aquaculture Information System		
		Conduct baseline survey of aquaculture	Baseline report on aquaculture		
		Conduct regular collection of aquaculture data	Annual aquaculture data reports		
Undefined aquaculture production zones	Establish aquaculture production zones	Conduct spatial planning and zonation of aquaculture production zones	Maps of aquaculture production zones produced in each Partner State by 2022	Aquaculture WG, National Aquaculture management institutions, Environment Management Authorities, Water Management Authorities,	**600,000**
			Management plan for each aquaculture production zone		
Inadequate and weak farmers organizations	Facilitate formation of strong farmers' organizations	Document and strengthen existing farmers' organizations	Number of existing farmers' organizations	Aquaculture WG, National Aquaculture management	**120,000**
		Promote formation of farmers organizations	Number of new farmers' organizations	institutions, farmers' organizations	
		Facilitation national and regional fish farmers' exhibition and conferences	Number of national and regional fish farmers' exhibition and conferences		
Predominance of subsistence and small-scale aquaculture	Promote investment in commercial aquaculture	Facilitate fish farmers to access to finance	Number of fish farmers accessing finance	Aquaculture research and development - WG	These are covered under organization of of farmers into zones and farmers organisations
		Support establishment of fish farming incubators to nurture commercial fish farmers	Number of fish farming incubators establishment	Aquaculture WG, National Aquaculture Management Institutions, private sector	
		Provide tax incentives on fish farming inputs and equipment	Number and type of tax incentives on fish farming inputs and equipment	Aquaculture WG, National Aquaculture Management Institutions, Ministry Responsible for finance	
		Facilitate availability aquaculture business development service providers	Number of providers for aquaculture business development services	Aquaculture WG, National Aquaculture Management Institutions, private sector	
		Facilitate aquaculture business to business linkage within the region and beyond	Number of aquaculturebusiness to business linkages	Aquaculture WG, National Aquaculture Management Institutions, private sector	

Inadequate knowledge and skills to develop aquaculture	Revise curriculum and upgrade practical training facilities in training institutions	Conduct training needs assessment	Revised training curriculum	Tertiary and Vocational Institutions, National Aquaculture Management Institutions,	**50,000**
		Conduct curriculum review to respond to needs of aquaculture industry	Number of reviews	AWG, Tertiary and Vocational Institutions, Farmer groups/associations	**150,000**
		Promote adoption of student-centered pedagogical approaches	Number of training institutions adopting pedagogical approaches	Tertiary and Vocational Institutions, National Aquaculture Management Institutions	**120,000**
		Upgrading practical training facilities	No of practical training facilities upgraded	Tertiary and Vocational Institutions, AWG, National Aquaculture Management Institutions	**40,000**
		Develop tailor-made short courses for retooling of technical staff	No of short courses undertaken/delivered	Tertiary and Vocational Institutions, AWG, National Aquaculture Management Institutions	**20,000**
		Conduct training for farmers	Number of farmers trained	FTI and FRIs	**400,000**
		Promote linkages between training institutions and fish farming enterprises	No of formal twinning arrangements supported	AWG, Tertiary and Vocational Institutions, Farmers' organizations, National Aquaculture Management Institutions	**100,000**
Inadequate and poor quality brood stock and seed;	Improve availability and quality broodstock and seed	Identify and domesticate new aquaculture species	Number of new aquaculture species recruited	Aquaculture WG, Research Institutions, National Aquaculture Management Institutions, private sector	**200,000**
		Establish breeding program(s) for improving performance of aquaculture species	Number of breeding programs	Aquaculture WG, Research Institutions, ational Aquaculture Management Institutions, private sector	**900,000**
		Promote private sector investment to establish aquaculture hatchery and seed distribution channels	Number of aquaculture hatcheries established	Aquaculture WG, Research Institutions, National Aquaculture Management Institutions, private sector	**200,000**
		Develop guidelines for certification of hatcheries	Number of guidelines for certification of hatcheries	Aquaculture WG, Research Institutions, National Aquaculture Management Institutions, private sector	**30,000**
		Conduct regular compliance inspections in aquaculture hatcheries	Number of compliance inspections in hatcheries conducted in each year	National Aquaculture Management Institutions,	100,000

Inadequate, costly and poor-quality aquaculture feeds;	Improve availability of affordable and quality aquaculture feed	Promote private sector investment to establish aquaculture feed manufacturing plants and distribution channels	Number of improved feed formulas produced and quality of high quality feed produced;	Aquaculture WG and private sector	40,000
		Finalise and operationalize regional guidelines for certification of aquaculture feeds and seed	Number of guidelines developed for certification of aquaculture feeds	Aquaculture WG, Research Institutions, National Aquaculture Management Institutions, private sector	40,000
		Promote appropriate pond fertilization and utilization of on-farm feeds using locally available ingredients	Number of farmers using appropriate pond fertilization and utilization of on-farm feeds using locally available ingredients	Aquaculture WG, Research Institutions, National Aquaculture Management Institutions, private sector	**600,000**
Weak aquaculture extension services	Strengthen aquaculture extension services	Strengthen Aquaculture Development Centers/Fry Centre to deliver quality extension services	Number of Aquaculture Development Centers/Fry strengthened	Aquaculture WG, National Aquaculture Management Institutions,	**200,000**
		Establish of Fish Farmer Field Schools to enhance adoption of fish farming	Number of Fish Farming Field Schools established	Aquaculture WG, National Aquaculture Management Institutions,	**400,000**
		Develop guidelines on best management practices for various aspects of aquaculture;	Number of best management guidelines developed	Aquaculture WG, National Aquaculture Management Institutions,	**50,000**
		Support extension kits and mobility for aquaculture extension officers	Number extension agents received extension kits and mobility	Aquaculture WG, National Aquaculture Management Institutions,	**900,000**
		Support development of ICT applications for extension services	Number of ICT applications for extension services developed	Aquaculture WG, National Aquaculture Management Institutions,	**200,000**
Inadequate biosecurity and biosafety measures	Strengthen biosecurity and biosafety measures	Establishment of aquatic animal health management, surveillance and control systems at national and regional levels	Number of aquatic animal health management, surveillance and control systems established	Aquaculture WG, National Aquaculture Management Institutions,	**500,000**
		Establish and strengthen aquatic animal health diagnostic facilities	Number of aquatic animal health diagnostic facilities established and strengthened	Aquaculture WG, National Aquaculture Management Institutions,	**600,000**
		Establish guidelines to control introduction of exotic species	Number of guidelines to control introduction of exotic species	Aquaculture WG, National Aquaculture Management Institutions,	**30,000**
		Build capacity of stakeholders to control and manage aquatic disease outbreaks	Number of stakeholders trained to control and manage aquatic disease outbreaks	Aquaculture WG, National Aquaculture Management Institutions,	**400,000**
		Conduct campaigns to raise awareness of management of aquatic animal health	Number of campaigns to raise awareness of management of aquatic animal health	Aquaculture WG, National Aquaculture Management Institutions,	**400,000**

		Developing national aquatic animal health strategy and plan	Number of national aquatic animal health strategies and plans developed	Aquaculture WG, National Aquaculture Management Institutions,	**200,000**
Inadequate post-harvest handling,	Improve post-harvest handling, value	Support establishment of post-harvest handling infrastructure	Number of post-harvest handling infrastructure established	Aquaculture WG, National Aquaculture Management Institutions,	**200,000**
value addition and limited markets for aquaculture products	addition and expand markets for aquaculture products	Developing and promoting use of protocols for post-harvest handling of aquaculture products	Number of protocols for post-harvest handling of aquaculture products developed and used	Aquaculture WG, National Aquaculture Management Institutions, Research Institutions	**120,000**
		Develop quality and safety standards for aquaculture products	Number of quality and safety standards for aquaculture products developed	Aquaculture WG, National Aquaculture Management Institutions, Research Institutions	**200,000**
		Conduct market surveys for aquaculture products	Number of market surveys for aquaculture products conducted	Aquaculture WG, National Aquaculture Management Institutions, Research Institutions	**120,000**
		Develop new value-added aquaculture products	Number of new value-added aquaculture products developed and promoted	Aquaculture WG, National Aquaculture Management Institutions, Research Institutions	**480,000**
		Promote aquaculture products to national, regional and international markets	Number of aquaculture products promoted in national, regional and international markets	Aquaculture WG, National Aquaculture Management Institutions,	**50,000**
Inadequate institutional, policy and legal framework	Strengthen policy, legal and institutional frameworks;	Review, harmonize and develop dedicated aquaculture institutional, policy and legal framework	Aquaculture institutional, policy and legal framework reviewed, harmonized and developed	Aquaculture WG, National Aquaculture Management Institutions,	**50,000**
		Establish cadre of aquaculture officers in civil service	Cadre of aquaculture officers established in civil service	Aquaculture WG, National Aquaculture Management Institutions,	
		Domestication of regional guidelines into national legal frameworks	Number of regional guidelines domesticated into national legal framework	Aquaculture WG, National Aquaculture Management Institutions,	**80,000**
Limited research and innovations in aquaculture	Strengthen research and innovations in aquaculture	Develop demand – driven research agenda for aquaculture	Number of demanddriven research agenda for aquaculture developed	Aquaculture WG, National Aquaculture Management Institutions, Research Institutions, Private sector	**35,000**
		Upgrading research facilities	No of research facilities upgraded	National Aquaculture Management Institutions, Research Institutions,	**200,000**
		Provide funds to support research and innovation activities	Amount of funds availed to funds to support research and innovation activities	Government, National Aquaculture Management	**1,000,000**

				Institutions, Research Institutions	
		Establish and strengthen technology transfer units in research institutions	Number of technology transfer units in research institutions established and strengthened	National Aquaculture Management Institutions, Research Institutions,	**400,000**
Lack of a regional aquaculture development plan	Provide a comprehensive plan for aquaculture development	Prepare a comprehensive aquaculture development plan	One aquaculture development plan	RWG - Consultant	**50,000**

4.15. Fish quality, value addition, marketing, and utilization

Overall objective: Enhance value addition, market access and trade of fish and fishery products and socio-economics and livelihoods

Issues	Intervention	Activities	Indicators	Actors	Budget
Low quality of fish and fishery products for domestic and regional markets	Provide protocols for fish handling, processing, and marketing for each of the key commercial species.	Review and update fish quality protocols and develop additional ones Build capacity of value chain actors	Protocols for fish handling, processing and marketing available for each commercial species. No. of value chain actors trained	Fish quality working group	**50,000**
Limited infrastructure for fish quality management along value chain coupled	Promote development of the appropriate infrastructure for quality and safety of fishery products.	Provide information on appropriate infrastructure for management of fish quality	Information on appropriate infrastructre requirements	WG-Infrastructure capacity building	**120,000**

4.16. Resources monitoring and research of capture fisheries

Objective. Broaden research and resource monitoring to adequately cover critical fisheries production areas of the fish habitat, fish stocks, aquaculture, post-harvest fisheries and socio-economics

Issues	Intervention	Activities	Indicators	Lead Actors	Budget (US$)
Limited information on critical inshore habitats of the lake	Provide information on critical inshore habitats	Undertake, environmental, biodiversity studies	Report on the status of the environment and biodiversity of nearshore areas	FRIs, WGs	**2,000,000**
Inadequate data and information on status of fish stocks	Provide data and information on the status of fish stocks	Undertake acoustics, surveys	Reports of acoustic surveys	WG – Fish stocks assessment	**1,500,000**

Issues	Intervention	Activities	Indicators	Lead Actors	Budget (US$)
Inadequate data on fish catcges	Provide data on fish catches	Undertake CAS surveys	Reports of CAS, surveys	WG – Fish stocks assessment	**1,200,000**
Inadequate data on fisheries inputs	Provide data fisheries inputs	Undertake frame surveys	Reports of frame, surveys	WG – Fish stocks assessment	**1,920,000**
Inadequate information on fisheries socio-economics	Provide socio-economics data	Undertake studies in fisheries socio-economics and livelihoods	Reports of socio-economics and livelihoods	Socio-economics WGs	**600,000**

4.17. Data, information sharing, and awareness creation

Objective: Improve availability and accessibility of fisheries and aquaculture information and data and promote ICT.

Issues	Intervention	Activities	Indicators	Actors	Budget
Inadequacy in information and data sharing	Put in place a policy on data and information sharing;	Operationalize the information and data sharing policy	Report on data sharing	Database development and management - WG	**50,000**
Inadequate of an information communication and outreach (ICO) strategy and action plan	Operationalize the ICO strategy and action plan;	Review and operationalize the ICO strategy and action plan	ICO strategy and action plan document	Information, communication and outreach - WG	**50,000**
Lack of robust fisheries database of Lake Victoria and aquaculture in the EAC	Establish a one stop centre of the EAC fisheries and aquaculture data;	Develop a robust EAC database on fisheries and aquaculture	A report on datamining and a Database on fisheries and aquaculture in the EAC	Database development and management - WG	**150,000**
Limited availability and accessibility of information	Make information under different production areas available to users	Package information in print and electronic media for different components	Information packages covering critical areas of different components and LVFO publication on website	All WGs	**1,000,000**
Limited availability and accessibility of many of LVFO information materials	Make public information of LVFO available to the users	Review and post LVFO publications on website	Information publications of the LVFO available on website	LVFO Secretariat	**10,000**
Limited application of digital for development (D4D) in fisheries	Embrace digital for development (D4D) in the LVFO	Develop a plan to domesticate ICT in the LVFO	Plan of how to embrace digital systems in the LVFO	Database and ICO WGs.	**10,000**
Limited information sharing and training events	Increase awareness and skills	Organize workshops and training events under different components	Number of workshops and workshop reports	Component WGs	**1,250,000**
Delay in convening an international conference on state of Lake Victoria fisheries, aquaculture and environment	Organize an international conference on the state of Lake Victoria Fisheries and aquaculture.	Organize an international conference on Lake Victoria.	Publication on the State of Lake Victoria Fisheries and Aquaculture	LVFO Secretariat	**400,000**

4.18. Policies, regulations, standards and guidelines

Objective: Improve and enhance application of existing policies and develop additional ones where they are lacking.

Issues	Interventions	Activities	Indicators	Actors	Budget
Inadequate adoption and application of harmonised instruments	Evaluate the extent of adoptions and application of agreed instruments;	Assess the extent of adoption and operationalization of agreed policies	A report on the extent of adoption and operationalization of adopted policies	WG - Fisheries policy, legislation, institutions and processes	**500,000**
Inadequate regional instruments in critical areas of the plan	Provide guidance in areas of the plan where policies are lacking aquaculture, and post-harvest fisheries;	Develop and harmonize policies areas where they are inadequate or lacking	Policy guidance available in all areas of the plan Aquaculture, Post-harvest fisheries,	Fisheries policy, legislation, institutions and processes with respective WGs	**150,000**
Inadequate monitoring and evaluatiton of implementation of agreed instruments	Provide for monitoring and evaluation of implementation of agreed instruments.	Monitoring implementation of agreed policies	Report on the state of implementation of agreed instruments	WG – Fisheries policy, legislation, institutions and processes	**500,000**

4.19. Law enforcement and MCS

Objective: Improve compliance to existing laws and regulation, and eliminate IUU fishing.

Issues	Intervention	Activities	Indicators	Actors	Budget
Persistence of IUU fishing	Reduce IUU fishing	Undertake MCS and Enforce existing laws enforcement at least quarterly	A report on reduction/elimination of IUU fishing	MCS - WGs	**1,400,000**
Inadequate resources for law enforcement;	Improve mobilization of resources (finances and personnel) for law enforcement	Lobby for adequate financial resources for laws enforcement. Recruit and train law enforcers	A report on improvement of funding for fisheries development and management No. of personnel recruited and trained	MCS - WGs	
Limited commitment and integrity by some law enforcers;	Develop disciplinary measures for errand and corrupt officials	Share information discipline corrupt and errand law enforcers.	Report on corrupt and errand law enforcers	MCS - WGs	
Inadequate facilities (patrol vehicles and boats) for law enforcement.	Enhance essential law enforcement facilities.	Provide adequate law enforcement facilities in Partner States	A report on the status of law enforcement facilities	MCS - WGs	
Inadequate trained and skilled manpower;	Improve the capacity of law enforcement agents.	Train laws enforcement officers in MSC operations	Report on the number of training events and the number of persons trained.	MCS - WGs	**600,000**

Issues	Intervention	Activities	Indicators	Actors	Budget
Weak Co-management institutions and Limited community involvement in law enforcement	Strengthen co-management Institutions to enhance community participation in law enforcement	Undertake an evaluation of existing co-management institutions to increase their participation in law enforcement	Reports of how community participartion can participate in laws enforcement	MCS - WGs	**600,000**
		Facilitate public sector players with equipment for law enforcement	Report of operational facilities (boats, engines, life jackets) provided	MCS - WGs	**640,000**
		Facilitate public sector players operational funds	Report of the amounts of operational funds provided.	MCS - WGs	**800,000**

4.20. Infrastructure

Overall objective: Identify and improve infrastructure gaps.

Issues	Intervention	Activities	Indicators	Actors	Budget
Inadequate information on available infrastructure for effective implementation of the different components of FMPIV	Provide information on infrastructure requirement for effective implementation of FMPIV	Undertake a needs assessment for improvement of infrastructure	Report on the status of infrastructure requirement at different operational levels of the LVFO	WGs	**50,000**

4.21. Institutional mechanisms

Overall objective: Strengthen implementation mechanisms of institutions for development and management of fisheries resources

Issues	Interventions	Activities	Indicators	Actors	Budget
Inadequate capacity to coordinate at regional level.	Ensure that there are appropriate technical staff at LVFO Secretariat to implement the plan	Undertake a functional analysis to determine the expertise require to implement the plan at LVFO Secretariat	A report of the Institutional and functional review of the LVFO.	LVFO Secretariat	**50,000**
Limited capacity at national level in fisheries development and management.	Ensure that there are experts at national level to implement the plan	Determine availability of experts to implement the plan at national level	A report on technical staff available to implements the plan at national level	Fisheries policy, legislation, institutions and processes - WG	**80,000**
Inadequate mobilization and alignment of thematic WGs to implement the LVFO activities;	Ensure that there are WGs at national and regional level to implement different components of the plan.	Determine availability of appropriate NWGs and RWGs to implement the plan	Report on the WGs required to implement the plan and their availability	Fisheries policy, legislation, institutions and processes - WG	**80,000**
Limited involvement of BMUs in fisheries development and management;	Review the status of BMUs and identify the requirement for their effective participation in the plan	Identify requirement for effective community participation in the plan	Report on the performance of BMUs and their improvement	Fisheries policy, legislation, institutions and processes - WG	**120,000**

Issues	Interventions	Activities	Indicators	Actors	Budget
Inadequate mobilization of Development Partners to support development and management of fisheries	Mobilize appropriate development partners to support implementation of the plan	Identify and engage development partners with interest in implementation of the plan.	Database of development partners that can contribute to implementation of the plan	LVFO Secretariat	**40,000**
Inadequate specialised skills in fisheries and aquaculture	Improve human resources capacity in required skills for implementation of the plan.	Undertake training needs requirement for implementation of the plan.	A training needs assessment report by 2022	FTIs & Human resources development - WGs	**50,000**
Inappropriate training curriculum	Improve training curriculum and FTIs	Assist FTIs in improving training curriculum to address requirements of the plan	Revised curiculum	FTIs and Human resources development WG	**1,000,000**
Inadequate appropriate training materials	Improve training materials/modules at FTIs.	Assist FTIs in developing training modules to address requirements of the plan	Report on proposals for review of fisheries curriculum	WGs & FTIs	**1,000,000**

4.22. Funding

Objective: Improve funding mechanisms

Issues	Intervention	Activities	Indicators	Actors	Budget

4.23. Human resources capacity

Overall objective: Support improvement of fisheries training institutions to enhance the capacity of public, private sector players in management and development of fisheries and aquaculture

Issues	Intervention	Activities	Indicators	Actors	Budget
Under valuation of the fisheries and aquaculture sector	Demonstrate the value of the fisheries and aquaculture;	Undertake a study on the economic, social and environmental importance of fisheries and aquaculture to justify the needs for more funding.	Report on the economic importance of the Lake Victoria fisheries and aquaculture in EAC	Socio-economics WG / Consultant	**50,000**
Limited funding of the fisheries sector by Partner States;	Develop modalities to improve funding from government;	Support translation of the regional plan in preparation of national fisheries plans	Number of proposals on the plan prepared and submitted to government/	Research and monitoring & Fisheries policy, legislation, institutions and processes WGs	**600,000**

Issues	Intervention	Activities	Indicators	Actors	Budget
Limited capacity in resource mobilization;	Develop capacity in resource mobilization;	Mobilize and train WGs in project preparation and resource mobilization	Report of training in project preparation and fund raising.	Consultant	**375,000**
Limited funding of fisheries by development partners	Explore opportunities by development partners to fund specific aspects of the plan.	Organize a donors' conference for impementation of the plan	The number of proposals prepared and submitted for funding	All WGs	**75,000**
Delay in operationalization of the Fish levy trust fund	Pursue operationalization of the fish levy trust fund	Review the factors that delayed operationalization of the fish levy trust fund	Report on the fish levy trust fund	Fisheries policy, legislation, institutions and processes;	**100,000**

4.24. Cross-cutting and emerging issues

Objective: Determine impacts of emerging and cross-cutting issues and develop adaptation, mitigation measures, and resilience of resources and stakeholders

Issues	Intervention	Activities	Indicators	Actors	Budget
Gender balance – inequality among fisher communities	Promote gender balance in all aspects of the plan	Prepare a strategy and action plan to promote gender balance in all aspects of the plan.	Report on gender roles and balance in different areas of the plan	Socio-economics - WG	**50,000**
HIV/AIDs and water related diseases especially bilharzia	Review and revitalize the HIV/ AIDs strategy and action plan in collaboration with agencies;	Review existing HIV / AIDs strategy and actions plan	Report of the status of HIV/AIDs and the required interventions	Socio-economics - WG	**50,000**
Impact of Covid-19 pandemic on fisheries	Review the impact of Covid-19 on fisheries and suggest mitigation measures;	Assess the implications of the Covid-19 pandemic on fisheries and fishers	A report on the impact of Covid-19 on fishers with mitigation measures including alternative livelihoods	Socio-economics - WG	**250,000**

4.25. Coordination, monitoring and evaluation

Objective: Improve coordination, monitoring and evaluation systems

Issues	Intervention	Activities	Indicators	Actors	Budget
Limited linkages with actors outside traditional LVFO system	Identify actors nationally, regionally and internationally who address issues of the plan and develop modalities for linking with them.	Identifying national and international institutions and persons addressing issues of the plan and developing modalities to working with them.	One progress report for each intervention area annually and one at the end of FMPIV	National implementing institutions	**250,000**
Ineffective national coordination	Establish a system to synthesize progress of planned actions and national and regional level.	Coordinating national implementers to provide progress of the plan at national level	One national progress report annually and one report at the end of FMPIV	LVFO desk officers	**2,000,000**
Ineffective regional coordination	Have a regional coordination mechanism to synthesize overall progress of the plan.	Operationalizing an M & E system at the LVFO Secretariat to provide overall progress in implementation of the plan.	One regional progress report annually and a final report at the end of FMPIV	Technical staff at LVFO Secretariat	**2,500,000**

5.0. THE BUDGET

5.1. Budget summary for the strategic interventions area

Strategic intervention / Period	2021-22	2022-23	2023-24	2024-25	2025-26	TOTAL
Regulating impacts of environment on fisheries	780,000	830,000	660,000	480,000	480,000	**3,230,000**
2. Regulating fishing effort, capacity and IUU	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000	**11,000,000**
3. Improving fisheries and aquaculture production	3,565,000	4,100,000	2,620,000	2,160,000	1,260,000	**13,705,000**
4. Improving fish quality and value	360,000	290,000	240,000	240,000	240,000	**1,370,000**
5. Improving information generation and dissemination	2,210,000	1,760,000	2,550,000	1,510,000	2,150,000	**10,180,000**
6. Improving development, harmonization and application of policies	1,680,000	910,000	1,080,000	760,000	760,000	**5,190,000**
7. Capacity building	905,000	2,180,000	1,195,000	595,000	595,000	**5,470,000**
8. Addressing cross cutting and emerging issues	300,000	50,000	-	-	-	**350,000**
9. Coordination, monitoring and evaluation	950,000	950,000	950,000	950,000	950,000	**4,750,000**
TOTAL	**12,950,000**	**13,270,000**	**11,495,000**	**8,895,000**	**8,635,000**	**55,245,000**
Contingency (10% of the budget)	1,295,000	1,327,000	1,149,500	889,500	863,500	5,524,500
Grand Total	**14,245,000**	**14,597,000**	**12,644,500**	**9,784,500**	**9,498,500**	**60,769,500**

5.2. Budget summary for the different components

	Component / Period	2021-22	2022-23	2023-24	2024-25	2025-26	TOTAL
1	Catchment management	120,000	120,000	-	-	-	240000
2	Lake productivity and health	660,000	710,000	660,000	480,000	480,000	2990000
3	Regulating fishing effort, capacity and IUU	2,200,000	2,200,000	2,200,000	2,200,000	2,200,000	11000000
4	Nile perch	20,000	150,000	-	-	-	170000
5	Nile tilapia	100,000	100,000	100,000	100,000	100,000	500000
6	Dagaa	360,000	420,000	80,000	80,000	80,000	1020000
7	Haplochromines and emerging fisheries	160,000	160,000	160,000	160,000	-	640000
8	Aquaculture	2,925,000	3,270,000	2,280,000	1,820,000	1,080,000	11375000
9	Improving fish quality and value	360,000	290,000	240,000	240,000	240,000	1370000
10	Resource monitoring and research	1,700,000	1,060,000	1,700,000	1,060,000	1,700,000	7220000
11	Data and knowledge management	510,000	700,000	850,000	450,000	450,000	2960000
12	Development and harmonisation of policies	200,000	350,000	200,000	200,000	200,000	1150000

	Component / Period	2021-22	2022-23	2023-24	2024-25	2025-26	TOTAL
13	6.2. Law enforcement and MCS	1,480,000	560,000	880,000	560,000	560,000	4040000
14	7.1. Infrastructure	-	1,250,000	600,000	-	-	1850000
15	7.2. Institutional mechanisms	160,000	210,000	-	-	-	370000
16	7.3. Human resources capacity	400,000	450,000	400,000	400,000	400,000	2050000
17	74. Funding	345,000	270,000	195,000	195,000	195,000	1200000
18	8.1. Cross cutting and emerging issues	300,000	50,000	-	-	-	350000
19	9. Coordination, monitoring and evaluation	950,000	950,000	950,000	950,000	950,000	4750000
	Sub-total;	**12,950,000**	**13,270,000**	**11,495,000**	**8,895,000**	**8,635,000**	55245000
	Contingency (10% of the budget)	1,295,000	1,327,000	1,149,500	889,500	863,500	5524500
	Grand Total	**14,245,000**	**14,597,000**	**12,644,500**	**9,784,500**	**9,498,500**	**60769500**

5.3. Investments

The total investment to implement FMPIV over the five years (2021-2026) is estimated at US$ 61 million. This is expected to increase fish production by at least 500,000 tons (Table 1) and to provide over 5 million jobs along the value chain.

Table 1: Fish production targets from Lake Victoria and aquaculture in the EAC (2021-2016)

	% Increase	Baseline	Target 2021-2026 (,000 tons)				
Commodity / Period (year)		21	21/22	22/23	23/24	24/25	25/26
Nile perch	0	250	250	250	250	250	250
Dagaa	10	510	561	617	679	747	822
Tilapia	0	52	52	52	52	52	52
Haplochromines (~5%)	10	95	105	116	128	141	155
Other species	10	16	18	20	22	24	26
Aquaculture	20	150	180	216	259	311	373
Total		**1,073**	**1166**	**1271**	**1390**	**1525**	**1678**

The baseline production targets are based on a ten-year average of each species for the period 2006 to 2015 for capture fisheries, and ten years (2011-2019) in the case of aquaculture production. The percentage increases used are based on trends in individual taxa and field consultations

6.0. MONITORING AND EVALUATION

The interventions will be monitored and reported annually at national and regional level through assessment of the indicators listed in the implementation matrix against each intervention using the format of the matrices used in the assessment of FMPIII.

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