EAST AFRICAN COMMUNITY

LAKE VICTORIA FISHERIES ORGANIZATION

SECRETARIAT

CAGE FISH FARMING POLICY

FOR THE

EAST AFRICAN COMMUNITY

SEPTEMBER 2021

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INTERPRETATIONS

The interpretations here under are made to enhance clarity of terms as applied to this Policy document

1	Aquaculture	Means the practice of breeding and raising aquatic organisms in a controlled aquatic environment
2	Blue economy	The Blue economy concept (BE) embraces multi-sectoral, multi-stakeholder connectedness in the sustainable use of fresh and marine water bodies for socio-economic development while preserving the environment
3	Cage	A structure enclosed on all or all but the topsides by wooden, mesh or net screens, whilst maintaining a free movement of water
4	Cage fish farming	Means the practice of raising fish in a cage to a desired market size
5	Capture fisheries	Means fishing practices in natural and man-made water bodies
6	Ecosystem Approach to Aquaculture Development (EAA)	Approach that requires cage fish farming to take place in full cognizance of all activities undertaken and the environment
7	Hatchery	A controlled breeding facility
8	Partner States	Refers to countries that constitute the East African Community
9	User-pays principle	Users of cage aquaculture resources should pay for related cage farming management and development

10	Policy instruments	Means unit actions taken to implement a policy for example, specific tax, law or regulation
11	Youth	People aged between 18-35 years

ABBREVIATIONS AND ACRONYMS

AU	African Union
AU-IBAR	African Union Inter-African Bureau for Animal Resources
BE	Blue Economy
CCRF	Code of Conduct for Responsible Fisheries
EAC	East African Community
EU	European Union
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organization of the United Nations
LTA	Lake Tanganyika Authority
LVFO	Lake Victoria Fisheries Organization
PFRS	Policy Framework and Reform Strategy
PPP	Public-Private Partnership

ACKNOWLEDGEMENT

The Cage Fish Farming Policy (CFF Policy) for the EAC 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. The evolution of the EAC CFF Policy benefited from consultations made with members of the Regional Aquaculture Working Group (ARWG) whose constructive comments and guidance shaped this policy. I also wish to acknowledge with sincere thanks staff of the LVFO Secretariat for the invaluable support they rendered during the entire period of preparation of this document Special thanks go to delegates from EAC Partner States, who constituted the Regional Team of Experts, for their active participation and invaluable contributions during the two Regional Validation Workshops, one in Arusha Tanzania on 2nd June 2021 and the second in Bujumbura, Burundi on the 21st June, 2021. Last but not least I would like to extend my sincere gratitude to all contributors who made valuable comments that improved this document; we all helped to shape up the CFF Policy document.

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EXECUTIVE SUMMARY

The need for a specific cage fish farming policy for the EAC was felt even at a time when the industry was just emerging in the region. FAO Regional Technical Expert Workshop on cage culture in Africa held at Entebbe Uganda from 20-23 October, 2004 was unanimous in concluding that cage aquaculture represents an important development opportunity for many African countries, but will require an effective policy framework to ensure that structural constraints to its development are overcome, and the development is equitable and sustainable. Nearly two decades to day cage fish farming continues to attract more investors from within and outside the region. This rapid expansion is triggered by a number of factors. The greater EAC experiences high population growth rates of 2.5-3.3% with the current population of nearly 200 million people pressing more demands for fish protein in the region.

In a paradox, regional capture fisheries data indicate that although the total annual production increased from 689,217Mt in the year 2000 to nearly 1.7 million Mt in 2018, the rate of increase in fish landings tended to decrease with time, despite the management efforts made by Partner States to reverse it. The region is grappling with fishing over-capacity and illegal, unreported and unregulated (IUU) fishing practices that are exacerbated by the open access nature of regional fisheries that cause difficulties in the enforcement of fisheries laws, regulations and guidelines. During the same period, fish production from aquaculture practices increased rapidly from 2,132 Mt in 2000 to 137,663 Mt in 2018, although the sub-sector's current contribution to the regions' total fish landed for food and trade is still insignificant.

This situation has resulted in a significant fish supply gap such that the average regional per capita fish consumption is less than 10kg. According to SOFIA 2020, per capita food fish consumption rose from 9.0 kg (live weight equivalent) in 1961 to 20.3 kg in 2017, at an average rate of about 1.5 percent per year, while preliminary estimates for per capita fish consumption in 2018 stand at 20.5 kg. The expansion in consumption has

been driven not only by increases in production is due to technological developments in processing, cold chain, shipping and distribution; rising incomes worldwide, which strongly correlate with increased demand for fish and fish products; reductions in loss and waste; and increased awareness of the health benefits of fish among consumers. In order to increase the current per capita fish consumption to the recommended 20.5kg, the EAC region will have to more than double the current level of fish production and, for this to happen, cage fish farming will have to play a critical role.

The emerging cage fish farming in Lake Victoria and other transboundary water bodies in the EAC is acknowledged as the fastest growing aquaculture sub-industry in the region. In just a decade of cage fish farming in the EAC region, the sub-industry's annual fish production is nearing 100 Mt, benefitting directly and indirectly more than 5 million people. Cage fish farming is among the technologies that offer potential for producing more fish per unit area of a water body. Experts estimate that cage fish production is more than 50 times of what is normally produced in semi-intensive pond aquaculture. The EAC Region is replete with numerous inland water bodies, including the Great Lakes, minor lakes and small water bodies (SWBs) that offer great opportunities for the development of sustainable cage fish farming, among other blue economy developments, for the creation of regional food and nutrition security, livelihoods, wealth, decent jobs, and economic growth and prosperity.

The development of cage fish farming in the EAC faces a number of constraints and challenges, including: inadequate zoning and delineation of freshwater bodies for conflict-free and sustainable cage fish farming development; inadequate, unstable supply and high prices of imported tilapia feed brands as well as locally produced tilapia fingerlings; a weak knowledge and technology base and uptake, weak access to institutional financing and government subsidies; weak enforcement of the EAC Guidelines and operation of cage fish farming, aquaculture laws and regulations; limited awareness and governance capacity to utilize small water bodies (SWBs) for effective cage fish farming operations; weak

multi-sectoral engagement in the implementation of blue economy (BE) policies; and inadequate capacity to manage and develop transboundary water resources for cage fish farming. In order to address these challenges and constraints and unleash the full potential of cage fish farming, the EAC region requires a coherent policy and effective coordination mechanisms.

The Cage Fish Farming Policy (CFF Policy) of the East African Community is an agreed position by the Partner States of the EAC to guide the management and development of cage operations in the region. The geographic scope of the CFF Policy covers the EAC Partner States and focusses on all inland freshwater resources. This policy addresses issues of policy coherence and coordination in the management of cage fish farming in the EAC Partner States to unleash the full potential of the industry. Evolution of the CFF Policy benefited from international, continental and regional benchmarks, protocols, conventions and treaties as well as from individual experts and participatory consultative regional workshops. The CFF Policy is chaptered as follows (i) Spatial Planning and Environmental Health Monitoring for management and development of cage fish farming in the EAC Region (ii) Capacity Building, demand-driven Research and Development (iii) Governance and Institutional Framework; Input Supply, Financing, Marketing and Trade, and (iv) Risk Management, Knowledge Generation and Information Sharing, and Cross-Cutting and Emerging Issues.

The implementation of the EAC CFF Policy will require collaborative effort and close cooperation between Partner States and the EAC institutions. An institutional framework for different stakeholders having different roles and responsibilities has been provided. The performance on the policy implementation and outcomes will be monitored annually both at regional, national and at devolved or decentralized level. This will be done through self-scoring of progress made on achieving each Objectively Verifiable Indicator (OVI) as provided in annexes I and II. The Partners States' Technical heads responsible for fisheries and aquaculture shall prepare annual progress reports.

1.0 INTRODUCTION

1.1 BACKGROUND

1.1.1 Scope of the Cage Fish Farming Policy

The Cage Fish Farming Policy (CFF Policy) of the East African Community is an agreed position by the Partner States of the EAC to guide the management and development of cage operations in the region. The geographic scope of the CFF Policy covers the EAC Partner States and focusses on all inland freshwater resources. This policy addresses issues of policy coherence and coordination in the management of cage fish farming in the EAC Partner States to unleash the full potential of the industry's contribution to fish production, consumption and trade in the region. The CFF Policy provides a policy framework guidance for the management and development of sustainable cage fish farming in the East African Community by promoting and enhancing coherence in policy implementation with linkage to the AU Aquaculture Policy framework.

1.1.2 Water Resources Potential for Cage Fish Farming in the EAC

Apart from the Indian Ocean water resources, water abundance in the Eastern African Region is in the form of trans-boundary water bodies. Lake Victoria, the second largest lake in the world, is shared by Kenya, Tanzania and Uganda; Lake Tanganyika, the second deepest lake in the world, is shared by Tanzania, Zambia, Democratic Republic of Congo (DRC) and Burundi; Lake Turkana is shared by Kenya and Ethiopia; Lakes Albert and Edward are shared by Uganda and DRC; Lake Kivu is shared by Rwanda and DRC; Lakes Rweru and Cohoha are shared by Rwanda and Burundi; and Lake Nyasa is shared by Tanzania, Malawi and Mozambique. Non-transboundary lakes are: Kyoga and George in Uganda; Naivasha in Kenya; Rukwa in Tanzania; and Muhazi and Nasho

in Rwanda. This is in addition to a number of small water bodies (SWBs), lakes, man-made dams and rivers.

1.1.3 Policy Development Process

The EAC-CFF Policy Development Process started on 17th May, 2021 through 18 July, 2021 passing through formal policy development and review framework, a process detailed in many sources (for example, https://policies.acu.edu.au/governance/policy-development-resources) : collation and mapping of issues, establishing rationale and justification for the policy, benchmarking exercise, writing the CFF Policy and a series of validation workshops leading to approval of policy. Writing of the draft CFF Policy benefited from consultations made with members of the Regional Aquaculture Working Group who offered constructive comments on the evolving policy document. The Inception Report for the assignment was organized by the LVFO Secretariat on 2nd June, 2021 in Arusha, Tanzania. In attendance were Senior Government Officials from EAC Member States and representatives from Fish farmers' associations from the EAC Region who made constructive comments to the presentation. The LVFO convened a Regional Validation Workshop on 21st June, 2021 in Bujumbura, Burundi, which was attended by SGOs from EAC Member States, responsible officials from LVFO Secretariat and other stakeholders. The workshop deliberation on the Draft CFF Policy for the EAC provided invaluable inputs for completion of the policy.

1.2 RATIONALE AND JUSTIFICATION

Cage fish farming continues to attract more investors from within and outside the region and this rapid expansion is triggered by a number of factors, including rapid growth of the human population, declining capture fisheries resource base, slow growth in pond-based aquaculture, abounding environmental and human resources for cage fish farming, recent drive for blue economy development and the un met demand for

fish in local, regional, continental and global markets. The greater EAC experiences high population growth rates of 2.5-3.3% with the current population of nearly 200 million people pressing more demands for fish protein in the region (Worldometers, 2020). Regional capture fisheries data indicate that although the total annual production increased from 689,217 Mt in the year 2000 to nearly 1.7 million Mt in 2018, the regional fish resource base is being over exploited by excessive fishing effort (Tanzania Fisheries Policy, 2015; EAC Fisheries and Aquaculture Policy, 2018) despite the management efforts being made by Partner States to reverse this trend. The region is grappling with fishing over-capacity and illegal, unreported and unregulated (IUU) fishing practices that are exacerbated by the open access nature of regional fisheries that cause difficulties in the enforcement of fisheries laws, regulations and guidelines. During the same period, fish production from aquaculture practices increased rapidly from 1,632 Mt in 2000 to 143,000 Mt in 2020 (World Bank, 2020), although the sub-sector's current contribution to the regions' total fish landed for food and trade is still insignificant.

There is an issue of national, regional, continental and international fish market demands not being met. The EAC region's per capita fish consumption is just about 10kg against the 20.5 recommended by the FAO's World State of Fisheries and Aquaculture (SOFIA, 2020) due to limited supply of fish and cultural factors. The emerging intensive cage fish farming industry in Lake Victoria and other transboundary water bodies in the EAC region is rapidly expanding in space and time and the technology offers potential for producing more fish per unit area of a water body. Experts estimate that cage fish production is more than 50 times of what is normally produced in semi-intensive pond aquaculture (FishTech Africa, 2018). However, cage fish farming can have serious environmental threat and conflict with other water users and therefore it requires adequate policy guidance and regulations.

The EAC has recognized the potential of cage fish farming as an intervention that can contribute significantly to regional food and nutrition security, livelihoods, wealth creation, economic growth and prosperity

provided that its operations are made in a sustainable manner. To achieve this regional goal, the emerging industry in the region needs a body to coordinate its management and development. Lake Victoria Fisheries Organization (LVFO), is a specialized institution of the East African Community (EAC) and has mandate to coordinate the management and development of fisheries and aquaculture resources in the EAC region. Therefore, as cage fish farming is expanding in regional fresh waters, a comprehensive policy is needed to guide sustainable utilization of these water systems to ensure that cage culture is conducted in sustainable manners without compromising reproductive potential of these water bodies and other usages. The LVFO developed in 2018 Guidelines for Establishment and Operation of Cage Fish Farming in the EAC to streamline and guide the establishment and of cage fish farming in the region. LVFO coordination role for sustainable management and development of cage fish farming in the EAC region will not be effective without forging strong collaboration with other Regional Fisheries Management Organizations (RFMOs) such as the Lake Tanganyika Authority (LTA), for Lake Tanganyika; and any other emerging RFMOs in the EAC region.

For the EAC to harness the full potential of cage fish farming, several challenges and constraints that prevent the region from leveraging its abundant water resources to increase fish production should be fully addressed. These include: zoning and delineation of suitable sites in freshwater bodies for the purpose of carrying out sustainable and conflict-free cage fish farming; monitoring of ambient water quality and environmental integrity in cage fish farming zones; facilitating farmers' access to input supply, extension services, demand-driven research, institutional financing, and market network and linkages; and un harmonized national policies, regulations, guidelines and Standard Operating Procedures (SOPs) for smooth implementation of the CFF Policy goals in the EAC Region. Others are: inadequate value addition to minimize post-harvest losses of farmed-fish and promotion of product marketing; capacity building, infrastructure development and research; unsustainable access to input supply and financing; inadequate extension

services, and market network linkages; inadequate risk management planning, knowledge and information sharing; and inadequate capacity to address cross cutting and emerging issues.

To achieve the desired outcomes stated above, the LVFO Secretariat initiated a process to develop the first Cage Fish Farming Policy in the EAC region. The Policy provides a framework for implementation of the Regional Strategy and Implementation Plan for Sustainable Aquaculture (2015-2020) and the LVFO Fisheries Management Plan IV (2021-2026). This Plan IV (FMP IV) for the period 2021-2026 was prepared to guide the Partner States in contributing to increases in fish production for food security, nutrition, and wealth creation in the EAC. To achieve this overarching objective, the FMP Plan provides guidance to Partner States in developing harmonized national fisheries management plans for the period 2021 to 2026.

1.3 POLICY CONTEXT

1.3.1 Global Perspective

FAO-Ecosystem Approach to Fisheries and Aquaculture (EAF and EAA) instruments have been adopted by the FAO Committee on Fisheries (COFI) as the appropriate and practical way to fully implement the Code of Conduct for Responsible Fisheries (CCRF). The EAA is a risk-based management planning process that covers the principles of Sustainable Development including the human and social elements of sustainability, not just the ecological and environmental components. For example, it provides guidance on the good or bad side of cage fish farming operations on people. The framework tries to address issues such as the impact of cage fish farming on the water body's ecosystem as well as on the communities surrounding it. It further addresses the impact of human activities on the water body's catchment on the sustainability of cage fish farming. The CCRF proposes the use of the Precautionary Approach in situations where the carrying capacity of a water body is not known.

The United Nations Environment Programme (UNEP) is the leading environmental authority in the United Nations system. UNEP uses its expertise to strengthen environmental standards and practices while helping implement environmental obligations at the country, regional and global levels. The EAC Partner States could leverage UNEP's expertise and a range of resources to formulate environmental standards and best practices for sustainable management of cage fish farming in the EAC region.

1.3.2 Continental Level

The AU-IBAR Policy Framework and Reform Strategy for Fisheries and Aquaculture (PFRS) underscores the importance and complementarities of aquaculture and Fisheries sub-sectors in Africa, and it provides a framework policy guidance on coherent policy development for fisheries and aquaculture, institutional arrangements to ensure coherence in policy development and implementation by AU Member States. A Policy Guide Handbook on Africa's Blue Economy (ECA, 2016) provides a framework to address the ecosystem and human wellbeing by optimizing on economic, social, and environmental sustainability. Optimization can only be achieved if resources governance can embrace the principles of interconnectedness of sectors that share space and inclusion policies. The tool provides policy formulators with simple guidelines and options for aligning their policies with the Blue Economy concept. It also provides a stepwise process on how to mainstream the Blue Economy concept into continental, sub-regional, and national policies, plans, laws, regulations, and practices for sustainable development. A complimenting tool is the Africa's Blue Economy Strategy that provides strategic interventions for implementation of blue economy policies in the African continent.

Launched in 2018, the African Continental Free Trade Area (AfCFTA), proposes to create a single market for goods and services, with free movement of people and investments across 55 countries. It also promises to promote trade liberalization and improve interactions within the existing regional economic communities. With AfCFTA operational, a

market of 1.2 billion people and a combined gross domestic product of $2.5 trillion will be brought together (EAC 6th Development Strategy 2021/22-2025/6).

Common Market for Eastern and Southern Africa (COMESA), Southern African Development Community (SADC) and the EAC Regional Economic Communities have initiated a free trade tripartite agreement that promotes elimination of tariffs and non-tariff barriers to foster deepening of regional and intra-regional integration. However, the regional fish trade remains informal. Policy guidance is needed to establish the volume of farmed fish, what the regions produces and what is being traded within regions and between regions and establishing the contribution of this trade to regional economies.

1.3.3 Regional Level

The Treaty for the Establishment of EAC identifies fisheries and aquaculture as one of the areas of cooperation by the Partner States. *Article 114 sub-Article 2(b) (ii)* and *(iii*) provide for the adoption of common policies and regulations for the conservation, management and development of fisheries resources including establishment of common fisheries management and investment guidelines for inland waters.

The main reference frameworks in the region include: the EAC Regional Strategy and Implementation Plan for Sustainable Aquaculture (2015 – 2020) which provides guidance to aquaculture development in the region; the EAC Food Security Action Plan (2011-2016) which calls for improved production of fisheries resources; the LVFO Strategic Plan (2021-2025) which calls for competitive and sustainable fisheries and aquaculture development in the EAC; the Convention for the Establishment of the Lake Victoria Fisheries Organization (1994, amended in 2016) that promotes sustainable utilization of the fisheries and aquaculture resources in the EAC water bodies; the Agriculture and Rural Development Policy for the EAC (2006) which calls for promotion of conservation, sustainable development, management and utilization of

fisheries resources for the benefit of communities in the Partner States; the 6th EAC Development Strategy (2021/22 – 2025/26) programming focus remains infrastructure development, human capital for long term skills development, consolidation of the EAC Common Market, funding of regional initiatives, strengthening the financing and banking systems, expanding savings and investment, Research & Development (R&D) and security and governance; The Protocol for Sustainable Development of the Lake Victoria Basin (2003) which provides an enabling environment for regional development including fisheries; the EAC Sanitary and Phyto – Sanitary Protocol which seeks to ensure food safety; and guidelines for establishment and operation of cage fish farming in the East African Community (2018).

1.3.4 National Level

At the national level, Partner States have visionary policies, legal instruments and other strategic documents for the management and development of cage operations. This has included National Cage Culture Guidelines (Uganda), National Aquaculture Policy (Kenya), Draft National Cage Culture Guidelines (Tanzania) and The Directorate of Water, Fishery and Fish Farming under the Ministry of Agriculture and Livestock in Burundi.

2.0 BROAD POLICY DIRECTIONS

2.1 VISION

The vision of the policy is *a Sustainable, Gender Equitable and Commercially Competitive Cage Fish Farming Industry in the East African Community*.

2.2 MISSION

The mission is *to develop a vibrant and sustainable commercial cage fish farming in the EAC and ensure that the industry is managed and developed for delivery of food and nutrition security, improved*

livelihoods, wealth creation, and regional economic growth and prosperity.

2.3 GOAL

The goal of the policy to promote sustainable, gender equitable and commercially competitive cage fish farming industry in the EAC region

2.4 OBJECTIVES

The Overarching objective of the policy is to increase the production and productivity of cage fish farming for enhanced consumption and trade in the EAC region.

The specific objectives of the policy are to:

1. Undertake zoning and establish water body carrying capacity; monitor water quality and the health of the environment for management and development of sustainable cage fish farming in the EAC region;
2. Strengthen capacity of cage farmers, value chain players and regional fisheries and aquaculture training, research and development institutions;
3. Put in place effective governance and harmonize institutional frameworks and operations for management and development of sustainable fish farming operations in the EAC region;
4. Promote farmer access to input supply, financing, marketing and trade information;
5. Mainstream risk assessment and management in cage fish farming enterprises; promote sharing of data and information accruing from cage fish farming operations in the EAC region; and
6. Address cross cutting and emerging issues pertaining to cage fish farming in the EAC region.

2.5 POLICY GUIDING PRINCIPLES

The Policy is guided by the following principles:

2.5.1 The precautionary approach

An important element of the FAO CCRF is the precautionary approach that recognizes the scientific uncertainty inherent in aquaculture management and species introductions. Cage aquaculture management and development measures should be based on the best scientific evidence available.

2.5.2 Sustainability and Environmental integrity

Water resources which are the base of cage fish farming are threatened by degradation of the environment. There is need for better knowledge about possible interactions between water users and the environment to minimize the potential for habitat degradation. Programs from different EAC Partner States would be geared towards environmental restoration, the results of these initiatives are expected to lead to clean environment and thus to increase fish production from commercial cage aquaculture in the EAC Partner States.

2.5.3 Ecosystem Based Approach to Fisheries and Aquaculture Management

Partner States will promote utilization of fisheries and aquaculture resources while taking into account their effects on the ecosystem and the effects of the ecosystem on them.

2.5.4 The user-pays principle

The ‘user-pays principle’ provides that those who use or benefit from natural resource use should contribute towards the costs of managing and developing those resources.

2.5.5 Poverty alleviation

The cage aquaculture activities contribute to poverty alleviation and to the prosperity of the EAC Partner States. Clear and measurable mechanisms

of poverty alleviation will be incorporated into sector strategic and action plans at all levels.

2.5.6 Gender and equity

The women, youth and marginalized groups will be actively involved in cage aquaculture management in terms of decision-making and share in both sector responsibilities and benefits. Clear and measurable mechanisms will be incorporated into sector strategic and action plans at all levels to address inequities experienced by women, youth and the marginalized.

2.5.7 Public Private Partnership (PPP)

The Partner States will promote PPP in cage aquaculture management and development.

2.5.8 International Instruments

The EAC recognizes and confirms its commitments regarding cage aquaculture under international obligations including but not limited to treaties, conventions and development initiatives such as Sustainable Development Goals.

2.5.9 Community participation

The management and development of cage aquaculture resources will involve a participatory co-management approach based on partnership in decision-making between governments, fisheries communities and the private sector.

2.5.10 Demand driven and applied research

Participatory research agenda setting will be encouraged to obtain relevant data and information for decision making processes in the management and development of cage aquaculture within the EAC region.

2.5.11 Cooperation

Implementation of the policy will require total collaboration and cooperation by the relevant cage aquaculture value chain actors at the international, continental, regional, national and devolved/decentralized levels.

2.5.12 Transparency and Accountability

The implementation of the policy will require transparency and accountability in every action carried out.

3.0 POLICY PRIORITY AREAS

3. 1 SPATIAL PLANNING AND ENVIRONMENTAL HEALTH MONITORING FOR SUSTAINABLE CAGE FISH FARMING IN THE EAC REGION

3.1.1 Current status

In the EAC region, total annual fish production from freshwater bodies is currently stabilized at about 1.7 million Mt (see Section 1.2) and it tends to continue declining with time, despite the management efforts being made by Partner States. The region is grappling with fishing over-capacity and illegal, unreported and unregulated (IUU) fishing practices that are exacerbated by the open access nature of regional fisheries that cause difficulties in the enforcement of fisheries laws, regulations and guidelines. The annual fish production from the region's aquaculture practices increased rapidly from 1,632 Mt in the year 2000 to 143,000 Mt in 2020 (World Bank, 2020). Currently the EAC annual fish production from aquaculture practices is about 100,000 Mt of which about half accrues from the fast-expanding cage fish farming sub-industry (World Bank, 2020). In the year 2020, the EAC annual fish production from aquaculture stood as follows: Burundi (150 Mt), Kenya (14,000 Mt), Uganda 56,000 Mt) and Tanzania (11,000 Mt) (Regional fisheries Statistics, 2018). However, the contribution of aquaculture production to the region's fish landed for food and trade is still low. The average

regional per capita fish consumption is about 10kg far below the 20.5kg recommended by FAO–SOFIA (2020), not surprising that national, regional, and international market demands are currently not being met. If the EAC targets to attain the global per capita consumption of 20.5 kg for its nearly 200 million people (Worldometers, 2020) and surplus fish for trade, the region will have to more than double its current annual fish production of 1.7 million Mt.

The emerging intensive cage fish farming industry in Lake Victoria and other transboundary water bodies and in the numerous small water bodies (SWBs) in the EAC (see section 1.1.2 of this document) is rapidly expanding in space and time and the technology offers potential for producing more fish per unit area of water. Experts estimate that cage fish production is more than 50 times of what is normally produced in semi-intensive pond aquaculture (FoodTech Africa, 2018). The EAC has recognized the potential of cage fish farming as an intervention that can contribute significantly to regional food and nutrition security, livelihoods, wealth creation and regional economic growth and prosperity provided that its operations are made in a sustainable manner. The bottom line is that the on-going expansion of cage fish farming practices requires adequate policy guidance and regulations. For example, in the EAC cage fish farming practices tend to proceed with little or no spatial planning and already in cage fish farming hotspots conflicts are being reported between cage farmers and other water users (For example, in the EAC, cage fish farming practices tend to proceed with little or no spatial planning. This is exemplified by reported conflicts between cage fish farmers and other water users (Kafuku, 2016 (Uganda); Msingi East Africa, 2021 (Tanzania).

Limited spatial planning of water bodies in most of the EAC water bodies is one of the constraints that prevent the region from leveraging its abundant water resources from increasing fish production through cage fish farming. According to the LVFO “Guidelines for Establishment and Operation of Cage Fish Farming in the East African Community” and aligned national strategies, it is a pre-condition that any proposed site

within a water body should be surveyed and assessed for its suitability for carrying out cage fish farming. The guidelines provide that national fisheries and aquaculture research institutions are the mandated authorities for conducting such suitability studies. The suitability studies are to focus on establishing the physical-chemical, biological and the socio-economic characteristics of a proposed site as a baseline condition. Surveyed locations and sites of a water body are to be georeferenced and subsequently bathymetrically mapped to guide cage placement within the site.

However, only small portions of Lake Victoria and other water bodies have been surveyed, georeferenced and mapped for guiding conflict-free cage fish farming investments. a GIS-based approach to the delineation of areas that have different levels of suitability for use as tilapia cage culture sites the Kenyan part of Lake Victoria, Africa. Recent studies indicate that the EAC already has considerable capacity within national research institutions for undertaking spatial planning surveys in water bodies to demarcate zones and specific sites for carrying out cage fish farming. For example, Aura et al., (2021 used a GIS-based approach to the delineation of areas that have different levels of suitability for use as tilapia cage culture sites the Kenyan part of Lake Victoria, Africa and recommended applicability of the methods to any water body in similar climatic conditions Georeferenced zones and farm sites provide templates for deterrence of imminent water user conflicts.

The status of water quality and environmental sustainability remains critical to the development of sustainable cage fish farming operations in the EAC region. The EAC is replete with water resources for the development of cage aquaculture, including the Great Lakes and numerous other trans-boundary water bodies, small water bodies (SWBs) in some of which cage aquaculture is currently being carried out. The ambient water in a cage farm-site should have good qualities including but not limited to optimum temperature, dissolved oxygen, pH and free

from excessive suspended solids, algal blooms, invasive weeds, and disease carrying organisms. Although water quality guidelines for cage operations exist in the EAC region, there is weak enforcement and there are unclear mandates and reporting mechanisms in place.

Apart from zoning and delineation of cage sites, cage fish farming in the region faces additional constraints and challenges that include but not limited to: inadequate and unstable supply of production inputs (seed and feed), high prices of imported tilapia feed brands, and high price of locally produced tilapia fingerlings; a weak knowledge and technical base; inadequate demand-driven research; weak uptake of technology and enforcement of legislation, including the EAC Guidelines for establishment and operation of cage fish farming; inadequate access to institutional financing and government subsidies; weak enforcement; unharmonized legislation and institutional processes; and the limited awareness and capacity to utilize SWBs for sustainable cage fish farming. However, these challenges are addressed in subsequent policy priority areas.

3.1.2 Policy objective

Conduct spatial planning to demarcate zones and specific cage farm sites in regional water bodies earmarked for cage fish farming and establish mechanisms for monitoring of water quality and environmental health for sustainable cage fish farming practices in the EAC region.

3.1.3 Policy Strategies

To realize the above objective, Partner States will:

i. Conduct systematic spatial planning in regional trans-boundary water bodies, inland minor lakes and small water bodies (SWBs) for the purpose of delineating zones and specific sites that are suitable for carrying out cage fish farming;
ii. Align, domesticate and enforce compliance with the *'Guidelines for Establishment and Operation of Cage Fish Farming in the East African*

Community' and put in place clear mandate and reporting mechanism for monitoring of water quality and the health of the environment in which cage fish farming is carried out;

iii. Strengthen the capacity for undertaking spatial planning within national fisheries and aquaculture research and development institutions for sustainable management and development of cage fish farming in the region; and,

iv. Promote private and public sector investment in sustainable cage fish farming and associated value chain businesses in order to increase fish production, boost per capita fish consumption and local and export trade in fish to spur regional economic growth.

3.2 CAPACITY BUILDING, RESEARCH AND DEVELOPMENT FOR SUSTAINABLE CAGE FISH FARMING IN THE EAC REGION

3.2.1 Current status

A recent FAO (2021) study indicates that the EAC region has a number of universities that offer graduate degrees in fisheries and aquaculture. They provide knowledge and impart some practical skills on intensive fish farming technologies, including cage fish farming, Recirculation Aquaculture Systems (RAS), ponds, tanks and race ways. However, knowledge institutions are particularly faced with inadequate practical training facilities and pedagogical skills to pace with the emerging cage fish farming technology in the region. However, Component 2 of the on-going True Fish Project is set to address these impediments during the project period 2021-2006. There are also several formal fisheries and aquaculture training institutions in the EAC that offer general diplomas and certificates. These, too, face infrastructural deficiencies, inadequate practical facilities, curricular and pedagogical gaps and training staff, thus rendering such institutions less effective in addressing emerging intensive farming technologies.

Luckily, most of these impediments will be addressed by the recently launched EU-EAC True Fish Farming Story in Lake Victoria Basin (True Fish) Project whose overarching objective is to contribute to the development of a competitive, gender equitable and sustainable commercial aquaculture with a view to supporting economic development and sustainable management of natural resources in the Lake Victoria Basin. The 5-year project covers the following components: 1. Business (access to commercial networks), 2. Skills (availability and quality of local skilled workers in aquaculture-related businesses) and the last Component 3. Sustainability (sustainable and bio-secure regional aquaculture production system).

FAO (2021) established that only between 20-60% of students graduating from regional universities and fisheries and aquaculture training institutions in the past 10 years were absorbed into the fisheries sector. The low absorption rate is attributed partly to the low wage bills in the public and private sectors as well as graduates' inadequate hands-on practical competencies. There is an obvious need for upgrading infrastructure and reviewing curricular of regional fisheries and aquaculture training institutions for effective delivery on knowledge, skills and acumen required by aquaculture operators, including cage fish farmers, as well as other farmed-fish value chain actors.

Demand-driven research on various aspects of cage fish farming and the entire farmed-fish value chain in the EAC region is currently constrained by inadequate funding from both the public and private sectors. Currently, regional aquaculture development budgets have not allocated sufficient funding for research on breeding programmes that target the production of quality tilapia and catfish strains from indigenous reference brood stock populations and quality fish feeds. The region is still having inadequate infrastructural capacity and manning capability for undertaking genetic research, including selective breeding programmes, that target the production of quality tilapia and catfish strains from locally available reference brood stock genetic resource. Consequently, cage fish farming operators are in a paradox; to continue with the usually slow growing

indigenous strains, sometimes being collected directly from the same water body or continue with fast growing imported tilapia hybrids.

However, there is a ray of hope on this scenario. A recent research on cichlid fish in Tanzania (Bradbeer et al., 2020) indicates that the region holds many indigenous tilapia species that qualify as suitable candidates for use in selective breeding programmes that target the production of fast growing and disease resistant strains. Already there are uncoordinated selective breeding programmes underway in private farms and government institutions that are at different stages of success, a situation that calls for a coordinated and collaborative regional research in this area. Luckily, the cost of modern equipment for undertaking selective breeding programmes has reduced over the years while there are hosting upgradable facilities within regional research and development institutions and a pool of trainable cohorts of local genetics experts.

The development of cage fish farming in the EAC region is partly constrained by ineffective extension services. Whereas researchers in the field of cage fish farming have generated a good body of knowledge and information, these resources are often not as widely disseminated to cage farmers and value chain players as expected. Although the number of transmission vehicles such as community radios, TV programmes, print and social media, exhibitions, business to business meetings, has increased with time, the number of extension staff has not paced with the regional demand. Consequently, there exists a weak linkage between training and research institutions, extension services agents and farmers, a linkage that would make up a recipe for a rapid aquaculture development in the EAC region. In an ideal and effective extension service: researchers obtain management information from operators out in the field to enable them to formulate demand-driven research; extension agents need information from researchers for improvement of best farm management practices (BMPs) whilst trainers need updates from research and practice to deliver effective training and awareness to farmers and value chain players. This synergy guarantees systems efficiency, increase production and productivity in the cage fish farming industry.

Additionally, farmers' access to aquatic animal health services is of utmost importance given the thriving and proliferation of cage farms in the EAC regional water bodies, even though there have been fewer reported incidences of fish disease infections. However, the EAC fisheries and aquaculture research and development institutions have insufficient capacity on aquatic animal health to cope with the expanding nature of the industry. It is a market requirement that for safety and quality, farmed fish should be produced from bio-secure and disease-free waters.

3.2.2 Policy objective

To capacitate regional fisheries and aquaculture research and training institutions; promote demand-driven research and support effective and inclusive extension services for the development of sustainable cage fish farming in the EAC region.

3.2.3 Policy Strategies

To realize the above objective, Partner States will:

i. Strengthen research-training-extension linkage for effective generation, dissemination and utilization of knowledge and skills for increased cage fish production and productivity in the EAC region;
ii. Facilitate implementation of the True Fish Story Project (2021-2025), particularly Component 2.1 Sills development which will review curricular and upgrade training and research infrastructure, facilities and equipment in regional fisheries development institutions;
iii. Support regional training, research and development institutions in the production of literal practical guides, reference books and extension manuals on various aspects of aquaculture, inclusive cage fish farming;
iv. Establish repositories for tilapia and catfish reference genetic resources and support selective breeding programmes in regional

research and development institutions with the view to produce strains that are fast growing and resistant to diseases and environmental conditions;

v. Promote farm Best Management Practices (BMPs) for increased fish production and productivity from cage farms;
vi. Promote research and production and distribution of quality local fish feeds and fingerlings to meet 100% of the regional demand;
vii. Promote demand-driven cage fish farming research for sustainable aquaculture development in the EAC region;
viii. Encourage and support the private sector to establish Seed Multiplication Centres (SMCs) by utilizing reference brood stock seed from regional fisheries and aquaculture research centres;
ix. Capacitate regional fisheries and aquaculture institutions by supporting infrastructure, development, training and research on aquatic animal health.

3.3 INPUT SUPPLY, FINANCING, MARKETING AND TRADE FOR SUSTAINABLE CAGE FISH FARMING IN THE EAC REGION

3.3.1 Current Status

The development of cage fish farming in the EAC is currently constrained by inadequate production supply of inputs including quality fish feeds and fingerlings; production and research materials and equipment, such as water quality monitoring equipment, hatchery production equipment, net webbings, twines and ropes most of which are still being imported from outside the EAC region. Regional policies are in unison to promote production of these inputs from within the region in order to reduce costs of inputs and promote regional youth employment. However, the current vibrancy nature of cage fish farming in regional water bodies appear to out-phase this intention. This situation has pressed for a transitional intervention to allow the importation of quality fish feeds from outside the region. It is estimated that more than 60% of floating fish feeds for cage

farms in the EAC region comprises imported brands that include but not limited to Kuodijs (Holland), Cargill (Vietnam), NOVA Tech (Zambia), and Aquaxcel feed brand from Egypt, Aller Aqua, and Raanan as well as imported supplies from Spain, Brazil and Mauritius. However, cage fish farmers consider the supply and price of imported fish feeds to be unpredictable and expensive respectively (Komugisha et al. 2018).

Meanwhile, the EAC Partner States have a limited number of small-scale hatcheries for production of tilapia and catfish fingerlings mainly for stocking on-farm cages or ponds. Although all the hatcheries are categorized as small (Haylor and Muir,1998), nevertheless, they have relatively higher installation capacities and could produce more fingerlings if demanded by other farmers. A few hatcheries have demand from other farmers but it does not seem to be a good business at the moment. Buyers of tilapia fingerlings consider prices offered to be unaffordable for stocking medium to large scale cage farms. Specialized, registered and accredited large-scale commercial tilapia or catfish hatcheries are currently limited in the EAC region. Lack of a fast-growing indigenous reference broodstock and low demand for tilapia fingerlings appear to constrain this business although with the expansion of cage fish farming in the region the business has prospects for opening up.

Quality tilapia fingerlings produced from regional hatcheries are estimated to meet well over 60% of the demand whilst the remaining 40% is accounted for by importation of hybrid tilapia from outside the EAC whilst others come from local farms (self-production) or obtained directly from water bodies (Komugisha et al. 2018; Msingi East Africa, 2021). It has to be noted here that self-production of seed from neighboring farms or obtaining fingerlings directly from a water body are not recommended practices in aquaculture. In a lake for example, several *Oreochromis* species co-habit and there are chances of introgression (conspecific mating is possible in fish) and other sources that compromise the genetic vigour and purity. To justify these practices, some form of scientific selection must be involved. In general, local producers and multipliers of fingerlings in the EAC are constrained by a lack of availability of quality

tilapia broodstock. Selective breeding programmes are on-going in uncoordinated manner within regional research and development institutions and in commercial farms but currently there are no published tilapia or catfish strains to bank on.

Cage operators have limited access to capital and affordable credit. Promotional agricultural banks and financial institutions that are characterized by issuing long term credits and low repayments rates to cage farmers and other players in the fish value chain are limited in the EAC region. . For example, although net webbings and cage manufacturing materials are locally available, there is a limited number of medium to large scale manufacturers of these inputs. Affordable credit could stimulate private sector interest to establish inputs production companies for cage frames, nets, ropes and twines across the EAC region thereby minimizing the cost of imports and logistics. However, banks and financial institutions are naturally risk averse, they offer short repayment periods, high interest rates as well as data, statistics, historic investment information and collateral as lending assurances, requirements that start-ups and many prospective investors fail to meet.

In the EAC region, markets for cage farmed-fish are generally weakly structured and fish marketing is formalized in three main ways: the producer (farmer) sets farm gate price for fish and sells it in bulk to a wholesaler who in turn sells it to traders in the market centres, hotels and restaurants who eventually sell to consumers; majority of cage farmers only harvest fish when they have a ready market at the farm gate since cage harvesting is quite easy; and the practice that a farmer produces fish in cages and upon harvesting the fish is transported in refrigerated vans to distant market outlets is just emerging, particularly with big farmers. Generally, the lack of certification process and product traceability in cage fish farming operations disqualifies products entry into lucrative export markets. Currently there is no clear physical market infrastructures and information systems, and this is coupled with little promotional effort in domestic, regional and international trade in cage farmed-fish.

3.3.2 Policy objective

To promote investments in the production of fish feeds ingredients and fish feed, fingerlings and cage materials and equipment from within the EAC region, improve farmer access to financing and insurance, and undertake structuring of fish markets and harmonization of certification protocols to facilitate entry of cage-farmed fish into regional and export markets.

3.3.3 Policy Strategies

To realize the above objective, Partner States will:

i. Sensitize and incentivize local investors, attract foreign investors and local, regional and foreign partners to invest in the production of fish feeds, cage materials and equipment from within the EAC region;
ii. Support public and private sector reference hatcheries to produce quality brood stock seed for distribution to feed multiplication centres (FMCs) and make quality seed available to cage farmers at affordable price;
iii. Improve farmer access to capital and credit facilities and insurance by promoting the establishment of financing schemes in existing banks and financial institutions that are characterized by issuing long term credits and low repayment rates;
iv. Institute mechanisms to initiate certification processes and product traceability for cage production in order to meet product safety and quality qualifications for entry into export trade and markets, including the EU and US markets;
v. Institute mechanisms for the structuring of farmed fish markets in the region and promote regional and intra-regional fish trade.

3.4 GOVERNANCE, REGULATORY AND INSTITUTIONAL FRAMEWORK

3.4.1 Current Status

Lake Victoria Fisheries Research Organization (LVFO) has the mandate to coordinate the management and development of cage aquaculture in the EAC region. Whereas the CCF Policy provides the framework for such coordination, the LVFO - Regional Aquaculture Working Group (RAWG) has the responsibility to generate information to support decision making of the organization in matters related to cage aquaculture management and development in the EAC. National policies in the EAC were developed in alignment with FAO's Code of Conduct for responsible Fisheries (CCRF), Ecosystem Approach to Aquaculture (EAA) and the AU-Policy Framework and Reform Strategy (PFRS). These policies provide for governance, regulatory and institutional framework that are generally supportive of cage aquaculture development. The prevailing governance structures for cage fish farming in the region are somewhat dissimilar; some Partner States already have specific aquaculture policies and regulations that adequately address cage fish farming while in others cage culture is regarded as one of the technologies that needs to be sustainably deployed in national water bodies. At the regional level, the EAC published in 2018 '*Guidelines for Establishment and Operation of Cage Fish Farming in the EAC'* as the agreed framework for undertaking sustainable cage fish farming in the EAC region.

The EAC Partner States have governance structures and institutional operations that are generally supportive to national cage fish farming practices. These include policies, legislation and guidelines on the environment, land, water, fisheries and aquaculture, trade and investment. However, these instruments are not regionally harmonized a situation that constrains the management and development of sustainable cage fish

farming taking place in transboundary water bodies in the EAC. Although prospective and active cage fish farmers interact with most of these governance structures through their respective institutions, the main institutions are: the national environment management institutions (e.g. National Environment Management Authorities (NEMAs) and National Environment Management Council (NEMC); national water basin authorities, regional trans-boundary water authorities (e.g. Nile Basin Water Authority, NWBA) and regional fisheries and aquaculture development and research institutes (e.g. Fisheries and aquaculture departments, national fisheries and aquaculture institutes (Tanzania Fisheries Research Institute, TAFIRI; Kenya Marine and Fisheries Research Institute, KMFRI and National Aquaculture Research Organization, NARO-Uganda and Burundian Institute for Agricultural Science-(SABU).

It is a legal requirement in the EAC that any person wishing to invest in cage fish farming in any water body must undertake project Environmental Impact Assessment (EIA) before project commencement. Although regional EIA laws and regulations were developed in alignment with international EIA frameworks, differences in national contexts and frequent amendments of the principle legislations have resulted in unharmonized regulations particularly in transboundary water bodies. In general, investors in cage fish farming consider EIA procedures excessively bureaucratic, expensive and it takes a long time to obtain EIA Clearance Certificates. In recent times, some of these authorities have devolved EIA approval procedures to the district level while others have categorized cage operations as borderline investments between EIA mandatory and EIA non-mandatory projects depending on the intensity of impacts they are likely to cause to the environment. However, such devolution and the entire EIA process need to be harmonized in all EAC Partner States.

For technical and practical reasons, cage fish farming operations in the EAC are distributed in suitable sheltered sites within water bodies. Potentially, such zones and sites could be developed and governed into cage-parks or cage-clusters to facilitate: farmed-fish marketing organization, bulk procurement of cage farm inputs, effective delivery of extension services and farmer-access to cold chain facilities and effective governance of cage operations, among other benefits. Although this concept is championed by Uganda, its potential is yet to be practically developed in the EAC region. Similarly, in Uganda there have been cases of dual governance of cage fish farming operations between the fisheries department and the military. In addition, the existing unharmonized chain of command between the central governments and the devolved/decentralized governance structures in the EAC has been blamed for constraining the sustainable management and development of cage fish farming in regional trans-boundary and inland water bodies.

3.4.2 Policy objective

To harmonize governance, regulatory and institutional framework and operations for smooth management and development of cage fish farming in the EAC Region.

3.4.3 Policy Strategies

To realize the above objective, Partner States will:

i. Promote the implementation of the regional Cage Fish Farming Policy in alignment with FAO's Code of Conduct for Responsible Fisheries (CCRF), Ecosystem Approach to Aquaculture (EAA) and the AU-Policy Framework and Reform Strategy (PFRS);
ii. Harmonize and enforce effective governance and institutional frameworks and operations in the management and development of cage fish farming, particularly in trans-boundary water bodies in the EAC;

iii. Establish more effective chain of command between the central governments and the devolved/decentralized governance structures for effective management and development of cage fish farming in the EAC;
iv. Ensure that the management and development of cage fish farming and associated cage fish value chain in the EAC are solely governed by the ministries responsible for aquaculture and fisheries;
v. Put in place governance procedures for establishment of cage-parks/cage-clusters and promote their management through private-public partnership (PPP), farmer associations and cooperatives;
vi. Harmonize reforms in EIA and water permit procedures for ease of carrying out cage fish farming particularly in trans-boundary water bodies in the EAC region;
vii. Undertake block EIA in priority water bodies and lease out surveyed blocks to investors as a means of reducing bureaucracy, and minimizing the time and costs spent by prospective investors before the issuance of an EIA Clearance Certificate;
viii. Enforce compliance with *'Guidelines for Establishment and Operation of Cage Fish Farming in the EAC'* for sustainable management and development of cage fish farming in the EAC region.

3.5 RISK MANAGEMENT, KNOWLEDGE AND INFORMATION SHARING FOR MANAGEMENT AND DEVELOPMENT OF SUSTAINABLE CAGE FISH FARMING

3.5.1 Current Status

Cage fish farming operations are usually beset with a number of risks, including health, safety, environmental, financial, technological, investment and expansion. As investments accrue profits, they usually attract re-investment in infrastructure development and operations. If this

investment continues with little or no planning, it could lead to exceeded carrying capacity of a water body, environmental degradation, financial loss and eventually result in unsustainable cage fish farming operations. Environmental risks include increasing the number of escaping fish from cage net bags thereby causing unwanted genetic admixtures and losses; uneaten feeds may result in decomposition processes that cause poor oxygen supply in cage sites, and reduced productivity of farm operations; health risks including the possibility of farms being affected by water-borne disease-causing pathogens such as *schistosomiasis* and *salmonella*. Cage-farmed fish affected by disease-causing pathogens threaten local and export marketability of cage-farmed fish.

Likewise, continued use of wood and timber as cage frames has potential to cause considerable local deforestation in surrounding communities and cage breakage during rough weather resulting in fish and financial losses. Cages with fish are a valuable property whose safety is always a farmer's concern. Thieves of fish usually tear cage nets to remove fish from cages thereby causing huge infrastructure and financial losses to farmers who are then forced to establish security measures as an additional running cost. Those who dive to make under-water observations on cage net bags or scrubbing clogged nets bear risks of injury. Once risks are identified, four principles of risk management are applicable, these are: Accept risk when benefits outweigh the cost; Accept no unnecessary risk; Anticipate and manage **risk** by planning and Make risk decisions in the right time at the right level.

On the other hand, cage fish farming industrial operations continue to generate data and information pertaining to transitioning technology, new practical knowledge and skills in cage fish farming and associated business and entrepreneurship, among others. However, currently there are no existing mechanisms for collection and management of data and information resulting from cage fish farming operations and associated value chain businesses for sharing among value chain actors and

stakeholders. Such information and data accruing from cage fish farming are yet to be incorporated into standard fisheries data and information management and sharing systems in the region.

3.5.2 Policy objective

To promote the use of risk management tools in identifying and assessing risks involved in cage fish farming investments as well as putting in place mechanisms for knowledge and information sharing among cage fish farmers and value chain actors.

3.5.3 Policy strategies

To achieve this policy objective, Partner States will:

i. Collate risk assessment tools for anticipating, managing and making risk decisions in the right time at the right level and disseminate those skills widely to prospecting and practicing cage fish farmers and investors across the farmed-fish value chain;
ii. Put in place mechanisms for collection and management of data and information resulting from cage fish farming operations and associated value chain businesses for sharing among value chain actors and stakeholders;
iii. Incorporate data and information accruing from cage fish farming into standard fisheries data and information management and sharing systems in the region.

3.6 CROSS CUTTING AND EMERGING ISSUES

i. Climate change and environment

As an externality to cage fish farming operations, farmers must mitigate climate change and build resilience to its impacts. Climate change has significant impacts on aquatic ecosystems, as it modifies biological, chemical, and physical conditions, which affects the sustainability of

human uses of aquatic resources and environment. Therefore, resilience to climate change should be strengthened to ensure that food security and livelihoods are guaranteed for the communities whose livelihoods depend on fisheries and aquaculture. Furthermore, environmental pollution because of human activities and rapid increase in human population could impair the ability of these aquatic ecosystems to provide sustainable benefits.

ii. Mining, quarrying, exploration and extraction of oil and gas

The increasing quarrying and mining activities; exploration and extraction of oil and gas in freshwater bodies impact negatively the environment including cage fish farming activities in the region. This has potential to result in loss of socio-economic benefits and livelihoods of the dependent communities.

iii. Gender equity, youth, women and men

Mainstreaming gender and engagement of the youth and the disenfranchised in cage fish farming is key in ensuring equity and sustainability. Currently, cage fish farming production processes are generally gender insensitive and this has a negative impact on the performance of this sub-industry in the EAC. Weak enforcement of legislations has resulted in women and men having unequal access to water and land rights in many communities that surround water bodies, whilst training on technical and managerial skills on cage fish farming is largely male-dominated. As a result, cage construction and assembling skills, placement into water body sites, feeding of fish, diving for underwater observations, and scrubbing nets to remove fouling sticky debris, mending of perforated nets, harvesting, processing, transporting, storage and selling activities are still largely male-dominated. WATER

FOR LIFE 2005-2025, [1]the resolution establishing the International Decade for Action, calls for women's participation and involvement in water-related development opportunities. Therefore, there is a need to put in place mechanisms to promote and protect women's rights and the marginalized to participate in all aspects of cage aquaculture value chain.

iv. Invasive aquatic weeds

Most of the EAC major freshwater bodies are affected by invasive aquatic weeds because of excessive nutrients input. The most common invasive aquatic weed species include water hyacinth (*Eichhornia crassipes*) and Giant Silvania (*Salvinia molesta*). Water Hyacinth has in the past 5 years has become a nuisance that causes several problems in cage fish farming in Tanzania (Komugisha et al., 2018), including total cover of cage farms necessitating farm site relocation to the dismay and cost of farmers.

v. COVID-19 and HIV-AIDS

The two major challenges facing the cage fish farming and fishing communities of Lake Victoria, other transboundary and inland water bodies are HIV/AIDS and COVID 19 pandemic. The Partner States know well the extent and cost of HIV/AIDS and COVID 10 in lives as well as to the national economies. Whereas the fishing communities are particularly vulnerable to HIV/AIDS and COVID 19 because of high mobility, daily cash income, cultural practices, the lower status of women in many cultures and attitudes to risk. Cage fish farming farm gate markets often involve meeting of people (including fisherfolk) in relatively large numbers which could facilitate infections, particularly of COVID virus. Likewise, HIV AIDS is still an issue of concern for which farmer communities must be facilitated on how to effectively address it. The LVFO HIV/AIDS Strategic Action Plan of 2006 has a vision to see 'Fishing (and cage fish farming) communities free from HIV/AIDS', while the purpose is 'HIV prevalence reduced, and impacts mitigated in fishing (and cage fish farming) communities. The Fisheries Management

[1] Based on a policy brief that was developed by the Inter-Agency Task Force on Gender and Water (GWTF), a sub-programme of both UN-Water and the Interagency Network on Women and Gender Equality (IANWGE) in support of International Decade for Action, 'Water for Life,' 2005-2015.

Plan (FMP IV) of 2021/22-2025/26 will review and document the impact of Covid-19 on fisheries (and cage fish farming) and propose mitigation measures; The EAC Development strategy 2021/22-2015/26 will also consider the regions medium term strategic responses to contain the devastating effects of COVID 19.

3.6.1 Policy objective

To promote gender equity, strengthen resilience and reduce vulnerabilities of cage fish farming to emerging and cross cutting issues such as HIV Aids, COVID-19 pandemic, climate change, mining, quarrying, and exploration and extraction oil and gas.

3.6.2 Policy strategies

To realize the above policy objective, Partner States will:

i. Promote the use of science to inform policy decisions on all cross-cutting and emerging issues in cage fish farming and resultant businesses in the EAC;
ii. Promote appropriate measures for the control of invasive aquatic weeds; and
iii. Put in place early warning systems for alerting cage farmers on impending weather and climate vagaries;
iv. Compensate and re-allocate to new sites cage fish farmers affected by mining, oil and gas explanatory and extraction activities;
v. Strengthen legislation and facilitate gender equitable access to water areas that are suitable for undertaking cage fish farming and nearshore land resources for carrying out land-based operations;
vi. Promote gender equitable capacity building in technical and managerial skills through training and acquisition of access to market linkages and information on cage fish farming value chain operations, with a laser focus on youth and women;
vii. Promote: gender equitable capacity building in technical, business and managerial skills for effective management and development of cage fish farming in the EAC;

viii. Facilitate gender equitable access to grants, micro-credit on concretionary terms and promote creative alternative financing mechanisms to gender-sensitive organizations to enable them engage in profitable cage fish farming industrial activities;
ix. Implement the EAC Development Strategy (2021/22-2025/26) and the LVFO FMP IV (2021/22-2025/26) to contain the devastating effects of COVID 19 pandemic, review and document its effects on cage fish farming and propose ways to mitigate it.

4.0 INSTITUTIONAL FRAMEWORK FOR POLICY IMPLEMENTATION, MONITORING AND EVALUATION

4.1 IMPLEMENTATION

4.1.1 Lake Victoria Fisheries Organization (LVFO)

Lake Victoria Fisheries Organization (LVFO) will play a vital role on the implementation of the strategic development programs identified in this policy and monitor implementation in the Partner States. LVFO Secretariat has mandate to:

i. Mobilize resources to support implementation of the CFF Policy;
ii. Coordinate the development of regional plans of action for the implementation of this policy and report progress against the implementation log frame;
iii. Coordinate and deliver programs on region-wide needs of common interests;
iv. Develop and implement Memoranda of Understanding with other Regional Fisheries Management Organizations in the EAC;
v. Promote cooperation and human capacity building in the EAC Partner States;
vi. Assist in the development of plans for peer-to-peer learning where policy makers, private sector and technical experts can visit countries/centers of innovation and success;

vii. Develop a communications strategy to keep all national, regional and international partners up-to-date with progress;
viii. Update the priorities in the implementation log frame periodically to ensure continuing relevance;
ix. Identify and promote opportunities through which regional organizations and Partner;
x. States can exchange their experiences and know-how; and
xi. Facilitate new initiatives to improve understanding of the importance and role of cage fish farming to Partner States.

4.1.2 EAC Partner States

The primary responsibility for implementing the policy lies with the Ministry in-charge of the aquaculture sub sector within the Partner States. The ministry will regulate, promote, support, guide, and coordinate the implementation of reforms through broad consultative processes with other stakeholders. At Partner State level, action plans of priority actions to be undertaken will be developed. Other roles and responsibilities include:

i. Advocating for cage aquaculture development needs to be given prominence in national government development plans and initiatives;
ii. Creating internal conditions in which the sub-sector is valued, and implementation of the
reforms is encouraged and supported at the most senior levels of government;
iii. Seeking external funds from donors and other development partners to support implementation of the provisions of the policy and effect appropriate reforms;

iv. Investing in capacity development to the maximum extent possible using internal funds;
v. Promoting both vertical and horizontal partnerships for implementing reforms;
vi. Ensuring national priorities are continually reviewed against current and emerging issues and are taken into consideration in applying strategies set out in this policy;
vii. Reporting national progress on policy strategic actions on the implementation of the cage aquaculture Policy for the EAC;
viii. Source resources for creating loan guarantee funds for investments in cage aquaculture; and
ix. Coordination and collaboration with cage aquaculture stakeholders and related sectors in all matters of conservation, management, development.

4.1.3 Decentralized/Devolved Governments

Ensure that information on which to base national reforms and development plans is available and communicated to stakeholders at all levels. More specifically, to:

i. Create awareness among stakeholders on the importance of the reform and development process;
ii. Develop the capacity to monitor the implementation of the reforms and developments;
iii. Develop mechanisms to ensure the effective involvement of all key stakeholders in the implementation process;
iv. Promote cage aquaculture sub-sector at all levels;
v. Secure adequate funding for implementation of reforms/development;
vi. Ensure that hygienic conditions and sanitary facilities are maintained at all farmed fish markets;
vii. Adopt appropriate practices and ensure cage farmers and operators receive the technical guidance and advisory services on better cage aquaculture practices;

viii. Monitor and evaluate activities in cage aquaculture; and,
ix. Adopt and implement invasive weeds management and control strategies.

4.1.4 Development partners

Development Partners have a critical role to play in technical and financial support of fisheries and aquaculture projects and programs. This is in addition to facilitating reforms and in creating the institutional conditions to ensure the benefits of appropriate policies and reforms highlighted in the EAC fisheries policy are sustained.

4.1.5 Civil society

i. Develop and implement public awareness campaigns and demonstration actions on specific cage fish farming issues;
ii. Facilitate multi-stakeholder activities and events such as round table discussions, exhibitions, business to business meetings and engaging the public and private sector in cage fish farming development agenda;
iii. Demonstrate practical ways of overcoming obstacles and barriers in adopting best management practices (BMPs);
iv. Test the feasibility and efficiency of innovative technologies and their applications;
v. Improve and broaden networks and coalitions;
vi. Co-finance specific activities;
vii. Organize capacity building activities;
viii. Contribute to the introduction, pilot use and evaluation of innovative financial instruments;
ix. Resource mobilization for fisheries and aquaculture management and development;
x. Disseminate results through their networks and channels; and
xi. Participate in monitoring and evaluation of fisheries activities.

4.1.6 Institutions of higher learning and research

i. Build capacity and conduct demand driven research;
ii. Capacity building of technical staff and other stakeholders in cage fish farming along the value chain;
iii. Technology generation and transfer; and,
iv. Participate in policy review and development.

4.1.7 Private sector

i. Investing in cage fish farming production and enterprises along the value chain;
ii. Promoting value addition and market linkages;
iii. Advocating for policy reforms; and
iv. Participate in policy review and development.

4.1.8 Cage farmer's associations and aquaculture associations

i. Conducting Fish farming, fishing and fish processing in line with approved policies and laws;
ii. Participate in fisheries co-management;
iii. Participate in development of by-laws;
iv. Cultivate saving culture and contribute to fisheries and aquaculture management and development; and
v. Participate in policy review and development.

4.2. MONITORING AND EVALUATION

Effective monitoring and evaluation will depend on coordinated effort and close cooperation between Partner States and the EAC institutions. The performance of the policy implementation and outcomes will be monitored annually both at regional, national and devolved levels. This will be done through self-scoring of progress made on achieving each Objectively Verifiable Indicator (OVI).

i. The Partners States' Technical heads responsible for fisheries and aquaculture shall prepare annual progress reports. Annexes 1 and 2 provide the implementation matrix and monitoring and evaluation framework respectively. However, considering that Partner States are not at par with cage fish farming and associated risk environments and management plans may not be necessarily the same. Therefore, each Partner State will have to identify, analyze and promote pertinent risks and prepare appropriate Risk Management, Monitoring and Evaluation Plans. Risks include Capital and financing, infrastructural, biological, trade, marketing, environmental, among others. This information should be packaged and transmitted to potential beneficiaries.

ii. Partner States should subsequently harmonize risk management regimen for cage fish farming in transboundary water bodies

5.0 ANNEXES

5.1. ANNEX 1: IMPLEMETATION MATRIX

Policy Area	Policy Objective	Policy Strategies
Spatial Planning and Environmental Health Monitoring for Management and Development of Sustainable Cage Fish Farming in the EAC Region	Conduct spatial planning to demarcate zones and specific cage farm sites in regional water bodies earmarked for cage fish farming; establish mechanisms for monitoring water quality and environmental health for sustainable cage fish farming practices in the EAC region.	Undertake zoning and carrying capacity assessments of transboundary and inland water bodies earmarked for cage fish farming; monitoring of water quality and environmental health, put in place clear mandate and reporting mechanism to ensure sustainability of cage fish farming in the EAC region; Enforce compliance with the *'Guidelines for Establishment and Operation of Cage Fish Farming in the East African Community* for sustainability of cage fish farming in the EAC region*;* Strengthen capacity for undertaking spatial planning within national fisheries and aquaculture research and development institutions for sustainable management and development of cage fish farming in the region Promote science-based evidence in making decisions and in resolving conflicts between cage farmers and other water users; enhancing community involvement and collaborative approaches in managing and developing sustainable cage fish farming; Promote private and public sector investment in sustainable cage fish farming and associated value chain businesses in order to increase

		fish production, per capita fish consumption, local and export trade in fish, and spur regional economic growth.
Capacity Building, Research and Development for Sustainable Cage Fish Farming in the EAC Region	To capacitate regional fisheries and aquaculture research and training institutions; promote demand-driven research and effective and inclusive extension services for the development of sustainable cage fish farming in the EAC region	Strengthen research-training-extension linkage for effective generation, dissemination and utilization of knowledge and skills for increased cage fish production and productivity in the EAC region; Facilitate implementation of the TRUe FISH FARMING STORY PROJECT Component 2.1 Skills Development in reviewing curricular and upgrade training and research infrastructure and equipment in regional fisheries development institutions for effective delivery on demand-driven research and of competent cage fish farming personnel; Support regional training, research and development institutions in the production of literal practical guides, reference books and extension manuals on various aspects of aquaculture, and inclusive cage fish farming; Establish repositories for tilapia and catfish reference genetic resources and support selective breeding programmes in regional research and development institutions with the view to produce strains that are fast growing and resistant_to diseases and environmental conditions;

		Promote research on, and production and distribution of quality local fish feeds and fingerlings to meet 100% of the regional demand; Promote farm Best Management Practices (BMPs) for increased fish production and productivity from cage farms. Foster institutional collaboration in undertaking conservation, management and improvement of reference brood stock genetic resources; Encourage and support the private sector to establish seed multiplication centres (SMCs) by utilizing reference brood stock seed from regional fisheries and aquaculture research centres. Build capacity in aquatic animal health in regional fisheries and aquaculture research and development institutions for undertaking disease surveillance, diagnosis, control and treatment
Input Supply, Financing, Marketing and Trade for Sustainable Cage Fish	To promote investments in the production of fish feeds, fingerlings, cage materials and equipment from within the EAC	Sensitize and incentivize local investors, attract foreign investors and local, regional and foreign partners to invest in fish feed production, cage materials and equipment from within the EAC region.; Support public and private sector reference hatcheries to produce quality brood stock seed for distribution to fingerlings multiplication

Farming in the EAC Region	region; improve farmer access to financing, undertake structuring of fish markets and harmonization of certification protocols to facilitate entry of cage -farmed fish into regional and export markets;	centres (FMCs), and make quality seed available to cage farmers at affordable prices; Improve farmer access to capital and credit facilities by promoting the establishment of financing schemes in existing monetary banks and financial institutions that are characterized by issuing long term credits and low repayment rates; Support public and private sector reference hatcheries to produce quality brood stock seed for distribution to FMCs and make quality seed available at affordable cost within the region; Institute mechanisms to initiate certification processes for cage production in order to qualify for entry into export markets, including the EU and US markets; Institute mechanisms for the structuring of farmed fish markets in the region and promote regional and intra-regional fish trade
Governance, Regulatory and Institutional Framework	To harmonize governance and institutional operations, strengthen extension services and promote	Promote the implementation of the regional Cage Fish Farming Policy in alignment with FAO's Code of Conduct for responsible Fisheries (CCRF), Ecosystem Approach to Aquaculture (EAA) and the AU-Policy Framework and Reform Strategy (PFRS); Harmonize and enforce effective governance and institutional frameworks and operations in the management and development of

	demand-driven research in the management and development of cage fish farming policies in EAC Region.	cage fish farming, particularly in trans-boundary water bodies in the EAC; Establish more effective chain of command between the central governments and the devolved/decentralized governance structures for effective management and development of cage fish farming in the EAC; Ensure that the management and development of cage fish farming and associated cage fish value chain in the EAC are solely governed by the ministries responsible for aquaculture and fisheries; Put in place governance procedures for establishment of cage-parks/cage-clusters and promote their management through private-public partnership (PPP), farmer associations and cooperatives; Harmonize reforms in EIA and water permit procedures for ease of carrying out cage fish farming particularly in trans-boundary water bodies in the EAC region; Undertake block EIA in priority water bodies and lease out surveyed blocks to investors as a means of reducing the bureaucracy, time and costs spent by prospective investors before the issuance of an EIA Clearance Certificate;
Risk Management, Knowledge	To promote the use of risk management	Collate risk assessment tools for anticipating, managing and making **risk** decisions in the right time at the right level and disseminate

and Information Sharing	principles and tools in identifying and assessing risks involved in cage fish farming; putting in place mechanisms for knowledge and information sharing among cage fish farmers and other value chain actors	those skills widely to prospecting and practicing cage fish farmers and investors across the farmed-fish value chain; Put in place mechanisms for collection and management of data and information resulting from cage fish farming operations and associated value chain businesses for sharing among value chain actors and stakeholders; Incorporate data and information accruing from cage fish farming into standard fisheries data and information management and sharing systems in the region.
Cross-cutting and Emerging Issues	To promote gender equity, strengthen resilience and reduce vulnerabilities of cage fish farming to emerging and cross cutting issues.	Strengthen legislation and facilitate gender equitable access to water areas that are suitable for undertaking cage fish farming and nearshore land resources for carrying out land-based operations; Promote gender equitable capacity building in technical and managerial skills through training and acquisition of access to market linkages and information on cage fish farming value chain operations, with a laser focus on youth and women; Compensate and re-allocate to new sites cage fish farmers affected by oil and gas explanatory and extraction activities;

		Promote: gender equitable capacity building in technical, business and managerial skills for effective management and development of cage fish farming in the EAC; Facilitate gender equitable access to grants, micro-credit on concretionary terms and promote creative alternative financing mechanisms to gender-sensitive organizations to enable them engage in profitable cage fish farming industrial activities. Promote the use of science to inform policy decisions on all cross-cutting and emerging issues in cage fish farming and resultant businesses in the EAC; Implement the EAC Development Strategy (2021/22-2025/26) strategic and the LVFO FMP IV (2021/22-2025/26) to contain the devastating effects of COVID 19 pandemic, review and document its effects on cage fish farming and propose ways to mitigate it Promote appropriate measures for the control of invasive aquatic weeds; and Put in place early warning systems for alerting cage farmers on impending weather and climate vagaries.

5.2. ANNEX 2: MONITORING AND EVALUATION INFORMATION BASE FOR OBJECTIVELY VERIFIABLE INDICATORS (OVI)

Objectively Verifiable Indicators (OVI)	Means of Verification
5.2. Purpose of the Policy: To optimize benefits in food and nutrition security, wealth creation, decent employment, economic development and livelihoods	
Per cent fish production from cage fish farming operations	Partner States catch assessment reports
Tons of fish produced from cage farms	Partner States survey reports
Number of employments in cage farming operations (women, men, youth and the disenfranchised)	Partner States survey reports
Institutional financial support to cage farming Industry	Central and commercial banks reports
Kg of fish per capita consumption	Partner States survey reports
Tons of cage farmed fish exported	Partner States survey reports
5.2.1. Policy Area: Areas of water bodies suitable for cage fish farming.	
Number of suitability and carrying capacity studies conducted and total area covered	Partner states aquaculture departments and research reports from national fisheries research institutes, Water Basin Authorities, National environment management authorities and LVFO
Number of scientists trained in GiS and remote sensing and institutions with capability for undertaking zoning and carrying capacity assessment in water bodies earmarked for cage fish farming operations	Partner states aquaculture departments and research reports from national fisheries research institutes, LVFO

Number of fully equipped GiS Labs	Partner states aquaculture departments and research reports from fisheries research institutes
Number and percentage of farms complying with 'Guidelines for Establishment and Operation of Cage Fish Farming in the EAC'	Partner states aquaculture departments and research reports from fisheries research institutes
Number, size and types of cages in water bodies	Partner States fisheries research bulletins and aquaculture departments
Number of trainings on water quality monitoring, farmed fish value addition, environmental awareness, marketing requirements and linkages	Partner States fisheries research bulletins and aquaculture departments; national environmental authorities
Frequency of water quality samplings	Partner States research institutions reports
Levels of pollution in ambient water in cage sites	Partner States research institutions reports
5.2.2. Capacity building, Demand Driven Research and Development	
Number of reference Broodstock Centres established	Partner States research institutions reports
Number of cage fish farmers trained in cage fish farming design, maintenance, and operations segregated by sex	
Number of gene banks and species established	Partner States research institutions reports
Number of trained breeders scientists	Partner States research institutions reports
Number of quality strains produced	Partner States research institutions reports
Number of training, research and extension institutions that have established effective links for dissemination of practical knowledge and	Partner States knowledge, research and development institutions; ministries

skills to cage fish farmers and value chain actors	responsible for fisheries and aquaculture development
Number and type of out-door and indoor infrastructures upgraded or established for enhancement of practical skills	Partner States knowledge, research, training and development institutions; ministries responsible for fisheries and aquaculture development
Number and type of expertise acquired by graduates from research and knowledge institutions	Partner States knowledge, research, training and development institutions; ministries responsible for fisheries and aquaculture development
Number of demand-driven research projects executed in research and training institutions	Partner States knowledge, research, training and development institutions; ministries responsible for fisheries and aquaculture development
Number of Broodstock reference centres and types of indigenous fish species selectively bred	Partner States knowledge, research, training and development institutions; ministries responsible for fisheries and aquaculture development
5.2.3. Policy Area: Input Supply, Financing, Marketing and Trade	
Number of feed and seed producers	Partner states department of aquaculture reports
Tons of feed produced in the region and imports	Partner states department of aquaculture reports
Number of cage clusters/parks established	Partner states department of aquaculture reports

Number of market network linkages secured	Partner states reports by ministries responsible for marketing and trade; department of aquaculture reports
Number of extension manuals, guidelines, books, policy briefs produced	Partner States knowledge, research, training and development institutions; ministries responsible for fisheries and aquaculture development
Number of farmer associations and cooperatives formed and level of material, financial or technical support rendered	Partner States reports by registrar of associations and cooperatives ; ministries responsible for fisheries and aquaculture development
Number of operators and actors received training and extension support	ministries responsible for fisheries and aquaculture development
Number of cage farmers and value chain actors received credit financing (credits and insurance)	Partner states central and commercial banks and insurance department of aquaculture reports
5.2.4. Governance, and Institutional Framework	
Number of harmonized policies, laws and guidelines developed	Partner States ministries responsible for aquaculture development
Number of harmonization meetings and types of outputs made between central government and local/devolved government officials	LVFO, Partner States
Level of technical and financial support rendered to Regional Aquaculture Working Group and Technical	LVFO, Partner States

committees in terms of local currency and type and number of facilities	
Level of effectiveness of chain of command between central government and local/devolved governance structures	Ministries responsible for regional administration; and fisheries and aquaculture
Number of public-private partnerships established	Ministries responsible for regional administration; and fisheries and aquaculture
Number of harmonized EIA legally binding procedures; EIA surveyed areas and EIA clearance certificates issued	Partner States Environment authorities
5.2.5. Risk Management, Knowledge and Information Sharing	
Types of information managed/ archived and shared	Partner states aquaculture departments
Number of networks established	Partner states aquaculture departments
Number of risk management tools prepared and disseminated to end users	Partner states aquaculture departments
5.2.6. Policy Area: Cross Cutting and Emerging Issues	
Number of women with access to land and water for undertaking cage fish farming	Partner States reports by ministries responsible for land and water; departments responsible for aquaculture and fisheries
Number of women and youth received formal and informal training on cage fish farming and related businesses	Partner States fisheries and aquaculture training institutions,
Number of attendees and seminars on HIV Aids and Covid-19 and subsequent variants within cage fish farming communities	Partner States reports by ministries responsible for public health and departments responsible for aquaculture and fisheries

Number and type of early warning systems installed to alert cage fish farming operators against weather and climatic vagaries	Partner States reports by agencies responsible for meteorology and departments responsible for aquaculture and fisheries at local and national levels
Types of measures taken to control/manage invasive weeds against cage fish farming operations	Reports by affected farmers, departments responsible for aquaculture and fisheries, local/devolved government
Number of new cases of HIV/Aids and COVID pandemic in cage fish farming communities	Regional ministry responsible for health Reports; Regional Aquaculture and fisheries directorates

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