GUIDELINES ON EXTRACTION, PROCESSING AND TRADING OF NILE PERCH MAWS FROM LAKE VICTORIA

MARCH 2021
Table of Contents

Acknowledgements ........................................................................................................................... iv
Abbreviations and Acronyms ............................................................................................................ v
Foreword ........................................................................................................................................ vi

1. BACKGROUND .......................................................................................................................... 1
2. INTRODUCTION ......................................................................................................................... 2
3. RATIONALE .................................................................................................................................. 5
4. AIMS AND SCOPE ....................................................................................................................... 6
5. REQUIREMENTS FOR EXTRACTION, HANDLING, STORAGE AND TRANSPORTATION OF NILE PERCH MAWS ............................................................................................................. 6
   5.1 Requirements for facilities of maw extraction ....................................................................... 6
   5.2 Requirements of Fish from which maw is extracted ............................................................... 7
   5.3 Process of extraction of maw ............................................................................................... 7
      5.3.1 Recommended techniques for extraction of fish maw .................................................. 8
      5.3.2 General requirements for extraction process ................................................................. 8
   5.4 Handling of maw after extraction - preservation (icing, freezing and drying) ................. 9
      5.4.1 Requirements for packing and transportation of fresh maw ........................................ 9

6. RECOMMENDED PROCESSING METHODS THAT ENSURE QUALITY AND SAFETY OF THE FISH MAW PRODUCT ............................................................................................................. 10
   6.1 Requirements for the maw received by factories for processing .......................................... 10
   6.2 Requirements for maw processing facilities ......................................................................... 10
   6.3 Processing methods for maw ................................................................................................. 11
   6.4 Requirements for drying of fish maws .................................................................................. 13
   6.5 General requirements for maw processing ......................................................................... 13
   6.6 Requirements for packaging and transportation of processed dry maw ............................... 14
   6.7 Determining and managing the quality of fish maws ........................................................... 14
      6.7.1 Parameters for determining the quality of fresh fish maw ........................................... 14
      6.7.2 Parameters for determining the quality of dried maw .................................................... 15
      6.7.3 Quality attributes of dried fish maw that should be incorporated in the Standards for Exports ............................................................................................................................... 15

7. REQUIREMENTS AND PROCEDURES FOR TRADE IN NILE PERCH MAW AT NATIONAL AND REGIONAL LEVEL ............................................................................................................. 16
   7.1 Requirements and procedures for trading in fish maw at national level (domestic market) ................................................................................................................................. 16
   7.2 Requirements and procedures for trading in fish maw from Lake Victoria ......................... 16
   7.3 Requirements and procedures for importation of fish maw from the region ..................... 17

8. MECHANISMS AND DOCUMENTATION REQUIRED TO TRACE AND TRACK THE FISH MAWS ALONG THE VALUE CHAIN ............................................................................................................. 18
| 8.1 | Storage of data records for traceability (Sharing of information for tracing and tracking of fish maw in the value chain) | 18 |
| 8.3 | Traceability checklist to guide the Competent Authority to curb Trading in Illegal, Unreported and Unregulated (IUU) maw products | 19 |
| 9. | GUIDELINE ON RATIONALIZING THE BENEFITS FROM THE NILE PERCH MAWS TO TRICKLE DOWN TO ALL CHAIN ACTORS | 19 |
| 10. | GUIDANCE ON GOVERNMENT SUPPORT TO LOCAL INVESTORS TO ENGAGE IN THE NILE PERCH MAW PROCESSING AND TRADE | 20 |
| 11. | GUIDANCE ON VALUE ADDED PRODUCTS FROM FISH | 20 |
| 12. | RECOMMENDED MINIMUM SIZE OF NILE PERCH MAWS FOR TRADING BASING ON STUDIES CONDUCTED IN PARTNER STATES | 20 |
| 13. | GUIDANCE ON REGULATORY MECHANISM REGARDING EXTRACTION, PROCESSING, TRANSPORTATION AND TRADE TO ENSURE SUSTAINABILITY OF THE NILE PERCH RESOURCES | 20 |
| 13.1 | Set up of official controls for fish maw | 20 |
| 13.2 | Registration and licensing of all maw business operators | 21 |
| 14. | OFFICIAL CONTROL PROCEDURES (INSPECTION, APPROVALS AND CERTIFICATIONS) REQUIRED TO ENSURE QUALITY AND SAFETY OF NILE PERCH FISH MAW | 21 |
| 15. | PROPOSED SYSTEMS TO ENSURE AVAILABILITY OF DATA ON EXTRACTION, PROCESSING AND TRADE | 21 |
| 16. | INSTITUTIONS ALONG THE VALUE CHAIN OF NILE PERCH MAWS, THEIR ROLES AND RESPONSIBILITIES | 21 |
| REFERENCES | | 28 |
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### Abbreviations and Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>BMU</td>
<td>Beach Management Unit</td>
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<tr>
<td>CA</td>
<td>Competent Authority</td>
</tr>
<tr>
<td>CAC</td>
<td>Codex Alimetarius Commission</td>
</tr>
<tr>
<td>EAC</td>
<td>East African Community</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
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<tr>
<td>GHP</td>
<td>Good Hygiene Practices</td>
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<tr>
<td>GMPs</td>
<td>Good Manufacturing Practices</td>
</tr>
<tr>
<td>H&amp;G</td>
<td>Head and Gutted</td>
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<tr>
<td>HACCP</td>
<td>Hazard Analysis Critical Control Point</td>
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<tr>
<td>ID No.</td>
<td>Identification Number</td>
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<tr>
<td>IEC</td>
<td>International Electro Technical Commission</td>
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<td>ISO</td>
<td>International Standards Organization</td>
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<tr>
<td>IUU</td>
<td>Illegal, Unregulated and Unreported</td>
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<tr>
<td>LVFO</td>
<td>Lake Victoria Fisheries Organization</td>
</tr>
<tr>
<td>MBOs</td>
<td>Maw Business Operators</td>
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<tr>
<td>MSC</td>
<td>Monitoring, Surveillance and Control</td>
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<tr>
<td>OIE</td>
<td>World Animal Health Organization</td>
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<tr>
<td>OSHA</td>
<td>Occupation Safety and Health Administration</td>
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<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>RFID</td>
<td>Radio-Frequency Identification</td>
</tr>
<tr>
<td>SOPs</td>
<td>Standard Operating Procedures</td>
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<tr>
<td>SPS</td>
<td>Sanitary and Phytosanitary</td>
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<tr>
<td>TBT</td>
<td>Technical Barriers to Trade</td>
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<tr>
<td>TIN</td>
<td>Tax Identification Number</td>
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<tr>
<td>UK,</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
</tr>
<tr>
<td>USD</td>
<td>United States Dollar</td>
</tr>
<tr>
<td>WCF</td>
<td>Workers Compensation Fund</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<tr>
<td>WTO</td>
<td>World Trade Organization</td>
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Foreword

Nile Perch maw is a highly trading product in the East African region (particularly in Tanzania, Kenya and Uganda) with high rate of increase in trade in all the three countries. Generally, exported fish maw quantities have witnessed an increase of 636.86 metric tons between the years 2017 to 2019. Fish maw export volumes in 2019 were estimated at 1640.19 metric tons valued at USD 157.9 million in foreign exchange. The three countries exported an estimated total of Nile Perch maws in 2019. The main markets are Hong Kong and Mainland China, Vietnam, and Japan. Most exports comprise dried maws, although some few frozen fish maws have been exported out of the region as well. There are round 33 maw processing and exporting companies, 14 are operating in Uganda, 12 in Tanzania and 5 in Kenya. There are also more than 19 regional cross-border maw trading businesses most of whom are based in Uganda.

As of June 2018, there were estimated 1,473 maw business operators in the three East African countries comprising of 1,114 maw extractors and collectors, 278 middle men traders, 50 agents of maw factory operators and 33 maw processors and exporters (Bagumire, Muyanja and Kiboneka, 2018).

The fish maws which were once regarded as waste in the East African region are increasingly becoming a highly sought-after product because of multiple uses. It is on high demand in Asian countries and most especially, in Hong Kong where it is traded en route to Southern China and other countries in the Far East. The maws are used as treasured trophies, consumed as food, or sold to serve other purposes in beverages, medical, automobile, aviation and other manufacturing industries.

There is high opportunity to boost exports of maws and increase the benefits from the fisheries resources of Lake Victoria by tapping into the increasing world demand for maw and maw derived products. The high demand for maws is prompted by the decline in stocks of other maw-sourced fishes from other regions of the world and has driven up the prices. It is understood that by 2015, the Lake Victoria sourced maw had become one of the major traded maws in Hong Kong - a world’s major market for maw (De Mitcheson et al 2019). The existing export market for maws provides an opportunity for employment, especially for the youth and women who are involved in the maw value chain as fishermen, fish suppliers, maw extractors, maw collectors and traders, middlemen and agents of maw processing factories. It also opens a window for employment in maw processing and export factories and other allied sectors such as transport, packaging and trade in inputs for the maw and related industries. It could boost the incomes of fish dependent communities and those directly employed in various enterprises in the maw value chain; enhance national income and foreign exchange for the region.

However, the region’s enjoyment of the full economic benefits from Nile Perch Maws is hampered by the challenge of exporters not having access to the main land China (Peoples Republic of China (PRC) and therefore resort to export to Hong Kong which is a province of China, but which is governed independently. The Market prices in Hong Kong are low due to middle men who subsequently sell the maw into the Mainland China.

There have been initiatives taken by the LVFO Member countries to improve trading in fish and fishery products in the region who among others have developed the “Harmonized Guidelines for Trade in Fish and Fishery Products”; which also cover
trading in fish maw. However, the mentioned guidelines only provide guidance on cross-border trading in fish and fishery products without delving into the procedures and processes to be followed by traders and processors in sourcing, extraction and handling, processing and exportation of the fish maws.

There are several challenges relating to Nile Perch maw trade that require a harmonized approach by regional countries to promote trade while ensuring the sustainability of the fisheries resources. Such challenges include among others: inequitable sharing of benefits accrued from the Nile Perch maw among the different value chain actors; poor handling of fish from which maw is extracted thereby affecting the quality of maw; ineffective facilities and poor practices for extraction, processing and handling of maw which has potential to render maw unsafe for human consumption or lower the quality; un-harmonized control activities that could promote smuggling and illegal, unregulated and unreported (IUU) maw trade that could lead to unsustainable fishing practices; and limited investments in maw value chain operations especially in extraction, handling, processing and exportation. Another challenge is the lack of formalized export channels to China – a major destination of maw from Lake Victoria region, a scenario that has only advantaged exporters originating from China that are able to utilize informal market channels in Hong Kong. This scenario leaves out other potential exporters who may not have personal contacts with traders in Hong Kong, and hence undermines competition and leaves out some regional traders and processors who may wish to export the maws.

Therefore the “Guidelines on extraction, trading and processing of Nile Perch Maws in East Africa” will promote regional and international trade by facilitating the adoption of measures that promote best practices during the extraction, processing and trading of the maw. Such measures will ensure that only safe and quality maw is exported from the region. The guidelines will facilitate adoption of common systems, requirements and documentation procedures by extractors, traders, processors and exporters. The guidelines will also promote fair practices among the maw business operators at every stage in the chain to ensure equitable distribution of benefits. They will facilitate institution of measures to formalize all maw businesses, promote application of regionally agreed technical requirements and standards, inspection and certification to enhance compliance as required to protect the fisheries resource and increase competitiveness and value of maw in export markets. The guidelines are aimed to standardize the operation of official control services offered by the regional mandated bodies to ensure sustainability of the resources and enhancement of safety and quality of maw produced and exported.

The guidelines are intended for all maw business operators, relevant government officials and other stakeholders that are responsible for promoting best practices during extraction, processing and all stages in the trading process. The LVFO Partner States are requested to incorporate provisions of these guidelines in their national laws, regulations and guidelines to promote sustainability of fisheries resources and optimize trading in maws.

Dr. Shigalla Mahongo
EXECUTIVE SECRETARY – LVFO
1. BACKGROUND

Trade in Nile Perch fish maws like other fish and fishery products is affected by stringent safety and quality requirements which have to be followed to access regional and international markets. At the international level, World Trade Organization (WTO) Sanitary and Phytosanitary (SPS) Agreement and WTO Technical Barriers to Trade (TBT) Agreement provide frameworks regarding control of safety and quality of food and non-food products including fishery products such as maw. The SPS agreement requires SPS measures developed to control products in international trade to at least meet the international standards developed by standards setting bodies such as Food and Agriculture Organization and World Health Organization (FAO/WHO) Codex Alimentarius Commission (CAC) and World Animal Health Organization (OIE), although importing countries can still require imported products to be of higher standards to protect consumers. The WTO TBT agreement requires importing countries to enforce products standards and also use conformity assessment procedures that meet certain prescribed international criteria – i.e. developed by international standards setting bodies such as International Standards Organization (ISO) and International Electro technical Commission (IEC) among others, although higher standards than prescribed by international bodies may be applied on imports under certain circumstances.

The East African Community countries have committed themselves to accelerate fish trade by developing fish value chains, promoting responsible and equitable fish trade and marketing in order to significantly harness the benefits of Africa’s fisheries and aquaculture endowments. Fishery products being an important source of income and revenues for households involved in various operations in the fisheries value chain in EAC countries, promotion of trade in fishery products such as the Nile Perch fish maw addresses the EAC Treaty Article 74, which provides for the community to cooperate in trade liberalization and development. Also articles 79, 80 and 81 of the EAC Treaty which provide for cooperation of Partner States on industrial development and standardization, quality assurance, metrology and testing are relevant to the development process of Nile Perch maw exports.

In recognition of the need to streamline trade in products such as fish and fishery products (including the Nile Perch fish maw) which have stringent food safety and quality requirements for accessing regional and international markets, the EAC adopted the Sanitary and Phytosanitary (SPS) measures Volume III (Sanitary Measures for Fish and Fishery Products) as a way to ensure the safety and quality of fish and fishery products and facilitate access to regional and international markets. In addition, the EAC has developed a number of standards including standards on dry and salted fish, as well as fresh and frozen whole fin fish. However, specific standards for fish maw are not yet developed by the EAC.

The First Fisheries and Aquaculture Sectoral Council of Ministers approved a Harmonized Fisheries and Aquaculture Border Inspection Manual in March 2018. The manual provides guidance to fisheries inspectors in facilitating cross-border trade by ensuring compliance with regulatory requirements and making sure fisheries and aquaculture inputs and products that cross the borders are of the required safety and quality standards. In order to facilitate the implementation of the above manual and minimize the delays in clearance, bridge the gaps in the knowledge of the border clearance procedures, requirements and documentation;
the LVFO developed the Harmonized EAC Guidelines for Trade in Fish, Fishery and Aquaculture Products and Inputs in Regional and International Trade which were approved in March 2019.

One of the recent challenges facing trade in fish and fishery products in the region is the increased demand and fluctuating prices for the Nile Perch Maw. Although the increased demand and high prices are good for the maw businesses, they raise emerging sustainability issues which have to be mitigated. More so, even though the Nile Perch maw is a valuable product, the markets require safe and good quality product. The Nile Perch maw trade in the region has also been characterized by smuggling across borders leading to increased illegal, unregulated and unreported (IUU) fishing and fish maw trade. Also, extraction and processing of Nile perch fish maw need improvement to produce better safe and quality product. Against this background, the LVFO Council of Ministers in their meeting of 1st March 2019 directed LVFO secretariat to coordinate development of harmonized traceability guidelines for fish maw to control IUU and ease inspection at the borders. To provide guidance on tracing and tracking the product along the value chain, there is need to guide the extraction, processing and trading of Nile perch maws. This will ensure the safety and quality demanded by the market and sustainability of the Nile Perch fishery.

2. INTRODUCTION

Nile perch maw is a highly valued fish product in the international market - especially in China and South-East Asian countries where most of the maws from East Africa are exported. Maw is an important foreign exchange earner for Tanzania, Uganda and Kenya. Fish maw exports in the year 2019 contributed USD 77.9million in Tanzania; USD 76.3 million in Uganda and USD 3.7million in Kenya, hence bringing to the region a total of USD 157.9million in foreign exchange earnings. The three countries exported an estimated total of 1640.19metric tons of Nile Perch maws in 2019. The available data on the volume and value of maw exports for the three countries is indicated in the table below:

Table 1: Volume and value of maw exports for three EAC countries from 2014-2019

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Uganda</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Quantity</td>
<td>507.82</td>
<td>491.55</td>
<td>352.24</td>
<td>488.33</td>
<td>531.56</td>
<td>740.00</td>
</tr>
<tr>
<td>Value</td>
<td>35,499,150</td>
<td>27,441,000</td>
<td>31,573,230</td>
<td>48,832,490</td>
<td>52,904,360</td>
<td>76,300,000</td>
</tr>
<tr>
<td>Kenya</td>
<td></td>
<td></td>
<td>63</td>
<td>111.3</td>
<td>-</td>
<td>62.00</td>
</tr>
<tr>
<td>Quantity</td>
<td>-</td>
<td>-</td>
<td>5,600,000</td>
<td>-</td>
<td>8,500,000</td>
<td>3,720,841</td>
</tr>
<tr>
<td>Value</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>403.7</td>
<td>831.26</td>
<td>838.19</td>
</tr>
<tr>
<td>Tanzania</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>27,274,132.52</td>
<td>86,834,574.86</td>
<td>77,971,835.11</td>
</tr>
<tr>
<td>Value</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>32.52</td>
<td>74.86</td>
<td>35.11</td>
</tr>
</tbody>
</table>
There are an estimated 1,473 maw businesses that employ a combined total of 4,124 people including the business owners. About 2,651 people work in the maw businesses as employees. Majority (90-95%) of the employees in the maw trading and processing companies are women. The wage bill for employed workers in maw business is estimated at USD 2.41 million per annum hence making maw an important source of livelihoods for the majority of women employees. In the year 2019, there were 12 maw processors and exporters in Tanzania, 14 in Uganda and 5 in Kenya; all totaling 33 companies that process and export maw. Most of the maw is exported to Hong Kong where it is subsequently re-exported to other destinations including Main Land China, Vietnam and other South East Asian countries.

Most of the Nile Perch maw processed by the maw export companies is supplied by the fish processing factories who receive the Nile Perch fish that contain maw, remove the fillets and extract maws. The Nile perch maws are then sold unprocessed to the maw processing companies. A significant portion of the Nile Perch maws is supplied by the artisanal sector which is dominated by four categories of traders including: maw extractors and collectors who extract maw from fish brought by/ or buy maw from/ fishermen, boat owners and homes and sale to maw traders; maw traders who buy from extractors and collectors for sale to middlemen and regional maw traders; middle men who buy Nile Perch maw from traders and sell to the agents of the maw processing factories and regional maw traders; and the factory agents and regional exporters who buy from the middle men and/or regional traders for sale to maw factory processors that process and export maw. There are estimated 557 maw extractors, 557 maw collectors, 278 middle men, 50 agents of maw processors and 33 maw processors and exporters in the region. The regional prices for maw are fluctuating and they depend on the sizes; but range between USD 30-200 per kg of fresh maws.

The fish maw, also referred to as the swim bladder, gas bladder or air bladder, is an internal gas-filled organ that inflates or deflates to regulate buoyancy so that live fish can adjust their depth in water. It exists in a large number of bony fish species including Brown croaker (*Protonibeadiacanthus*), Seabass/Barramundi (*Latescalcarifer*), Croaker (*Otolithes* spp.), Giant catfish (*Arius thalassinus*), Common Carp, Bigeye snapper (*Priacanthustayenus*), Solder croaker (*Boesmaniamicrolepis*), Eels, Ling, Congor pike, Yellow tail tuna (*Code*), Big head carp (*Hypophthalmichthysnobilis*), Sturgeon and Nile perch (*Lates niloticus*) among others.

Fish maws are used in a variety of ways. Customers in Hong Kong and Mainland China utilize fish maw for its traditional medicinal benefits and nutritional values. In addition, they are used in manufacture of certain plane and space shuttle body parts, car parts, surgical stitching threads and anesthetic drugs (Koochekian, *et al*, 2006; Fabinyi *et al*, 2012; Sinthusamran, *et al*, 2013; Sinthusamran and Benjakul, 2015; Wen, *et al*, 2015; Choo, *et al*, 2016; Weng, *et al*, 2016; Bagumire *et al*; 2018; De Micheson *et al*, 2019). Fish maw is also used in the preparation of isinglass which is widely used commercially in the clarification of beers and wines. The international prices of maw vary and depend on the sources, where some species of fish have sought-after maws of high quality than others. The international prices for Nile Perch fish maws are reported to range from $80 to $1000 per kg of dry maw; but some reports indicate prices of some types of maw rise up to more than $3000 per kg. The larger the maw the higher the price.
Although globally there are several traditionally sought-after sources of maw, it appears that increasing demand coupled with declining supply from traditional sources have led to increased demand for Nile Perch maw. Overtime, this has positioned the Lake Victoria region as an important source of maw. For instance, Nile perch maws were reported among the dominant imports of Hong Kong - the global trade hub for maw in the world; where between 2015-2018, about 3144 to 3882 tons of dried fish maw from about 110 countries and territories with a declared import value of 264 to 394 million USD were imported. In the same period (2015-2018), fifty percent (50%) of the maw (by volume) came from Uganda, Brazil, Tanzania, India and Vietnam in that order, hence indicating that East Africa was already among the major sources of maw sold on the world market (De Mitcheson, et al., 2019).

The growing demand for maws is an opportunity for the businesses and governments in the region to expand industrialization of the fisheries sector for increased employment and incomes. The knowledge acquired from the fish industry, especially on complying with the stringent market requirements related to standards and sanitary measures that characterizes the fish exports to the European Union is another opportunity the region can capitalize on to capture, maintain and dominate the world market for maw. The existing capacity for official controls on fish and fishery products can be deployed into the maw sector; and lessons learnt used to build a modern sustainable maw industry. The region is also endowed with several fish species, including the catfishes for which fish maws are already sought-after on the international market. There is potential of processing these into maws by either development of culture or capture fisheries to enhance their production. Moreover, the existing trade in maw is not limited only to Nile Perch maw from Lake Victoria, but also the Nile perch sourced from other lakes like Kyoga, Turkana and others. This could present an opportunity to promote development of maw industry in other locations away from Lake Victoria basin to distribute economic benefits of fishery resources. On the other hand, the emergence of the maw as a valuable product demonstrates opportunity for identifying other products that could have potential for industrialization and export for increased benefits accrued from fishery resources. There are several products from mostly the Nile perch, which should be investigated of their commercial trade, industrialization and export potentials with a view of promoting investments in them.

Before the growth of artisanal maw trade, fishers would sell most of their catch to the middle men (fish suppliers) who in turn would sell the fish still containing the maws to fish factories that process fish for export. With the development of artisanal Nile perch maw trade, the fishers now have a choice of selling fish to small scale processors who extract maws and sell fish from which maw has been removed to local and regional markets.

Despite the high potential for maw exports, the maw value chain in the region is still faced with several challenges which need to be addressed. The major challenge is guaranteeing the safety and quality of maw coming from illegal small scale extractors, collectors, processors and traders who operate in areas without adequate facilities for proper handling of maws. These illegal operators are not regulated thus threatening the sustainability of the Nile Perch fishery. The rise of informal operators
is occasioned by lack of capital, technical know-how and market information. In addition, some factory maw processing is undertaken in small cottage-like industries located in residential compounds most which lack basic infrastructure and facilities for handling and processing large quantities of maw.

These guidelines on extraction, processing and trading in Nile perch maws from Lake Victoria are expected to provide knowledge and technical guidance on areas, practices, facilities and requirements for all the fish maw value chain actors. They recommend the appropriate sizes of maw to ensure that maws are only extracted from legally sized fish to avoid fishing malpractices; and the appropriate regulatory mechanism for extraction, processing, trading and exportation of maw to ensure sustainability of Nile Perch resources. The guidelines propose a mechanism for ensuring the availability of data on extraction, processing and trading in maw, and establishment and management of effective official controls for maw value chain activities. They identify the roles and institutions involved in guiding the activities in the maw value chain among others. They also give guidance on how benefits from maws can be rationalized to enable them trickle to all value chain actors; and how support can be extended to local businesses to engage in profitable maw processing and export.

3. RATIONALE

The guidelines are expected to provide policy, regulatory and operational guidance to the LVFO Lake Victoria riparian Partner States on how the issues and concerns of maw business in the region can be tackled to improve the benefits of the people and governments. Specifically, the guidelines are expected to:

- Strengthen official controls (inspection, sampling, testing and certification) of fish maws and ensure compliance to the regulations and standards for processing and placing on market of Nile Perch maw;
- Provide guidance on best practices for handling, processing, marketing and trade of/in fish maws to be undertaken by business operators to ensure minimal contamination and reduce or eliminate hazards while promoting fair trade;
- To streamline the flow of fish business operations in the maw value chain and guide on minimum standards for the facilities and the required measures for compliance during extraction, processing or handling maws in the supply chain;
- Guide the maw business operators and stakeholders regarding the rationalization and distribution of benefits from maw resource to trickle down to all actors; including policy recommendations on tapping any available opportunities to expand benefits from fish and fishery products;
- To ensure exports of fish maws are guaranteed by the competent authorities and therefore minimize and/or eliminate food safety and quality risks that may endanger the whole export industry with un desirable socio-economic consequences if the prime market rejected fish and fishery products from the region;
4. AIMS AND SCOPE

These guidelines aim to provide guidance on the policy, regulatory, institutional and operational measures required to improve the supply chain and guarantee the safety and quality of maw in the regional and international markets while maintaining the established fish processing industry; and enhancing sustainability of the fisheries resources of Lake Victoria. The scope covers:

i. Requirements for facilities for extraction, proper extraction process, handling of fish maws, freezing or drying, packing and transportation without compromising the quality;

ii. Requirements and procedures for trade in Nile perch maw both at national and regional level;

iii. Proposals on required documentation and mechanisms to trace the fish maws along the value chain;

iv. Guidance on rationalizing the benefits from the Nile perch maws to trickle down to all chain actors;

v. Guidance on Government support to local investors to engage in the lucrative Nile perch maw processing and trade;

vi. Guidance on value added products from fish;

vii. Recommended minimum size of fish maws for trading basing on studies conducted in Partner States;

viii. Regulating and controlling the number of Nile perch maw processing Establishments in EAC Member states to ensure sustainability of Nile perch Resources;

ix. Guidance on regulatory mechanism regarding extraction, processing, transportation and trade to ensure sustainability of the Nile perch resources;

x. Proposals on the systems to ensure availability of data on extraction, processing and trade;

xi. Official controls required to ensure quality and safety of Nile perch maw;

xii. Identification of Institutions along the value chain of fish maws, their roles and responsibilities.

5. REQUIREMENTS FOR EXTRACTION, HANDLING, STORAGE AND TRANSPORTATION OF NILE PERCH MAWS

5.1 Requirements for facilities of maw extraction

All facilities used for maw extraction should be approved and licensed by the Competent Authority and should have the following requirements:
Designated enclosed place with an adequate roofing material to provide shade and protection from sun, vermin and other adverse weather conditions such as rain, wind, dust, flooding etc.;

A special room, zone or section should be designated for the purpose of extraction and handling of the maw with a clear process-flow map for the maw product;

Separate rooms or sections for fish washing, fish maw extraction, fish maw storage and cleaning of equipment;

Adequate facilities, equipment and tools for maw extraction should be available;

Permanent structures to withstand adverse weather conditions like strong winds, heavy rains and flooding;

Working environments such as walls, floors, ceiling, drainages etc. made out of cleanable materials and fitted to ease cleaning;

Cleanable work surfaces which should be raised from the ground to facilitate proper drainage of cleaning waste water;

Adequate facilities for maintaining maw in cold chain;

Potable water (of drinking quality) for cleaning of the fish, work surfaces and the maw;

Sanitary facilities such as wash rooms;

Facilities to ensure that waste material including that generated from maw extraction are disposed of safely and in accordance with the relevant environment laws;

Have permanent fence to screen off animals and unauthorized persons;

Recognized and registered with the local government for security and local government taxes purposes;

If the facility accommodates other fish processing activities, the equipment and Personal Protective Equipment (PPEs) in the maw extraction room should be differently color-coded or labeled.

5.2 Requirements of Fish from which maw is extracted

The fish from which maw is to be extracted should: The guidance here is at the time of extraction. How will the extractor know whether the fish was killed gently or not

i) Be of legal size accompanied by a movement permit or local health fish inspection certificate;

ii) Be wholesome, properly handled and well preserved;

iii) Be cleaned and washed with potable water before maw extraction.

5.3 Process of extraction of maw
5.3.1 Recommended techniques for extraction of fish maw

For the Whole Gutted and Headless and Gutted (H&G) fish products, the following extraction process is followed:

i. Make a slit/cut on the abdominal side using a sharp knife, which is easy to clean and sanitize;

ii. Using the fingers slowly and properly locate and trace the position and full length of the maw right from the anal section through to the head section;

iii. Slowly and gently raise the maw from the normal position by moving the fingers through its entire length from anal to head sections until its attachment on the head section is properly traced;

iv. Pull and detach the maw carefully from the attachment on the fish skeleton.

For the fish to be filleted, the following steps should be taken to extract the maw:

i. First remove the fillet;

ii. Gently place the carcass containing the fish maw and the gut content in ice in an appropriate container;

iii. Immediately transfer the container from the filleting area to the maw extraction area;

iv. Place the carcass containing the fish maw on a clean washable table; and by using the fingers properly locate and pull out the fish maw carefully by cutting the attachment on head side of the fish skeleton;

v. Trim away any severely stained part of fish maw that may subsequently lower its quality.

5.3.2 General requirements for extraction process

i. All extractors of maw for sale should have authorization from a responsible Competent Authority indicating the location or sites where extraction of maw takes place, landing site, market locations and expected buyers;

ii. Caution is taken during the maw extraction to ensure that only the outer skin is cut and opened to avoid damaging the gut material or the maw which is located on the underside;

iii. Care should also be taken during the opening of the skin to avoid rapturing the fish maw with knife and staining it with blood, fat and other gut material (gall belly);

iv. Caution is taken to push off the two bones near the attachment to the head section before removal to avoid rapturing the maw;

v. After extraction the fish maw should be adequately iced to maintain its quality;

vi. The techniques of extracting the fish maw through the fish gills and mouth should be prohibited;
vii. The maw should be extracted as quickly as possible to minimize potential loss of quality;

viii. The maw extractor should observe Good Hygiene Practices (GHPs) when extracting the maw.

5.4 Handling of maw after extraction - preservation (icing, freezing and drying)

i. After extraction, the fresh maw should be cleaned to remove any adipose fat, blood stains, any gut content spills or visible dirt;

ii. Maw should be packed in appropriate packaging material to avoid cross contamination;

iii. Fresh maw should be placed in ice containers or cool box with a maw to ice ratio of 1:2 at a temperature of below 5°C;

iv. Frozen maws should be kept in freezing facilities at a temperature of -18°C;

v. To ensure quality and safety of maw, all extracted maws should be maintained in the cold chain right from extraction point until the processing (drying) stage;

vi. The cold chain facilities used by extractors should be approved by the responsible Competent Authority;

vii. Extracted maws should be appropriately coded or labeled with respective batch codes.

5.4.1 Requirements for packing and transportation of fresh maw

i. Chilled maw should be transported in holding containers such as cool box, or appropriately designed buckets/containers with ice or in refrigerated facilities to keep temperature below 5°C;

ii. Frozen maws should be transported in appropriate containers or refrigerated trucks at recommended temperature of -18°C and below during delivery to the destination;

iii. If the distance to the destination is long the maw should be transported with sufficient ice in case there are no refrigerated facilities;

iv. Frozen or chilled maw can be encased in appropriate packaging materials like Styrofoam boxes and appropriately packed in vehicles approved by the CA. Appropriate packaging materials should be food grade and leak-proof;

v. The packaging of maw should be done in such a way as to ensure that the cold chain is not violated during transportation and the risk of contamination is prevented;

vi. Different means of transportation can be used to transport the maw depending on the quantities, destination and preservation method used;

vii. The transporter should observe GHPs during transportation;
viii. Transportation of any quantity of maw exceeding 1kg should be accompanied by a movement permit or any other valid document depending on the national regulations;

ix. The vehicle used to transport maws should.
   a) meet requirements set out in the Standard Operating Procedures issued by the Competent Authority;
   b) be in good state of repair, exclusively used for transportation of maw, and maintained in the recommended cold and hygienic conditions.

6. RECOMMENDED PROCESSING METHODS THAT ENSURE QUALITY AND SAFETY OF THE FISH MAW PRODUCT

6.1 Requirements for the maw received by factories for processing

i. The maw should be as per national regulations (At least 13g of fresh maw and 4g for dried maw);

ii. The maw transporter should have a maw movement permit issued by the responsible authorities and the processing factory should obtain and retain a copy;

iii. The delivery should be in approved means of transport and the fish maws received should be inspected by the receiver to verify the hygiene and safety compliance;

iv. The receiver at the factory should obtain and keep the updated information regarding the identity and contacts of the transporter / maw supplier;

v. Received maws should be iced or refrigerated immediately to maintain the cold chain prior to processing.

6.2 Requirements for maw processing facilities

Facilities designated for maw processing should have:

i) Sufficient space enough to meet the requirements of the operations;

ii) Distinctly designated stations for operations of
   - Cleaning and fat removal
   - Washing of maw
   - Sorting the maw
   - Stitching, repair and reshaping of damaged maw
   - Insertion and stretching the maw on molded sticks (wooden/glass/plastic) to maintain/keep shape during drying
   - Drying: either using dryers or sunlight
   - Packaging
   - Cold storage for fresh maw
   - Dry storage for processed maw
   - Store for chemicals, cleaners such as soap, cleaning equipment, utensils and other implements, packaging and packing materials etc;
iii) Ice or cold chain facilities to preserve fresh maw before processing;

iv) Well-constructed structures with roof, proper walls, ceiling and floor claddings that are easy to clean, sanitize and the working area well laid and ventilated; the necessary equipment and tools well in place. Well designed and equipped with processing tables, drying racks, drying moldings (sticks) and containers;

v) The cold and dry storage facilities of adequate capacity to meet the needs with sufficient number of pallets to ensure that final maws are packed in appropriate packaging material to avoid cross contamination;

vi) Well secured and ventilated dry storage facilities that is vermin and dust proof to safeguard the quality and integrity of the maw;

vii) A design of a factory with a clear flow map indicating the low and high risk areas in order to eliminate the possibility of cross-contamination;

viii) Potable water for cleaning the maw and the processing areas;

ix) Been approved and regularly inspected by the Competent Authority.

6.3 Processing methods for maw

The processing of maw should follow the steps indicated in the process flow chart below:

Fig 1: Process flow chat for maw processing

The processing of maw should follow the steps indicated in the flow chart below:
Figure 1. Process flow chat for maw processing
6.4 Requirements for drying of fish maws

The drying of fish maw should be done in accordance with the following requirements:

i. Fresh maws must be washed and cleaned before drying;

ii. Fresh maw should be dried on appropriate molds designed to give it the required shape;

iii. The drying molds holding the maws should be displayed on drying racks made out of the recommended materials. The maw should be dried to the appropriate quality (ideally less than 14% moisture content) as stipulated by national/regional/international standards;

iv. The raised racks should be positioned in an exposed place with good winds and low humidity;

v. While drying on the racks, the maw should be protected against contamination from pests, vermin, and other contaminants;

vi. The processing establishment should have alternative mechanical drying methods like artificial dryers set at recommended temperatures and time instead of relying solely on weather-based energy;

vii. The well-dried maw should be stored in a well-secured, ventilated, vermin and dust-proof facility to maintain the quality and safety of the product.

6.5 General requirements for maw processing

i) Only food-grade preservatives or chemical additives recommended by the Competent Authority should be used;

ii) All maw processing factory workers should wear personal protective equipment (PPEs) i.e. clean uniforms, gloves, gumboots, nose and mouth masks and head gears etc.;

iii) Personnel working in the fish maw processing establishments should have valid medical certificates;

iv) Only appropriate clean utensils, tools, and equipment which are in a good state of repair should be used accordingly at all stages in processing. The maw should be handled on/in clean dry surfaces and containers during processing stages and the working surfaces and containers should be continuously cleaned at short intervals (15-30 minutes) when handling a wet maw product to stop the build-up of microbes;

v) The factory should have a clear and functional GHPs, Good Manufacturing Practices (GMP), SOPs, and Waste Management Plan and Hazard Analysis Critical Control Point (HACCP) Plan, all which are approved by the responsible Competent Authority;

vi) Dry maw should be stored in appropriate packaging material in a cool dry place away from the ground and the walls;

vii) Processing of maw should be inspected by the Competent Authority and each batch of processing certified before export;
viii) The factory should have qualified staff who should be well trained in - processing, hygiene and food safety fields.

6.6 Requirements for packaging and transportation of processed dry maw

i. All packaging materials for dried maw should be of food grade materials;

ii. Dried maw should be packed in clean, dry and new appropriate packaging materials with a food grade liner “wall” made of transparent hard water-proof polythene material;

iii. Appropriate quantities of the maw should be packed in each unit to avoid cracking and loss of shape;

iv. The appropriate packaging material used should be properly sealed to prevent pouring or dropping of the product;

v. The packaging materials should be properly labelled in accordance with the relevant standards for labelling and traceability;

vi. The appropriate packaging materials and the packaged maw should be kept in a designated store that is clean, dry and free of pests, chemicals and any other contaminants;

vii. Care should be taken when stacking the packed bags in the store or means of transport to avoid stepping on and trampling of the maw or overloading;

viii. The cargo should be transported to the point of dispatch using an appropriately designed motor vehicle to avoid the effect of adverse weather conditions;

ix. The means of transport should meet the requirements set out in the National Regulations approved by Competent Authority. Any transfer of the maw cargo from one means of transport to another should be done carefully to avoid exposing the product to contamination and incase of rain covering the cargo with water resistant materials. The fish maw bags should be packed on pallets for transportation by air to maintain the quality and safety of the product to the final market destination;

x. All maw to be exported should meet market and regulatory requirements and accompanied by Sanitary Health Certificates.

6.7 Determining and managing the quality of fish maws

6.7.1 Parameters for determining the quality of fresh fish maw

i. Size: The larger and thicker the maw the better the quality and the reverse is true. The minimum allowed size of Nile perch maw should be based on national regulations (extracted from Nile perch fish of at least 50cm total length);

ii. Shape: Maw that are damaged due to improper extraction or cleaning methods is of poor quality;

iii. Colour: Quality fresh maw is whitish in colour which turns golden yellow when properly processed by drying. Discoloration is an indication of inadequate
cleaning, microbiological spoilage, improper handling, preservation and processing;

iv. Smell/Odour: Good quality maw should have a natural fishy smell. Off-odours is an indication of microbiological spoilage of the maw;

v. Texture: Good maw should be firm, matured enough and thick. Spoilage of maw due to microbial attack affects both colour and texture. Improper handling and preservation techniques affect the quality and acceptability of the maw;

vi. Water content: The lower the amount of water contained in the fresh maw, the better the quality of the resulting dry maw and the shorter the drying time. Moisture content is a major quality characteristic of the final product (dried maw).

6.7.2 Parameters for determining the quality of dried maw

The following are the parameters that are considered when judging quality of dried fish maw in the market:

i. Size: The markets prefer the large sized maw obtained from bigger fish

ii. Source Species: The quality of fish maw in the international market depends on the type of fish. Fishes such as sturgeon, hake, conger-pike, croaker and carp get high price for their fish maws followed by Nile perch maw and fetch relatively better; prices in the market

iii. Thickness (related to gender): The market commands higher prices for thicker maw. The thickness of the maw depends on the sex and geographical area;

iv. Colour: A good fish maw has a rich yellow colour which may be maintained during extended period of cooking

v. Age: the older the fish from which maw is obtained, the better is the maw due to the fact that older fish has less oil and less fishy taste compared to the younger ones

vi. Aroma: Aroma is not an influential factor with dried fish maw in comparison to other dried seafood, however fish maw with unexpected aroma (could be due to spoilage, contamination etc.) may not be acceptable

vii. Texture: Well dried maw should not be soft and brittle.

6.7.3 Quality attributes of dried fish maw that should be incorporated in the Standards for Exports

The quality of the dried fish maw for the regional and international export market should comply with the National Standards and Regulations as follows:

i. The dried fish maws should have the characteristic colour and odour of dried fish maws and should be free from any indication of spoilage such as moulds;
ii. The product should be wholesome and free from stains, blood vessels, shreds, blood spots and any other form of foreign matter;

iii. Dried fish maws should have moisture content (% max) as 8, acid insoluble ash (% max.) 1.5, and total ash (% max) 15 (ref. US 1801: 2017);

iv. The microbiological set limits include: *Salmonella* in 25g to be absent, *E. coli* per gram to be absent, *Staphylococcus aureus* 103 CFU per gram, Total Viable Count 105 CFU per gram, *Clostridium perfrigens spp* to be absent, *Vibrio Cholerae* to be absent and yeast and mould at 104. Contaminant limits (Maximum limit – mg/kg) for dried fish maws is set as follows: Arsenic (0.1), lead (0.3), Cadmium (0.3) and mercury (0.5)(ref. US 1801: 2017);

v. The dried fish maws should also not contain more than 10 microgram per kilogram total aflatoxin of which not more than 5 microgram per kilogram may be aflatoxin B1 when tested (ref. US ISO 16050);

vi. Dried fish maws should comply with the maximum pesticide residue limits established by the Codex Alimentarius Commission;

vii. If food additives are used in processing of dried fish maws it should be indicated on the label;

viii. Specific labelling requirements that are legibly and indelibly marked; with the name of the product, name and physical address of processor or/packer, net weight in grams or kilograms, date of packaging, batch or code number, expiry date, storage conditions, country of origin and nutritional labelling, nutrition and health claims made accordingly;

ix. The weight of dry maw should not be less than 4g which corresponds to 8cms length of dry maw.

7. REQUIREMENTS AND PROCEDURES FOR TRADE IN NILE PERCH MAW AT NATIONAL AND REGIONAL LEVEL

7.1 Requirements and procedures for trading in fish maw at national level (domestic market)

i. The maw trader should have a trading/business license obtained from the local authorities;

ii. The maw trader should have a maw collection license from the responsible local fisheries office at the local, municipal or county government as stipulated in the National Regulations;

iii. The trader should have a maw movement permit for each of the traded batch/consignment obtainable from the local authorities in accordance to the recommendations of the CA.

7.2 Requirements and procedures for trading in fish maw from Lake Victoria

In addition to possession of trading license, maw collection license, fish maw movement permit and meeting the requirements specified above in section 7.1; the regional maw trader should meet the following conditions:
i. All maw for exports must come from approved handling/extraction/processing establishments;

ii. The maw trader should obtain a license (export permits) from the Ministry responsible for trade to authorize him or her to export the maw to the region;

iii. The maw traders should have a Sanitary (health) certificate issued by the central Competent Authority for every maw consignment to be exported following the procedure provided in the National Regulations;

iv. The maw to be exported to the region should be inspected and verified by the fisheries inspectors at the premises or establishment; and while on-the-site, a Sanitary/health certificate for the consignment will be issued;

v. Inspected consignments are sealed and the seal number is indicated on the health certificate;

vi. The consignment should be accompanied by all the relevant documents including original copy of the health certificate, the export license, export invoice and packing list;

vii. The consignment should comply with the requirements of the importing country. It is the responsibility of the trader to find out and comply with the requirements of the importing country;

viii. All the taxes and royalties accruing from exportation of the maw has to be paid before the exportation takes place.

NB: It is the responsibility of the mandated Competent Authority to inspect and certify the safety and quality of maw before the Sanitary/health certificate is issued. The Competent Authority should also conduct surveillance to ensure that movement permits are not misused by the maw traders. The regionally traded maw should be subjected to verification of movements by the border fisheries inspector at the point of exit in accordance with the “Harmonized EAC Guidelines for Traders in Fish, Fishery and Aquaculture Products and inputs in Regional and International Trade” of March 2019.

7.3 Requirements and procedures for importation of fish maw from the region

i. The trader intending to import maw from the regional countries should make application for import permit as provided for in national regulations;

ii. The imported maw from the region should meet the requirements of the importing country and should be accompanied by all relevant documents including health certificate issued by the competent authority in the exporting country;

iii. The importing country’s Fisheries inspector should subject the imported consignment to inspection and verification at border inspection point;

iv. All consignments should be accompanied by traceability documents as per the national regulations.
8. MECHANISMS AND DOCUMENTATION REQUIRED TO TRACE AND TRACK THE FISH MAWS ALONG THE VALUE CHAIN

Traceability of fish maw is the ability to follow the movement of maw products from the time of extraction from the fish, through all the stages of handling, processing, exportation and distribution to the final user or consumer. It facilitates knowledge regarding the identity of product, history and source of maw or materials contained in it. It also facilitates the knowledge regarding the destination of maw.

A traceability system for maw should therefore identify all the lots of maw handled, and record their sources and characteristics (attributes) during the extraction, handling, processing, exportation, and distribution up to the final user/consumer. The system should also ensure information on identity, source and characteristics (attributes) of maw is shared among business operators and stakeholders in the entire value chain up to the final user.

Identifying maws and recording their sources and characteristics (attributes) during the extraction, handling, processing, exportation, and distribution up to the final user/consumer

For proper implementation of the traceability system of maw through the supply chain; the maw business operators should follow all the requirements set out in the national regulations and Standard Operating Procedures.

8.1 Storage of data records for traceability (Sharing of information for tracing and tracking of fish maw in the value chain)

Maw business operators should keep and share information to be used for tracing and tracking the product in the value chain by:

i. Ensuring that the records on the source of fish maws including the suppliers, quantities, and means of transport are maintained;

ii. Ensuring that all products are properly labelled or information is provided on tag attached to the product;

iii. For fresh maw, labelling can be done by developing product tags with information specified in (a.) above to accompany the maw product-holding containers. For dry maw product labels are affixed on to the package or inside the package as specified in the relevant national regulations;

iv. Processing companies should use barcodes on the tags or labels accompanying the products.

v. Use a Transaction form to record data to aid traceability;

vi. If use of sales documentation is not possible then a simple Transaction Form for Traceability Records indicated in Annex 1 should be filled by the maw supplier to provide a means of capturing transaction data in a small maw business operation.

8.2 Responsibility of Competent Authority in tracing and tracking the movement of Nile Perch maws within the value chain
a) Traceability of maws and maw products should be done based on the available national regulations to safeguard the food safety requirement. The inspection service has to check and ensure that traceability obligations are met by the fish maw business operators;

b) The checks conducted by the official Competent Authority for compliance of businesses to traceability requirements are covered in the Standards Operation Procedures and national regulations;

c) The checks should be part of the routine inspection of maw establishments and should check all essential elements of a traceability system using the checklist indicated in Annex 2;

d) Typically, if revealed by the inspection, the following should be the actionable non-conformances by the maw business operators
   - Failure to keep records or make false records;
   - Failure to disclose information when lawfully requested;
   - Failure to keep a recall or withdrawal plan;
   - Failure to implement a recall or withdrawal plan.

8.3 Traceability checklist to guide the Competent Authority to curb Trading in Illegal, Unreported and Unregulated (IUU) maw products

i) There should be adequate measures for maw business operators to document the origin of maw and make fish maw supply more transparent from extraction to processing and export;

ii) The Competent Authority should put in place measures to ascertain that all maws handled by business operators come from verifiable sources through conducting effective documents checks such as health certificates, maw movement permits, sales documents such as invoices, delivery notes, and receipts, maw transaction data form for traceability and others. All lots of maw within or leaving the premises of the maw business operator should be traceable at all stages in upstream chains; and final products to be exported should be traceable. This can be checked based on the codes and tags used internally by business operators to trace the lots and labels on the product and the accompanying documents;

iii) Maw business operators must have information systems and procedures to identify an operator from whom they are supplied with the lots of maw and to whom these maw products have been supplied to in the end as narrated in the SOPs.

9. GUIDANCE ON RATIONALIZING THE BENEFITS FROM THE NILE PERCH MAWS TO TRICKLE DOWN TO ALL CHAIN ACTORS

For guidance on how to rationalize benefits from the fish maws among the value chain actors see annex 3.
10. GUIDANCE ON GOVERNMENT SUPPORT TO LOCAL INVESTORS TO ENGAGE IN THE NILE PERCH MAW PROCESSING AND TRADE

For guidance on government support to local investors on fish maw processing and trade see Annex 4

11. GUIDANCE ON VALUE ADDED PRODUCTS FROM FISH

For guidance on value added products from fish see annex 5

12. RECOMMENDED MINIMUM SIZE OF NILE PERCH MAWS FOR TRADING BASING ON STUDIES CONDUCTED IN PARTNER STATES

Background information on the proposed minimum size for maw is provided in annex 6.

13. GUIDANCE ON REGULATORY MECHANISM REGARDING EXTRACTION, PROCESSING, TRANSPORTATION AND TRADE TO ENSURE SUSTAINABILITY OF THE NILE PERCH RESOURCES

13.1 Set up of official controls for fish maw

Competent Authorities should develop adequate regulations relating to the extraction, processing and trading of maw to ensure sustainability of fisheries resources. The head of the Competent Authority should therefore cause a process to:

a) Develop regulations that specify the standards and measures to be observed in extraction, processing and trading of fish maw in accordance to relevant national laws;

b) Develop mechanism for enforcing the regulatory compliance by all the maw business operators by:
   i) Establishing inspection services that cover inspection of all stages of maw chain from extraction, processing and trading. Keep and update register for all approved fish maw operators;
   ii) Certifying all exports and issuing approval/permit for all imports in line with the Guideline issued by LVFO (LVFO, 2021).

c) Develop appropriate Standard Operating Procedures (SOPs) for guiding the inspection and certification of handling/holding facilities, maw extraction and processing;

d) Collaborate with the National Standards Setting and other relevant Bodies to develop standards for maw;

e) Collaborate with maw business associations to develop a Code of Good Practices to guide them in complying with the regulatory requirements;

f) Supporting the maw business associations to promote self-regulation and voluntary compliance among their members;
g) Establish a self-checking mechanism (internal audit system) of the official control system with a clear routine schedule to ensure that the official control actions remain purposed to promote the sustainability of fisheries resources, value addition, quality and safety of the maw.

13.2 Registration and licensing of all maw business operators

The Competent Authorities should establish a register for all maw business operators. Criteria should be developed to determine the authorized maw business operators upon which the Competent Authority should base to license the business operators. The licensing mechanism should be based on the relevant national legislation.

14. OFFICIAL CONTROL PROCEDURES (INSPECTION, APPROVALS AND CERTIFICATIONS) REQUIRED TO ENSURE QUALITY AND SAFETY OF NILE PERCH FISH MAW

Any business operator who wishes to engage in the business of extraction, trading, processing and export of maw should first adhere to the National Regulations and the approved Harmonized Fisheries and Aquaculture Border Inspection Manual, the Harmonized EAC Guidelines for Trade in Fish, Fishery and Aquaculture Products and Inputs in Regional and International Trade.

15. PROPOSED SYSTEMS TO ENSURE AVAILABILITY OF DATA ON EXTRACTION, PROCESSING AND TRADE

In order to ensure that sufficient data and information on extraction, processing and trade of maw are collected and made available to CA to aid policy and planning; the National Regulations, Harmonized Fisheries and Aquaculture Border Inspection Manual for East African and Harmonized Sanitary and Phyto-sanitary (SPS) Measures (Sanitary Measures for Fish and Fishery Products) should be followed.

16. INSTITUTIONS ALONG THE VALUE CHAIN OF NILE PERCH MAWS, THEIR ROLES AND RESPONSIBILITIES

The implementation of this guideline therefore should be done through collaboration of different stakeholders who will have responsibilities along the fish maw value chain and trading. The key Institutions include Lake Victoria Fisheries Organization (LVFO), National Competent Authorities of Fish and Fishery Products, National Research Fisheries Institutions, Local/Municipal/County Governments, Beach Management Units, National Fish Processors and Fish Maw Traders Associations and Civil Society Organizations. The roles of these Institutions are annex in this guideline.

The following are different roles played by the key stakeholders in fish maw extraction, processing and trading:

1. Lake Victoria Fisheries Organization (LVFO)

The role of LVFO in relation to extraction, processing and trading of Nile perch maws are to:
i. Coordinate the development and review of Regional Guidelines for extraction, trading and processing of fish maws;

ii. Develop policy briefs and other technical documents to guide national authorities on the necessary policy, legal and institutional framework and strategies needed to streamline the extraction, processing trading, and exportation of maw in a manner that ensures the sustainability of the fisheries resource, improves the safety and quality and access to better markets for maw;

iii. Coordinate the synthesis of national reports on extraction, trading and processing of fish maws;

iv. Support and harmonize studies aimed to understand the dynamics in extraction, processing and export of fish maws and provide guidance to national governments on development of maw industry in the region;

v. Brief the Sectoral Council regarding the opportunities existing in processing and manufacturing of maw and other value-added products from fish and guidance on attracting related investments in the region;

vi. Provide regional fora for networking and information sharing;

vii. Initiate and facilitate regional discussions on a common approach to seeking formal access to China and other far East country markets for maw by regional countries;

viii. Work with the relevant bodies at regional and national level and coordinate the development of a coherent strategy on attracting investments in manufacturing of finished products from maw and other fishery intermediate and value-added products such as Collagen/Gelatin from scales and skins; isinglass from maw; extraction of fish oil targeting omega-3 fatty acids etc;

ix. Report to the Sectoral Council whenever there is a need for policy guidance in regard to implementation of these guidelines.

2. National Competent Authorities for Fish and Fishery Products

i) Develop regulations for implementing these guidelines on extraction, trading, processing and exportation of maw;

ii) Register and approve all maw business operators that export to the region and beyond;

iii) Initiate and take part in intra-regional discussions on common approach to seeking formal access to Chinese and other markets for maw in the far East Asia countries; and also, bi-lateral talks with the authorities in the countries where there is market for maw to agree on a protocol for maw export to those countries;

iv) Develop national guidelines which should incorporate Standard Code of Good practice for the Extraction, Trading and Processing of Maw to guide business operators in maw value chain on complying with the requirements of the regulations;
v) Spear-head the implementation of national official controls for maw extraction, trading and processing by developing Standard Operating Procedures (SOPs) for inspection, verification and quality assurance for fish maw for guiding the inspectors and others involved in official control activities;

vi) Undertake monitoring, surveillance and control (MSC) activities to enforce compliance to all the regulatory requirements for the extraction, trading and processing of maw;

vii) Issue licenses, permits, certificates for the export and import of maw and also monitor to check the authenticity of all documents used to attest compliance to the requirements of maw extraction, trading and processing;

viii) Conduct sensitization and awareness campaigns to inform stakeholders on best practices for maw extraction, trading and processing and exportation;

ix) Provide technical guidance to local/municipal/county governments on the need to implement official control activities under their mandates relating to extraction, trading and processing of maw;

x) Promoting self-regulation among the maw business operators involved in extraction, trading and processing to ensure fisheries resources sustainability, improving safety and quality; and access to better markets for fish maw;

xi) Coordinating collection of data related to extraction, trading and processing of fish maws;

xii) Establishing national database for fish maw extraction, trading and processing and exportation; and ensuring the national database is continually updated;

xiii) Sharing information and data on maw extraction, trading and processing with other stakeholders as may be needed.

3. Researchers

Research efforts should focus on answering research questions that could help to unlock the industrial and market potential of maw and other fishery value added products. Specifically, research efforts should focus on the following:

i. Further research to determine the minimum size for maw that should be legally accepted for sell based on the legal sizes for fish. Specifically, more research is needed in Uganda and Kenya. Also, research is needed to evaluate the influence of fishing ground on maw sizes;

ii. Research to determine the price dynamics and the drivers of prices of maw in the region to recommend measures on how to control price fluctuations;

iii. Research to assess the commercial viability of fish maws (maw) in other fish species such as African catfish and others for which maws could have demand in international markets;

iv. Study of the characteristics and features of maw from different fishing grounds and other water bodies to determine their influence on quality;

v. Further studies on Collagen/Gelatin from Nile perch skins/scales and maw, as well as isinglass from Nile perch as way to guide future investments in the manufacturing of finished products in the region;
vi. More research is needed regarding the extraction method and quality of Nile perch fish oil in relation to amount of omega-3 fatty acids;

vii. Harmonize the minimum sizes of fish maw allowed for extraction and processing among the three countries (SOPS for data collection needed);

viii. Further research to explore relationships between Nile perch size and swim bladder, focusing on aspects of season, geographical location, depth, and fish sex;

ix. Dedicated value addition research to diversify Nile perch products from fish maw, skin, scales, carcass) and associated economic returns.

4. Local/municipal/county governments

i. Disseminate the national regulations and guidelines for maw extraction, trading and processing to all maw business operators and other stakeholders at the local government and community levels;

ii. Develop ordinances and bye-laws aimed to improve the extraction, trading and processing of fish maws where necessary;

iii. Maintain and implement the ordinances and bye-laws related to maw extraction, trade and processing;

iv. Register and approve all maw business operators authorized to extract, trade and process maw in the areas of jurisdiction;

v. Collect and compile data from maw business operators on the extraction, trading and processing of maw, transmit the data to the National Competent Authority for fish and fishery products;

vi. Monitor and enforce compliance with the national regulations and local/municipal/county government bye-laws on maw extraction, trading and processing of maw;

vii. Maintain the register of all business operators involved in extraction, trading and processing and export of maw;

viii. Conduct regular inspection and verification of compliance for facilities, techniques and practices used/applied in extraction, trading and processing of maw at all the stages in the chain;

ix. Collaborate with the National Competent Authority for fish and fishery products and other relevant stakeholders to improve the extraction, trading and processing and exportation of fish maw;

x. Sensitize and create awareness among maw business operators and other stakeholders in local/municipal/county government and communities regarding the importance of complying with the requirements of regulations on extraction, trading and processing of maw;

xi. Mobilize funds to support awareness creation, technical support to the maw business operators and conducting all official control activities such as licensing, inspection and approvals relating to facilities and practices used in extraction, trading and processing of maw; and certification of maw products;
xii. Issue maw movement permit and approve establishments and businesses that meet the requirements for the extraction, trading and processing.

5. Beach Management Units (BMUs)/Landing site committees

i. Maintain sanitation and hygiene of the areas within and around the beaches to ensure that the maw extracted by artisanal extractors is handled in proper conditions and safe and fit for purpose;

ii. Create awareness among the fish community members about the importance of proper handling of fish in maintaining the quality of maw extracted from them;

iii. Collect and share data and information regarding the maw extraction, trading and processing within the fishing community;

iv. Report any illegal activities regarding the extraction, trading and processing of the maw by community members;

v. Disseminate information on extraction, trading and processing of the maw to the members of the community;

vi. Develop and implement bye-laws to facilitate and improve areas and conditions of extraction, trading and processing of the Nile perch maw among community members;

vii. Monitor the compliance with the respective bye-laws by the fisher folk.

6. Fish maw traders and processors’ associations

i. Participate together with the competent authority and other stakeholders in the development of standard code of good practices for extraction, trading and processing of fish maws;

ii. Strengthen the associations by expanding membership to include all operators of businesses involving the extraction, trading, processing and exportation of the fish maws;

iii. Establish schemes to promote and encourage compliance and self-regulation relating to the adherence to the standard code of good practices for extraction, trading and processing and exportation among members;

iv. Provide data and information regarding the volume, value and markets of maws extracted, traded, processed and exported;

v. Report any illegal activities regarding the extraction, trading and processing of the fish maw by association and community members;

vi. Create awareness among the association members about the importance of complying with the regulatory and market requirements relating to the extraction, trading, processing and exportation of the fish maw;

vii. Disseminate information on extraction, trading and processing of the fish maw to the members of the association and community.

7. Civil Society organizations
i. Advocate for policy and strategy changes through research and development to improve areas, conditions and practices in extraction, trading and processing that could affect the sustainability of the fisheries resources, or have effect on the safety, quality and markets for fish maw;

ii. Participate in the development of standard code of good practices for extraction, trading and processing to represent public interests;

iii. Advocate and promote the implementation of the guidelines on extraction, trading and processing the fish maws by the respective stakeholders;

iv. Create awareness among the general public regarding the importance of compliance with regulatory requirements for extraction, trading and processing of fish maw by the maw business operators;

v. Support and promote activities that facilitate improvements in extraction, trading, and processing and exportation of the fish maws;

vi. Monitor the impacts of maw extraction, trading and processing activities on the community’s livelihoods, environment and the economy;

vii. Facilitate community members to take part in extraction, trading and processing of the fish maw;

viii. Provide community liaison with the government and businesses regarding matters related to extraction, trading and processing of the fish maw.

8. Other Stakeholders with roles and responsibilities for facilitating maw business operators involved in the extraction, trading, processing and exportation of fish maw

There are other stakeholder institutions who have an important role to play in facilitating the maw business operators in the extraction, trading and processing and exportation of maw. The details of their roles and responsibilities are given below:

<table>
<thead>
<tr>
<th>SN</th>
<th>Stakeholder institution</th>
<th>Roles and responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Revenue Authority</td>
<td>Assess and collect revenues, taxes, levies and royalties, give tax clearances, monitor and control imports and exports</td>
</tr>
<tr>
<td>2</td>
<td>Water and sewerage departments</td>
<td>Issue waste water disposal certificates</td>
</tr>
<tr>
<td>3</td>
<td>Public Health departments</td>
<td>Assess compliance of maw establishments to public health requirements; issue hygiene compliance certificate and workers’ medical health certificates; and enforcing fumigation of the working premises</td>
</tr>
<tr>
<td>4</td>
<td>Labour departments</td>
<td>Provide Occupation Safety and Health Administration (OSHA) certificate to the maw business operations; Ensure contribution to Workers Compensation Fund (WCF) or to Workers International Training and Skills Development Fund as may be applicable</td>
</tr>
<tr>
<td>5</td>
<td>Environmental</td>
<td>Ensuring environmental audit and production of</td>
</tr>
<tr>
<td>Management Agency</td>
<td>environmental audit reports; and issuing environmental compliance certificate</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>6</strong> Registrar of Companies and Business</td>
<td>Incorporation of Companies and Businesses and issuing Certificate of Incorporation</td>
<td></td>
</tr>
<tr>
<td><strong>7</strong> Fire Safety department (Fire Control Services)</td>
<td>Issuing fire safety clearance certificate</td>
<td></td>
</tr>
<tr>
<td><strong>8</strong> Internal Trade department</td>
<td>Issuing business/trade licenses</td>
<td></td>
</tr>
<tr>
<td><strong>9</strong> External Trade department</td>
<td>Issuing Export Licenses</td>
<td></td>
</tr>
<tr>
<td><strong>10</strong> Industry Department</td>
<td>Issuing industrial/processing license/certificate</td>
<td></td>
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<tr>
<td><strong>11</strong> Investment Promotion Agency</td>
<td>Issuing of Investment Incentive certificate</td>
<td></td>
</tr>
<tr>
<td><strong>12</strong> Atomic Energy Agency</td>
<td>Issuing of certificate of compliance with requirements related to radio-active elements and radiations in fish maws</td>
<td></td>
</tr>
<tr>
<td><strong>13</strong> National Chamber of Commerce and Industry</td>
<td>Issuing the certificate of origin for exported maw products</td>
<td></td>
</tr>
<tr>
<td><strong>14</strong> Police and other security organs</td>
<td>Enforcing all the laws relating to maw and fish and fishery products</td>
<td></td>
</tr>
<tr>
<td><strong>15</strong> Bureau of Standards</td>
<td>Setting, managing and monitoring the implementation of maw standards</td>
<td></td>
</tr>
<tr>
<td><strong>16</strong> Veterinary services</td>
<td>Ensure compliance to standards in the processing and trade in fish skins and resultant leather products</td>
<td></td>
</tr>
<tr>
<td><strong>17</strong> Crop protection</td>
<td>Certifying chemicals used in fumigation</td>
<td></td>
</tr>
<tr>
<td><strong>18</strong> Foreign Affairs Department</td>
<td>Provide diplomatic assistance and linkages with external markets</td>
<td></td>
</tr>
</tbody>
</table>
REFERENCES


### SIMPLE TRANSACTION DATA FORM FOR TRACEABILITY RECORDS FOR MAW

<table>
<thead>
<tr>
<th>Supplier Name:</th>
<th>Supplier registration code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier Contacts:</td>
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</table>

<table>
<thead>
<tr>
<th>Batch No.</th>
<th>Identification</th>
<th>Product description</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
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</table>

<table>
<thead>
<tr>
<th>Receiver’s Name:</th>
<th>Receiver’s registration Code</th>
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</thead>
<tbody>
<tr>
<td>Receiver contacts:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supplier/Representative</th>
<th>Receiver representative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>Name:</td>
</tr>
<tr>
<td>Signature:</td>
<td>Signature:</td>
</tr>
<tr>
<td>Date:</td>
<td>Date:</td>
</tr>
</tbody>
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## Checklist for inspection of traceability system for maw

### FORMAT OF THE CHECKLIST FOR INSPECTION OF TRACEABILITY SYSTEM FOR MAW

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Satisfactory</th>
<th>Non-satisfactory</th>
<th>Comments</th>
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<tbody>
<tr>
<td>Maw supplier/origin clearly identified</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Received raw material identified by code No.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lots separated during transport</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lots identified during the process</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The codes include all essential information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Separation or addition (mixing) of lots recorded</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Label codes permit trace-back</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recall plan formalized and operational</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data on suppliers and clients available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product distribution plans available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recall plan verification recorded</td>
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</table>

### Conclusions

<table>
<thead>
<tr>
<th>Comments on corrections needed for each element assessed above</th>
<th>Correction requested</th>
<th>Date limit</th>
<th>Done or not</th>
</tr>
</thead>
</table>

### Comments

<table>
<thead>
<tr>
<th>Conclusions: Compliant/non-compliant</th>
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</table>

<table>
<thead>
<tr>
<th>Inspector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maw business responsible person</td>
</tr>
</tbody>
</table>

| Name:                                 |
| Signature:                            |
| Date                                  |
|                                       |
| Name:                                 |
| Signature:                            |
| Date                                  |
ANNEX 3: GUIDANCE ON RATIONALIZING THE BENEFITS FROM THE NILE PERCH MAWS TO TRICKLE DOWN TO ALL CHAIN ACTORS

Conduct research to further understand the dynamics in international markets for maw. It has been found out that Lake Victoria Region is now one of the major sources of maw sold in Hong Kong. It is understood that the maw is re-exported to Vietnam from where a significant proportion is re-exported into South East China (Quanzhou) where it is largely consumed as food and medicine or used as traditional trophies. The remaining maw is sold in Vietnam and other South East Asian countries for perhaps processing into other products. Therefore, in order to enable the benefits of maw to trickle down to all chain players; it is important:

a) To study the real flow of the maw product from the region beyond Hong Kong to fully understand the export market dynamics with a view to determine and disentangle the exact channels of end markets for maw exported from the region;

b) Since maw products are reported to support a wide range of industries to produce different manufactured finished products, a study should be conducted to identify and determine the specific industries Nile perch maw products support, the finished products manufactured from maw and the countries where this manufacturing takes place;

c) Regional countries, working through the East African Community Secretariat should attract the investments to manufacture the final maw products in the region. This will preserve the jobs for the nationals of the region and maximize revenues of the operators in the maw value chain.

1. Open maw export businesses to other players other than foreign investors. This will reveal the real value and operating prices of maw on international and regional market. Currently, the "real-world" value of maw is not known to majority of regional maw value chain actors. There are several nationals of regional and other countries with capital and resources who have interest and have tried to export to Hong Kong but hindered by lack of knowledge on the operation of that market. Opening up of maw export business will liberalize the processing and export business by introducing proper competition and transparency and attract more plausible investments in maw processing in the region. Therefore in order to open-up the maw export business the following steps are required:

a) Formalize maw trade between the region and the Peoples Republic of China. This should be done by regional countries working through the East African Community to initiate trade talks and negotiation with the Chinese government to officially open up the market. The official opening of Chinese market to regional maw businesses will further create transparency and help to eliminate middlemen and costs associated with illegal importation of the maw into China market which increase transaction costs that subsequently lower the prices earned by the maw suppliers in the upstream chain;

b) The regional governments will have to prepare maw businesses and improve the value chain activities to meet the quality, safety and other trade requirements of the Chinese market;
c) The basis for preparation of maw businesses, value chain activities and Competent Authorities to meet the requirements of Chinese export markets should be the interpretation of the negotiated trade protocol with the Peoples Republic of China. This should result into the development and implementation of Maw and Products Regulations; Standard operating procedures for inspections and quality assurance of maw products to be used by competent authorities in verification of compliance by the maw business actors to the regulations; and Standard Code of Good Practices to guide the maw business actors on complying with the regulations;

d) The Governments of the regional countries should establish and implement regulatory official controls to enforce compliance to the maw regulations by all maw business actors. By doing so, this will increase benefits through better taxes paid by the more transparent players to government, promote skills and professionalism among the key staff of the companies and enhanced salaries paid to workers. Better business performance will result in better quality and high value products that will fetch high revenues for the operators which will trickle down to maw suppliers through better prices;

2. Address the challenge of price fluctuation. Fluctuating prices of maw not only affect incomes of maw traders but also of fish suppliers and fish factories. When maw prices are low, the majority of local fish traders tend to sell most of the fish to fish factories. This affects the incomes of maw traders who are always dependent on maw supplies from local fish traders that normally extract maw before selling the fish. However, when maw prices go high the local fish traders and the fish suppliers to the factories prefer to extract the maw from the fish and sell the fish to the local and regional market. Therefore, either way fluctuation of the maw prices affects the stability of the supply of the maw to local traders but also affects the stability of fish supply to the fish processing factories hence affecting incomes and revenues of the maw traders, undermining growth of fish processing industry and the livelihoods of employees of the fish factories as well as revenues generated by fish factories. The maw price fluctuation also has potential to impact on the supply of fish on the market hence affecting the food security of fish consuming households. To address the challenge of maw price fluctuation the following measures should be undertaken:

a) Improving regulation of maw businesses through registration and licensing of all maw businesses and conducting official controls to enforce specific regulations targeting extraction, trading, processing and exportation of maw will drive businesses to play by the rules. This will help to create transparency in business transactions, strengthen commercial relationships and help weed-out businesses operated by speculators who tend to distort market and pricing information. These speculators operate through connivance with enforcement and security organs to create the impression that dealing in maw is an illegal undertaking. This is normally done in order to arouse unnecessary competition which ends up promoting corruption, trading in illegal sized maw and smuggling of maw across regional borders which increase the cost of transactions that subsequently affect the income and revenue of maw suppliers;
b) Regional governments could form a body to intervene by undertaking market studies – especially in the export market to keep updated on the price changes; and whenever the maw industry is not transparent in determination of the prices offered to the local suppliers, the responsible regional body would then give indicative prices.

3. Legislation should recognize the fish maw as a prime fishery product. Recognition of the maw as a highly valued and prime product of fish will among others;

   a) Enable fishers and fish suppliers to receive a price that includes the value of maw;

   b) Enable development of specific regulations and establishing formal regulatory controls based on specific technical considerations of maw product characteristics and standards with well clearly stated sanctions to violators of the regulations. This will streamline enforcement to avoid ambiguity in interpreting the existing fishery products laws that lead to arbitrary application by enforcement bodies which has promoted corruption, smuggling, and other underworld illegal trading activities. Such a scenario tends to make maw trading, especially to small players who cannot afford bribes and enticements demanded by law enforcement, as though it is an illegal and cumbersome business in which they opt not to participate. This gives opportunity to only those with resources, connections and good knowledge about the market and working of the processes involved to reach final buyers to dictate the prices offered to small players such as extractors, collectors and small-scale traders.

4. Empower communities engaged in artisanal extraction, maw collection, small scale trade, and processing of maw to access markets and better prices of maw. This should be done by:

   a) Undertaking awareness and sensitization campaign targeting actors in the maw upstream chain such as fishermen, boat owners, fish suppliers, maw collectors, extractors and traders regarding the uses of maw and create transparency about the existing markets, regulations and standards, and pricing of maw. Also empower this category of actors with negotiation skills relating to maw transactions;

   b) Local governments/Districts/Counties should set up bye-laws to guard against cheating of small maw business operators such as extractors and collectors by other actors in the chain through underpricing and under estimation of quantity of maw. The bye-laws should require all maw buyers to have tools of measurements/weighing machines and ensure that amount offered to maw sellers are derived objectively basing on quantities measured;

   c) Government should license maw extraction facilities where community members e.g. fishermen, boat owners, local fish traders and fish suppliers who wish to sell the fish in the domestic and region markets can be allowed to have their maw legally extracted, cleaned and packed under sanitary conditions. This will increase the benefits of upstream maw chain
actors by curbing the very rampant practice of extracting maw in un-
gazetted places which lowers the quality, value and subsequently the price
of maw paid to the maw suppliers by processors;

d) Support the formation and strengthening of groups and associations of
maw business operators: especially extractors, collectors and traders to
aggregate their maw into reasonably large volumes and sell in bulk. This
will improve their bargaining power. It will also be possible to source and
access better markets as a group;

e) Provide market and pricing information to maw business actors in the
upstream chain in real time to curtail cheating and price manipulation by
the business actors in the downstream chain. By working through the
groups and associations of maw business actors such real time
information can be passed on to them on daily basis through phone text
messaging, use of social media or designing appropriate apps used
through enhanced mobile tools such as phones and tablets;

5. Reviewing, revising and upgrading the licensing mechanisms to remove
measures that are unfair to the small maw business operators or encourage
inequities among similar categories of maw businesses. To do this;

   a) Governments should review the maw collection licenses fees set out in the
   relevant regulations and set non-regressive license fees that segregate the
   small scale operators such as artisanal extractors and collectors who
   handle a very small quantity of maw, from traders, middlemen, and agents
   who should also be charged fees correlated to the volumes of business.
   Lumping all maw traders and handlers into one category where similar
   collection license fee apply marginalizes the small players such as
   extractors and collectors who earn a living by selling maw;

   b) The fees payable by maw businesses per unit quantity of maw for
   movement permit to the local government/municipality/county/district
   should be standardized by National Government to avoid a scenario where
   same businesses in different locations in the country are charged
differently. This variability in movement permit fees strengthens maw
   businesses in one region and weakens others in other regions, districts or
   county.

6. Address the problem of cheating of maw suppliers by maw processors which is
done through use of arbitrary and non-transparent methods of sorting and
grading of maw which are based on the standards only known to the buyer. This
should be done by:

   a) Conducting studies in export markets for maw to determine the standards
   for the best quality maw that attract better prices;

   b) Developing standards for maw and building the capacity of maw suppliers
   in implementation of the standards;

   c) Increasing awareness among the maw suppliers, maw processors and
   buyers regarding the best quality standards for maw applied in the market.
In order to promote local investments in maw extraction, processing and export business the governments need to:

i) Support the establishment of maw business associations, strengthen the existing ones and organize the associations into cooperatives to aggregate savings to a level necessary to undertake meaningful trading and processing businesses;

ii) Strengthen the cooperatives and some serious and resilient maw traders who have the basic resources such as land, maw handling infrastructure, technological know-how and interest to move into processing and export of maw. They should be given technical and financial support to upgrade their facilities and businesses to undertake processing and export;

iii) Assist maw businesses owned by nationals of regional countries who have interest in processing and exporting maw to access the targeted markets. To this end, EAC secretariat and regional governments should launch talks and negotiations with the Chinese and other governments of countries where maw from the region is exported to formalize exports. Also working through export promotion agencies there is need to organize trade fairs and exhibition in the target market countries and where possible, facilitate regional businesses to establish commercial contacts with the buyers of maw and show case their products;

iv) Promote any existing and future partnerships between local business operators and foreign maw processors/investors to enable acquisition of business skills and acumen and facilitate technology transfer among nationals of regional countries; One strategy to achieve this is to put in place policies where it is made a requirement for maw processors and exporters to cede some shares to local businesses as a condition to obtain an operating license;

v) Build the capacity of local business operators already linked to foreign maw processors/investors as partners, agents and middlemen to strengthen commercial relationships and business partnerships and improve levels of trust between them;

vi) Develop and provide standard models and prototypes for maw extraction facilities and give directions on the appropriate site locations, basic infrastructure such as building and equipment, waste water disposal systems and other facilities needed to extract maw in acceptable sanitary conditions;

vii) Study the viability of manufacturing intermediate products from maw such as collagen, isinglass and others in the region; and by working with investment promotion bodies attract investors so that more opportunities can be created for regional traders and processors to operate in an expanded maw value chain;
viii) Empower existing maw business operators through training in improving food safety and quality of maw, related quality standards, and better techniques for handling, preservation, processing and packaging of maw for export.

ix) Make the process of acquisition of maw collection, maw export licenses and other necessary documents for trading, processing and exporting of maw much easier and bring the services for application closer to the maw business hubs. Also reduce the different approval requirements, royalties and taxes to make maw trade, processing and export attractive to nationals of regional countries;

x) Promote the use, and ease acquisition of East African passports and reduce border checks for regional traders holding the East African passport who vend maw products across-borders provided they pay all the taxes;

xi) Develop technical regulations to guide the extraction, trading, processing and exporting of maw in and from the region; ensure that the law enforcement institutions such as police and other security organs are sensitized about the requirements of the regulations. Eliminate corruption among law enforcers and guide them to work with the technical fisheries staff during enforcement of compliance to the maw regulations;

xii) Explore opportunities to increase maw supply on the market by extending official controls, awareness and sensitization activities to all the water bodies where Nile perch maw is sourced;

xiii) Study through research the commercial viability of maws from the African catfish which is currently doing well in aquaculture in the region to determine whether its maw can attract market, as the case for other catfishes, which are known to supply maw on the world market. This will be helpful in expansion of maw business opportunities in the region.
ANNEX 5: GUIDANCE ON VALUE ADDED PRODUCTS FROM FISH

The current fish processing practice/techniques/processes generate large amounts of by-products which are reported to account for three-quarters of total weight. Despite several valuable components of fish, especially the Nile perch, fish processing by-products are usually dumped. Yet some of the products are highly valuable and can be used as raw materials in several industries in production of diverse products of high commercial value.

The by-products from fish processing include: viscera, heads, trim, skins, scales, fins, tails and bones as well as fish rejected for processing as being unsuitable for human consumption due to spoilage. The other by-products which commonly are of low commercial value include fish meal used to feed other fishes, fish silage, and fertilizers.

However, there are high value by-products obtained from different fish parts which have several applications in different industries as indicated below:

a) Fish scales used in textile industry to produce soft fiber for making beddings and other outdoor materials
   Fish scales are increasingly gaining popularity in countries known for innovative textile and clothing industries such as Taiwan where they are used to produce soft fiber utilized in making soft hand feel material and fabric with naturally good moisture management. Because of the high cost, such fabrics are normally used in making luxurious and expensive warm beddings and outdoor clothing materials mainly liked by the rich and celebrities;

b) Fish scales, skin, bones and fins are used in pharmaceutical, packaging and food industries to produce diverse products.

Fish scales, skins, fins and bones contain a type of protein called Collagen in large quantities which is a source of Food Grade Gelatin widely used in pharmaceutical, biomaterial industry packaging and photographic industries. Gelatin's use for encapsulation and edible film formation makes it an interest to pharmaceutical, bio-material based packaging, and photographic industries. Besides the numerous industrial applications, Gelatin is useful in maintaining joints and bone health, preventing osteoporosis, promoting hair growth and improving nail strength and growth. Osteoporosis is a medical condition in which the bones become brittle and fragile from loss of tissue typically as a result of hormonal changes, or deficiency of calcium or vitamin D. Although the majority of Gelatin used in industry comes from mammalian animals especially from hides and skins; there is increased interest in extracting Gelatin from fish. Particularly, it has been found that Nile Perch and Tilapia have good yield of Gelatin that can support industry operations. Examples of countries where fish scales are used to support related industries such as cosmetics, Gelatin and Collagen are the Philippines, Bangladesh and Cameroon;

c) Fish skins and scales are used to make bio-degradable plastics for use in production of assortment of items
The fish scales and skins are used to make bio-degradable plastic sheeting that can be used to produce different materials. The scales and skin are bound together using seaweed and chitosan from shells obtained from shell fish. When they are treated under temperature they result into a plastic like biodegradable translucent sheet. The plastic sheet biodegrades on its own within 4-6 weeks which solves a problem of packaging using plastic materials made from petroleum products which are non-bio-degradable and therefore degrade the environment. Fish skins and scales are used to make biodegradable plastic materials used for making cups, eyeglasses and goggles;

d) Fish by-products are used innovatively and selectively to make assortment of goods and materials. A lot of innovations to design new products from fish by-products have shown potential to produce different environmentally safe and commercially useful products as indicated below.

i) Fish bones are carefully cut and molded to produce buttons and other components used in making of shoes, handbags etc.;

ii) Fish skins and viscera (intestines) are tanned into leather for making shoes, clothes, bags, belts and other leather-made materials;

iii) The fish eyes are used to make ladies earrings;

iv) Fish bones are used in making of stitching glue;

v) Fish scales are used in making of decorative artificial flowers, necklaces and other artifacts;

vi) Fish skins, scales, heads and other components such as skeletons and trims are dried and crushed in a milling machine and used to provide nutrient supplement for feeds used in poultry, piggery and fish farming;

vii) Fish trimmings and fat are enclosed in skin and fried to make a delicacy by some communities in the region;

viii) Fish heads are used in making soup liked by communities in the region but also used as medicine among some communities especially in Democratic Republic of Congo;

ix) Fish skin powder is used by communities in treatment of wounds;

ox) Fish carcasses are chopped, salted and dried to produce fish chips liked by Congolese and some other consumers in the region.

e) Fish fats are used to produce oil which has wide application in production of nutritional supplements, pharmaceutical products, animal feeding and functional foods

The fish oil contains omega-3 fatty acids which are recommended by health experts for reduction of cholesterol known to cause high blood pressure and heart diseases. In addition to human nutritional uses, fish oil is essentially used as a feed item in several animals, which comprise aquaculture feed, animal and pet feed. It is globally a key ingredient in growth of aquaculture
industry. Fish oil is used in pharmaceuticals, dietary supplements and functional feed.

Fish Products with potential for value addition and marketing in the region

To benefit from different fish components such as fish skins, scales, viscera, bones, oil etc. the following approaches are required by the governments of the region:

a) Produce sun dried skins and scales for production of Collagen powder or produce the Collagen powder in the region

Dry fish skins and scales have markets in China and East Asian Countries where they are largely used for production of Collagen powder. The average price of dried skin prepared for collagen production is USD 1.7-2.30/kg or USD 1599/metric ton which makes export to the international market less profitable when transport costs are considered. However, there is good business sense to attract investors to produce Collagen powder in the region. To begin with, it is important to compare the prices of Collagen extracted from regional fishes with the other products already on the market especially from Norway and Mauritania who seem to be the major players in supplying fish Collagen powder in the Chinese market. More studies can explore other markets available for fish Collagen powder in the world;

b) Promote production of art-crafts such as flowers, handbags, footwear and others made out of fish scales, fish skins, bones and other fish parts

Fish scales are used to design decorative materials and items such as making of artificial flowers. Scales and skins in combination with fish bones are used in making of unique art crafts such as hand bags, slippers and sandals and others; which are very popular among tourists and high-end customers. The fish bones are used for producing the stitching glue and making of buttons. These art crafts are already being developed by some of regional innovators although they lack better technologies and hence their products are not yet of good standards. Such innovators need to be promoted and technologies popularized to produce better exportable products;

c) Develop the tanning industry for fish skins and intestines. There are already skin tanning efforts in the region. However, these efforts have not been profitable mainly because of high export taxes (royalties). The industry is also affected by lack of leather processing and product development standards which lead to low quality products. Other challenges include the use of mineral tanning (chromium) for which waste waters have effect on environment. There is need to develop standards in leather sectors, review the taxes and conduct research in use of natural products in fish skin tanning. More investments should be attracted to produce innovative products such as soft feel materials used in beddings and outdoor wear that are on demand in high end markets. There is worldwide growing demand for leather products tanned from fish viscera such as intestines used in making of straps for ladies’ shoes. More studies should be undertaken to unveil the potential in such opportunities;
d) Commercialize and industrialize the production of fish oil. The global fish oil market is estimated to be about USD 4.0 billion and expected to reach 5.42 billion in 2026. This is due to growing demand for Omega-3 fatty acids and growing aquaculture activities which are the major uses of fish oil. Because health experts continuously recommend increase in daily dietary intake of Omega-3 fatty acids, fish oil consumption in the world is on exponential increase with the global market expected to grow at 9.1% between 2020 -2025. There are also advances in research for extraction of Omega-3 fatty acid and strengthening the value chain for fish oil industry. Oil is therefore being extracted on large industrial scale in some countries and shipped to various markets as nutritional or pharmaceutical grade oil to serve different purposes in pharmaceutical industry, nutraceutical industries, and animal feed industry or as functional food. Currently, fish oil is being extracted in the artisanal sector in the region and used by women in frying of fish and other food stuffs. Previous efforts by an investor who extracted oil at industrial scale did not go far. There is need to attract more serious investments in fish oil extraction based on quality standards required by the existing markets;

e) Support growth of fish meal industry in the region to strengthen linkage between the fishery industry and animal and livestock rearing sector

The fish meal is currently made out of fish heads, trims, bones - skeletons, fins etc. which are dried in different combinations as may be available, and crushed/milled to produce a fish meal that is primarily a feed supplement in compounded feed for livestock or fish. Worldwide, 56% of the fish meal is used to make feed for farmed fish, 20% for pig meal, 12% for poultry and 12% for other uses including use as fertilizers. There is already market for this type of fish meal in the region. The fish meal holds potential for cross-linkage to the livestock and aquaculture sector where it can be a vital source of protein supplement for the livestock sector (piggery and poultry) and aquacultured fish. More effort is needed though to organize the trading (including cross-border) to ensure proper safety and quality standards are followed by the processors, transporters, sellers and users of the fish meal to avoid potential health effects on animals and consumers of food derived from animals fed with the fish meal.
ANNEX 6: RECOMMENDED MINIMUM SIZE OF NILE PERCH MAWS FOR TRADING BASING ON STUDIES CONDUCTED IN PARTNER STATES

So far studies have been conducted in Tanzania to determine the minimum size of maw to be traded in the region. The studies are based on the legal size of Nile Perch, which is beyond 50 cm in length.

These studies give the minimum range of maw sizes to be traded as 13g for fresh maw and 4g for dry maw as being almost corresponding to the minimum legal size of fish. However, there is almost agreement among the value chain actors and regulators to suggest that maw sizes and fish do not correlate well hence leading to some regulators suggesting a minimum size of 20g of maw to be sure that immature fish will not be targeted by fishers for purposes of maw extraction.

However, depending on the country, currently the sizes traded are 13g and above. But there is near agreement that maw below 14g has no much economic value. Most maw business operators and regulators are of the view that the studies conducted are not yet conclusive. In the meantime, 13g should be the minimum size, however countries can set minimum sizes ranging between 13-20g until more conclusive studies are conducted to agree on the regional size.

It is therefore recommended that related studies be done in Uganda and Kenya as well to determine the maw sizes that match the minimum legal size of Nile perch. Where possible such studies can be jointly conducted by regional researchers targeting the different fishing grounds.

It is understood that maws from fish obtained from shallow waters tend to be thicker and heavier than those obtained from deeper waters. This is why fishing ground should be a major factor in determining the minimum size of maw from fish of legal size.

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GUIDELINES ON EXTRACTION, PROCESSING AND TRADING OF NILE PERCH MAWS FROM LAKE VICTORIA

The Regional Guidelines for Higher Level Fisheries Co-management on Lake Victoria were adopted by the 3rd Regular Session of Fisheries and Aquaculture Sectoral Council of Ministers on 18th March 2021

The guidelines will be implemented by the EAC Partner States sharing Lake Victoria, whose authorized representatives have duly signed on this 18th March 2021 in Nairobi, Kenya.

For the Republic of Uganda

For the Republic of Kenya

For the United Republic of Tanzania