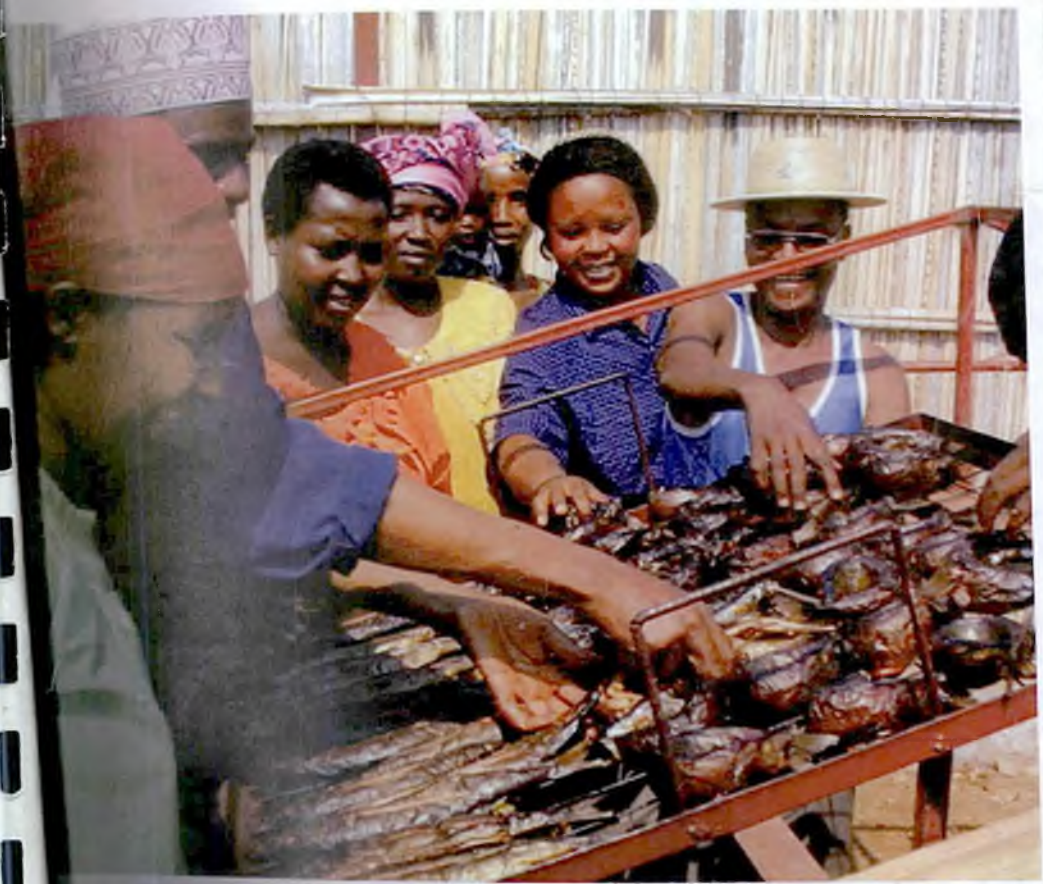
SUPPORT TO CAPACITY BUILDING FOR PROMOTING FORMAL MARKETING AND TRADE OF FISH AND FISH PRODUCTS FROM THE HORN OF AFRICA



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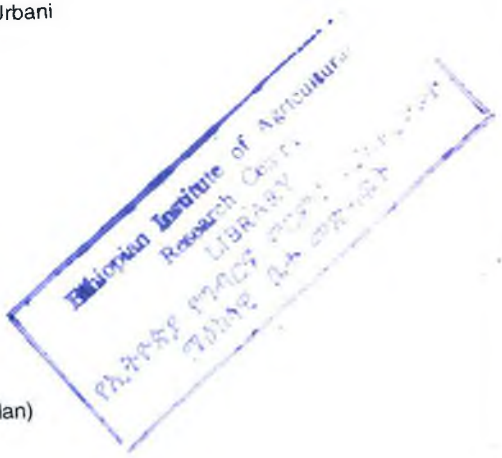

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SUPPORT TO CAPACITY BUILDING FOR PROMOTING FORMAL MARKETING AND TRADE OF FISH AND FISH PRODUCTS FROM THE HORN OF AFRICA

(TCP/RAF/3308)

ASSESSMENT OF REGIONAL FISHERY TRADE, MARKETING AND QUALITY ASSURANCE IN THE HORN OF AFRICA COVERING IGAD MEMBER COUNTRIES

BY

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Cover : Fisherwomen displaying smoked fish for sale - photo by Ms Ndiaye Oumoulkhairy

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ABBREVIATIONS and ACRONYMS

ACP African Caribbean and Pacific
AGMIS Agriculture Marketing Information System
AU IBAR Inter African Bureau for Animal Resources of the African Union
BMU Beach Management Unit
COMESA Common Market for Eastern and Southern Africa
CNA Capacity Need Assessment
DFR Department of Fisheries and Resources
DRC Democratic Republic of Congo
EAC East African Community
EBA Everything But Arms
EEZ Exclusive Economic Zone
EFMIS Electronics Fish Marketing Information System
EPA Economic Partnership Agreement
EU European Union
FAO Food and Agriculture Organization of the United Nations
FMIN Fish Marketing Information Network
FPME Fish Processing and Marketing Enterprises
FTA Free Trade Agreement
GDP Gross Domestic Products
GSP Generalized System of Preference
HACCP Hazard Analysis Critical Control Points
IEPA Interim EPA
IGAD Intergovernmental Authority for Development
IUU Illegal Unregulated and Unreported
KES Kenyan Shilling
KMFRI Kenya Marine and Fisheries Research Institute
LVFO Lake Victoria Fisheries Organization
MAAF Ministry of Agriculture and Fisheries
MAEM-HR Ministry of Agriculture, Livestock and Hydraulic Resources
MCS Monitoring, Control and Surveillance
MDT Multi Disciplinary Team (of FAO SFE)
MOU Memorandum of Understanding
MPA Marine Protected Area
MT Metric Tons
MoFD Ministry of Fisheries Development
MoFMR Ministry of Fisheries and Marine Resources**MUTEPA** *Mukene* Traders, Exporters and Processors Association
NEPAD New Partnership for Africa's Development
NGO Non-governmental organization
NTB Non Tariff Barriers
SADC Southern Africa Development Community
SFE Sub-regional Office for Eastern Africa (of FAO)
SPS Sanitary and Phytosanitary Measures
SSF Small Scale Fishery
TBT Technical Barriers to Trade
TCP Technical Cooperation Programme (of FAO)
UAE United Arab Emirate
UBOS Uganda National Bureau of Statistics
UFCP Uganda's Fisheries Competitiveness Plan
UFPEA Uganda Fish Processors and Exporters Association
WTO World Trade Organization

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EXECUTIVE SUMMARY

This report is a compilation of national studies carried out in seven IGAD member countries - Djibouti, Ethiopia, Kenya, Somalia, Sudan, South Sudan and Uganda. With total production of more than 787,000 metric tons (MT) in 2010, the fisheries sector in IGAD member countries has been recognized as one of the important sectors contributing to food security, livelihoods and foreign exchange earnings. The fisheries sector, is dominated by inland fisheries, where the Nile Rivers and Great lakes are located, contributes more than 94% (capture and aquaculture) of the total fisheries production of IGAD countries and contribution from marine fisheries is only 5.7%, produced by Somalia, Djibouti, Kenya and Sudan. Despite of its insignificant contribution, aquaculture grew rapidly for the past ten years with production increased from 4,384 MT in 2001 to about 110, 000 MT in 2010, an increas of up to 2395% during the period, representing an increase of 240% annually. Freshwater fish like tilapia, Nile perch, carps (Cyprinid) and catfish are the main species harvested, contributing more than 72% of total harvest. Tilapias contributed 26.7% followed by Nile perch (20.5%), carps or cyprinids (15.6%) and catfish (9.8%). The three species are popular in the domestic and regional markets while Nile perch is mainly for export to developed markets.

Rising demand for fish and fishery products has placed excessive pressure on inland capture fisheries which has led to over fishing, IUU fishing and illegal trade practices (e.g. selling undersize fish, illegal cross border trade). The other major issue faced by the fisheries sector is lack of infrastructure and post harvest facilities, resulting to inefficiency in fish distribution, high cost on transportation and preservation of the fish, high post harvest losses and poor quality of fish sold. Domestic markets in IGAD countries are dominated by freshwater species with strong preference towards tilapia, catfish, Nile perch and also small pelagic freshwater fish called *mukene or omena*. However, the exception is in Somalia and Djibouti which have access and strong preference for marine species. The total fish supply (live weight) in IGAD countries was about 697,000 MT in 2010 which was mainly supplied by local harvests. Uganda, consuming around 63% of total food fish supply, is the largest market for fishery products in the region.

In the global fishery trade only Uganda and Kenya, among the IGAD member countries, are actively engaged in fishery product exports. Total exports of fishery products from Uganda and Kenya alone accounted for 97.5%, valued at US$ 176.2 million in 2009. Fish exports from the region, dominated by Nile perch in general have been on a declining trend over the past few years, mainly due to the diminishing fish resources, quality related problems, and strong competition from cheaper products, particularly from other freshwater fish like *Pangasius* and Tilapia in the international markets. Uganda is the largest fish exporter among IGAD countries, followed by Kenya and Somalia. The main products exported from Uganda and Kenya is Nile Perch (*Lates niloticus*) caught in Lake Victoria. Fishery exports from other IGAD member countries are minor and mainly engaged in cross border trade for their traditional fishery products.

Regional trade is mainly conducted informally by small scale and traditional traders across the borders and bulk of this trade is unrecorded, thus many consider it is

as illegal trade; the products traded mainly are dried, salted and smoked products with limited amount of fresh fish and second grade frozen fish. Uganda is the main fish supplier to the regional markets. Official data indicate that regional fish trade generate an average of US $ 35 million per year for Uganda. Illegal trade is carried out to avoid government regulations such as taxes and tariffs, selling undersized fish, trans-shipment on the sea or Lake etc. The governments in IGAD countries acknowledge the importance of cross border trade and efforts have been made to legalise and assist the stakeholders of this trade.

As a pool, IGAD countries imported 34,783 MT of fishery products worth around US$39 million in 2009, thus IGAD as a whole has a foreign trade surplus (in fish) of about US$ 137.2 million. In general fish products imported into the region are intended for local consumption that can be classified into the following three segments: (1) local consumers, mainly consumes low value frozen small pelagic fishes such as mackerel and sardines, canned fish and dried/salted/smoked fish; (2) catering sector, mainly uses high value frozen fish, shrimp, lobster and other shellfish; and (3) expatriates/foreigners, mainly consumes high value frozen fish, shrimp and canned fish.

Results of the Field Survey

The field survey was carried out by interviewing a total of 2237 respondents from seven IGAD member countries representing the whole spectrum of each stakeholder, namely producer/fishermen, traders including middlemen and retailers, processors (traditional and industrial processors), restaurateurs, private and government institutions and also school kids. Following is a brief summary of the field survey.

Trading Practices: Grading system is commonly followed when selling fish throughout the supply chain, from producer up to retailer, though it generally involves a very simple system. Quality and origin are the most common criteria used. Size is the next important criteria with 45% of all stakeholders using it when selling/buying fish, followed by quality/ freshness (27.4%), origin (14.1%) and only 6.1% respondents indicated that they use all the criteria (size, freshness and origin). Around 7.5% of the respondents said that they do not employ any grading system as they sell their fish in bulk which happens in Kenya, Ethiopia and Somalia. In countries where there is a minimum size of fish allowed to be caught, like Nile perch in Uganda and Kenya, size is more important for fishermen as it will not only determine the price but also legal saleability. Down the supply chains, such as middlemen and processors, the quality aspect becomes more important as the criteria for selling their fish and fishery products. For the payment method, cash is still the most preferred mode of payment by all the stakeholders (average 69%) in all countries. However, in Ethiopia, most fishermen (83%) receive their payment by credit, while middlemen in Uganda, particularly those who supply fish to processors under contract system, receive the payment both by cash and also by credit as per 55.6% of the respondents interviewed. Meanwhile open negotiation is a common practice in settling fish price by stakeholders along the supply chains. Exporters mainly use fixed price based on prior agreement with their buyers, where price is set for a period of time to have certain degree of certainty and avoid losses due to price fluctuation. The main reasons for illegal trade practices or cross border trade are better demand and better price offered by the neighbouring markets. The other reason for illegal cross border trade (e.g. selling fish on the sea) was to avoid government taxes and red tape such as quality certification, license requirement and to save operating costs.

Inter-dependency of stakeholders: As in other parts of the world, fisheries stakeholders in IGAD countries have strong linkage, especially between fishermen (producers) and their buyers (traders) and also between fish suppliers (agent) and processors. The dependency is mainly in financial terms, but there is also in social aspect. Nevertheless, the dependency among stakeholders will be more transparent and balanced with the establishment of fishermen cooperatives, Beach Management Unit (BMU), fish traders associations, processors and exporters associations; which are now common trends in some IGAD countries. With the availability of micro credit, which is accessible to small scale fishermen, fish traders and fish processors, the patron-client type of relationship between stakeholders is minimal.

Access to fish marketing information: In general, fisheries stakeholders, from fishermen to retailers have a common complaint about limited access to fish marketing information. Fortunately, with wide spread use of mobile phone, fishermen and small scale traders and processors can nowadays get access to market information from their contacts such as buyers, traders and other sources. Industrial processors and exporters have better access via internet or other means to have update market information. Governments have established different types of market information system, mainly focus on agriculture products and limited attention is given for fishery products. Electronic Fish Marketing

Information System (EFMS) in Kenya is the only system that is currently established specifically for fishery products.

Mapping fish trade flows: Domestic trade flows of fishery products in each IGAD country varies significantly. The common pattern of trade flows in the domestic markets, after landing the fish, is by way of transfer to major cities, as the main market destinations. The regional trade for freshwater fish products shows that Uganda and to some extend Kenya are the main exporting countries in the region, while, Sudan, South Sudan, Ethiopia, DR Congo, Burundi and Rwanda are the main importing countries. Somalia is the main player exporting its marine products to Kenya, Djibouti and Yemen. The regional trade within IGAD countries is dominated by traditional products like dried, salted and smoked fishery products. However, small portion of live, fresh and frozen products are also being traded among the group members. The international trade, meanwhile, is dominated by Nile perch products from Uganda and Kenya in the form of chilled and frozen fillet, steaks and portions as well as Nile perch maws. There are however, significant quantities of seafood products exported from Kenya, Sudan and Somalia. Currently there is no export of fishery products from Ethiopia and South Sudan to the international markets. Certain product such as crocodile skin from South Sudan is finding their way to international market via third country.

Value chain analysis for major species: The report provides value chain analysis for main freshwater species namely Nile perch, tilapia, *omena/mukene*, others (catfish/ cyprinids) and marine finfish. Value chain analysis for freshwater species is mainly based on the country reports from Uganda and Kenya; while for marine fin fish it is based on the Somalia's scenario. Each process/ step of Nile perch exports industry generates different by-products. Whole fish constitutes about 37- 40% fillet and the remainder is by-products which include frame, skin, fat, trimmings, fish bladder (fish maws), and rejects from the processing line. The frames account for about 40- 43% of the fish by weight followed by red meat, skin, fat, fish maws, trimmings and eggs. The market price of Nile perch is influenced by the demand from international markets, exchange rate, as well as the size of the fish. The value chain of Nile perch in Kenya shows the value increases from US$2.0-2.5/Kg for landed (ex-vessel) whole fish to US$ 4.6-6/Kg for fillet at processor level; which is then priced at US$9-12/Kg at retailer level in major importing markets. Generally, Nile perch fetches better prices at all stages of the chain as compared to other fish species. As tilapia is mainly consumed in the local market, its value chain is relatively simple or rather not as complicated as Nile perch. In Uganda the value chain for tilapia from fisherman to landing site is almost similar to the Nile perch. In Ethiopia licensed fishermen land and sell their catches to fishermen cooperatives or to Fish Processing and Marketing Enterprises (FPME) at designated landing sites. Fresh tilapia is preferred and most widely consumed fish in Kenya. Unknown quantities of tilapia and Nile perch enter Kenya from Uganda over water ways. Landed whole fresh tilapia is priced around KES220-260/Kg and the price increases to KES350/Kg at wholesale level and consumer pay around KES 550/Kg to retailer. (1 US$=85.049 KES)

Mukene/Omena fishery is the second to Nile perch, harvested mainly from Lake Victoria. Besides the value chain for processed *mukene/omena* for human consumption, there is also a value chain for animal feeds. *Mukene* for human consumption has higher price than *mukene* for animal feeds. The prices for *Mukene* for human consumption also vary according to its processing methods. In Uganda fishermen obtain about 37-44% of the retail value for *mukene*, 35-37% of the retail value for tilapia and 32% for the export value of Nile perch. In the case of Nile perch sold in the domestic market, however, fishermen receive higher percentage at over 66% of the retail value.

Various types of market operators are involved in the value chain of marine finfish. In Somalia the market operators are fish producers (fishermen), traders, processors and exporter, fishmongers or retailers, catering sector (hotel and restaurant) and consumers. High value pelagic and demersal fishes are sold to traders or agents for overseas or in regional markets. The fisherman is the beneficiary, since the price moves from the international market via the exporter to the lowest actor in the chain, the fishermen.

Consumer preferences: Tilapia is the fish preferred and consumed in IGAD countries with the exception in Djibouti and Somalia, where consumers have more access to marine fishes. In general, consumers who are close to water bodies have strong preference for fish compared with consumers who live in other rural areas. Fresh fish is the most common form being consumed locally, but in Ethiopia, frozen fillet of tilapia, catfish and Nile perch are also easily available in major cities. The consumer survey throughout the IGAD countries shows that the highest percentage of consumers (38.9%) eat fish only occasionally, followed by those consuming fish on weekly basis(25%), daily (19%) and monthly (17.3%). Around 9.4% of the respondents say they do not eat fish at all.

Constraints/problems faced by stakeholders: The report also compiles constraints and problems faced by stakeholders which may vary from country to country. Declining catches due to decreasing stocks, limited infrastructure facilities along the supply chain, high costs incurred on fuel price/energy and transportation are among the major problems faced by stakeholders. These lead to unreliable fish supply (in terms of quality and quantity), high post harvest losses, low penetration into inland markets and less competitive products in the regional and global markets. Stakeholders, particularly small players, also indicated problems related to lack of accessibility to market information, limited access to soft credit, lack of business and marketing skills to support their business operations. Regulatory frameworks for fisheries management, fish marketing and quality assurance in most of the IGAD countries are also not sufficient or even not available or not being properly implemented/enforced.

Result of Capacity Need Assessment (CNA)

The results of CNA test among fishermen/producers show that they are knowledgeable about their field, particularly

in marketing/trade aspects. Fishermen have more problems responding to quality aspects, rather than marketing questions. This may also reflect that the awareness about quality among fishermen is still low and they did not know any marketing/trade regulations. Middlemen including traders and retailers, however, have higher social status and have better educational background or have better exposure to the outside world, compared to fishermen. Therefore, it is not surprising to see that middlemen generally scored better in CNA tests compared to fishermen. In Uganda the respondents mainly failed to answer the questions on what is involved in marketing as well as value addition, while in Ethiopia they could not answer questions related to quality. In Kenya all the middlemen and fish traders interacted for the study knew about fish trade related regulations, but majority of them (55%) did not know that all fish could be marketed. This may be the reason for selling undersized fish widely in the country. Generally middlemen/traders also failed to answer basic questions on trade and marketing aspects.

Industrial processors are however, more familiar with the questions on trade and trade regulations, while the majority of the artisanal processors and regional exporters were ignorant about issues relating to international /regional trade. In general, consumers are relatively knowledgeable about fish as the CNA results show. In most countries, high percentage of consumers scored 70% and above. Even in Ethiopia, with the lowest fish consumption among IGAD countries, more than 41% of respondents could score 100%. Respondents from government institutions were also evenly distributed in the score with those in fisheries and trade institutions being the most knowledgeable and those in law enforcement and tax administration being least knowledgeable on fisheries trade and regulations. However, there is high percentage of respondents, who could not answer international trade regulations, particularly related to WTO matters and also technical aspects of quality assurance programme.

Capacity Building

The results of the CNA test suggest that capacity building on marketing and quality assurance related aspects in general is still needed in all IGAD countries. Different emphasise for each country, however, should be given as the status of fisheries sector varies from country to country, thus their needs also vary. Uganda and Kenya which have relatively developed fishery industry compared with other IGAD countries may need more advanced training compared to others where the industry is basically small and artisanal. Capacity building in Ethiopia should emphasise on improving the quality of products as the key, to fetch better prices for the same quantities of products. The training package should be designed to bring out better product quality which would fetch a better income than before. In Uganda, all respondents involved along the value chain expressed interest in being trained in good fish handling practices, hygiene and fish preservation as well as in business management skills, including record keeping and formation of groups for management of credit and savings. All the respondents are also interested in being assisted to acquire other skills that would lead to an alternative source of income like cottage industry and fish farming. In Kenya

all the stakeholders are interested in improvement of marketing skills in order to improve their income. Basic training on marketing skills is the core to profitable and sustainable business. In Sudan around 90% of stakeholders surveyed agreed the importance of improving on quality assurance of fish and fish products, starting from the initial stages. The most immediate need in capacity building is towards improvement in hygienic and safety measures of seafoods in general to meet international standards. South Sudan is a young nation, therefore a wide range of training in all aspects of fish quality assurance, handling and safety regulations for meeting the international standards, is needed. Somalia requested proper and relevant training for fishermen in order to enhance their skills in fishing, navigation, fish handling and processing as well as training on marketing related aspects. Fishermen in Djibouti also need basic training on fishing skills such as the use of more modern fishing gears, navigation etc. Since most of the fish is sold in fresh form, improvement in handling and maintaining cold chain along the supply chain is important and essential, in order to improve quality of the fish. Value added fish processing is another area for improvement to encourage wider consumers (not only in coastal areas) to eat processed fish.

In conclusion, there is an urgent need to increase fish supply to meet increasing demand for fishery product in the region, through the development of aquaculture and optimising the utilisation of catches through reduction in post harvest losses. In anticipation of the increasing supply, it is important to start developing the domestic, regional and international markets, to ensure that increase in supply will be well absorbed by the market, thus improve the livelihood of stakeholders along the value chain.

1. INTRODUCTION

1.1 Background of the Study

With the total production of more than 787 000 metric tons (MT) in 2010, the fisheries sector in IGAD member countries has been recognised as one of the important growth sectors in the region. The sector provides a significant contribution to food security, livelihood and foreign exchange earnings for its member countries - Djibouti, Ethiopia, Kenya, Somalia, The Sudan, South Sudan and Uganda. In spite of major differences in the level of fisheries development in each country, the sector faces major challenges such as lack of infrastructure facilities to support proper post harvest handling and distribution, gaps in the skills of stakeholders to implement internationally acceptable requirements along the production chains of fishery products for exports. These constraints have resulted in the region being less competitive for fishery products in the global market, hindering the improvement of livelihood of majority stakeholders, particularly producers.

In order to address the above mentioned challenges and assist the IGAD countries to develop their fisheries in sustainable way, the Food and Agriculture Organization (FAO) Sub-Regional Office for Eastern Africa (SFE), in partnership with the IGAD Secretariat, launched a project under the FAO Technical Cooperation Programme (TCP) entitled "*Support to Capacity building to promote formal marketing and trade of fish and fish products from and within the Horn of Africa (TCP/RAF/3308)*, in October 2011.

The target groups, as stated in the project document, are various value chain actors and service providers both in private and public sectors that are actively involved in the facilitation, promotion and trade of fishery products in IGAD countries in the Horn of Africa. These include the producers, processors and traders (middlemen, retailers, restaurant owners, etc.) as well as governmental and non-governmental fisheries organisations. As key actors in promoting horizontal value chain networking, fisheries associations are also an essential target, as they can play pivotal roles in providing their members with updated technical information on trade requirements.

The overall outcome of the project is value addition in the regional fish production process, enhancement of fishery products trade locally and regionally and developing capacities of the government and private entities involved in the sector and other stakeholders that would add to the value of products and improve the livelihoods of the fisher folks in the region. The main outcome expected at the end of this two year project is:

a. Regional cooperation mechanism will be developed and supported.

b. Fish marketing and trade will be enhanced with clear indication of making a difference in livelihoods.

c. Improvement of quality of products to such standards that exports will have access to European andAmerican markets.

d. Fish Market Information Network (FMIN) will be established and supported in the IGAD countries.

A study was carried out to assess the status of regional fish trade in all IGAD member countries to support the implementation of the project activities.

1.2 Study Objectives

This report is a compilation of national studies carried out in seven IGAD member countries, in an attempt to get a clearer representation of the fisheries sector in the region, particularly on fish trade, marketing and quality assurance related aspects. The study identified areas for intervention, in order to strengthen the technical and managerial capacities of the actors along the supply chain and to complement national and regional development initiatives. Furthermore, the study provides baseline survey and the capacity need assessments for both the marketing and quality assurance components in the region. The study also tries to provide a benchmark to foster assistance in institutional strengthening and capacity building in production, marketing and trade. Capacity building includes building up awareness on the quality requirements and technologies on fish handling and preservation as well as importance of traceability at production level and on the certification issues of fishery products. The study also gives insight information of the fisheries sector in the region in general including constraints and problems, faced by stakeholders in particular.

1.3 Study Structure

This report largely draws on information, data and analysis provided by the national consultants, who carried out the study, based on the following methodologies:

a. Desk Study: Desk study has been undertaken by reviewing secondary data sources, statistics and published information. The review also involved cross referencing data sources with other relevant institutions.

b. Field Survey: The survey was to gather primary data and information mainly conducted using structured questionnaires developed by FAO. Field visits were also conducted to assess the status of fish trade, right from sources of raw materials up to the exit points/ border points. Direct interviews were carried out with key informants in relevant public institutions as well as private sector and actors along the value chain. The surveys in each country covered major regional fish trade corridors, both on land and across water bodies. The study also took into consideration the four main commercial fish species in the region. Capacity need assessment was also carried out to identify areas that require training.

c. Reporting: The national consultants were provided guidelines to carry out the study in their respective countries, compile data and information collected and to write the country's report based on standard outline and the national consultants finalised their reports based on inputs given by the international consultants. The draft reports were reviewed by international marketing and quality assurance consultants.

It is worth mentioning, however, that it was impossible to cover everything written in the national reports into this regional report. The national reports were used as the main

references for the implementation of the project activities in each country, as they provided detailed information and valuable analysis on the countries' fisheries trade and quality assurance aspects. Thus, this report, as much as possible, attempted to cover only important aspects of the national reports and put them in the broader context of regional interests.

2. RESULTS OF THE DESK STUDY

2.1 Overview of the Fisheries Sector in IGAD Countries

2.1.1 The Fisheries Sector

The fisheries sector in other IGAD member countries except for Uganda, contribute small percentage to the country's economy, generally below 1%. Being the largest producer of fish in the region, fisheries sector in Uganda contributes about 12% to the agricultural GDP and 2.5 % to the national GDP, as it has significant private sector investment in industrial/ commercial fish processing. The sector provides a major source of protein in the diet of most Ugandans, employs about 700,000 people, and provides livelihood to more than 1.2 million people (MAAIF DSIP, 2011). Meanwhile the contribution from the fishery sector to the national economy in Ethiopia, Kenya and the Sudan is very low, reported to be less than 1% to the national GDP, despite the fact that these countries have large water bodies, including dams, rivers, lakes and also seas. However, no accurate data are available, on how much fisheries sector contributes to the economies of Somalia, South Sudan and Djibouti. It is estimated that fishery exports contribute to about 2% of the Somalia's total exports *(see Table 1).*

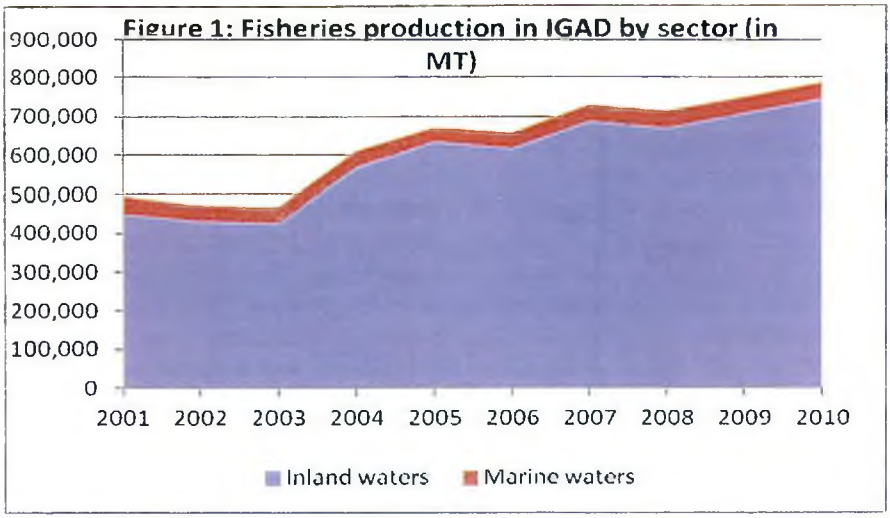
Table 1: General Information and Fisheries Sector in IGAD countries

Country	Population in 2011 (thousand)[1]	GDP per capita in 2011(in USDUSD)[2]	Contribution of fisheries to GDP (%)[3]	Fish production in MT (2010)[4]	Per capita fish consumption (Kg/ /year)[5]
Djibouti	906	2 427	NA	1666*	1.6
Ethiopia	84,734	1 342	<1	18,058	0.2
Kenya	41,610	1 916	0.5	140,751	2.7
Somalia	9 557		2.0 **)	30,000*	2.0
Sudan	33,000	2 192	0.4 (in 1999)	24,350	1-2***
Uganda	34,509	1 665	2.5	395,805	13.5
South Sudan	12,000			30-40,000	2.5-3.3

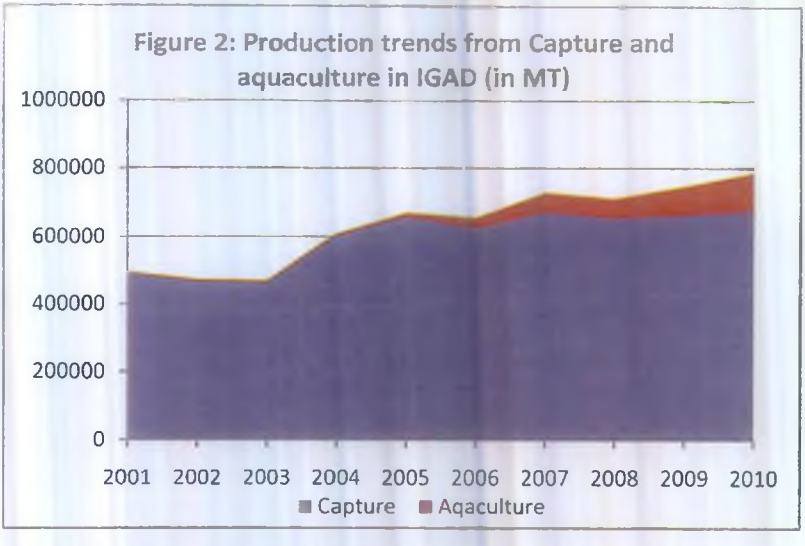
* in 2011, **) Fishery export contribution to the total exports.***) Based on The Sudan's country report

2.1.2 Fisheries Production Trends

The fisheries sector in IGAD countries is dominated by inland fisheries where Nile Rivers (Blue Nile and White Nile) and Great lakes (e.g. Lakes Victoria, Lake Turkana, and Lake Tana etc.) are located. Despite four countries (Somalia, Kenya Sudan and Djibouti) having access to marine resources, more than 94% of the total 787,293 MT of fisheries production recorded in 2010 was harvested from inland fisheries, while the contribution from marine fisheries was only 5.7% of the total fish production (Figure 1). In the broader context, overall fisheries sector in IGAD countries only contributes about 8.7% of the total fisheries production in the African continent. Nevertheless, from the positive point of view, this means that there is lot of room available to develop the fisheries sector further, particularly in aquaculture in IGAD member countries.



Despite its small contribution, aquaculture production grew rapidly for the past ten years from 4,384 MT in 2001 to about 110, 000 MT in 2010, or up by 2395% during the period representing an increase of 240% (Figure 2). Even though aquaculture exists in most of IGAD countries, it is mainly undertaken on a large scale in Uganda, contributing about 87% of the total aquaculture production in IGAD countries in 2010. Negligible production from aquaculture was reported in Kenya, Ethiopia, The Sudan and South Sudan.



Source: Fish Stat, FAO 2011

In the region, Uganda and Kenya are the key players in fisheries sector among the IGAD member countries, and their combined production contributed to more than 84% of the total fisheries production in the six IGAD countries as shown in Table 2 below.

Table 2: Total Fishery Production IGAD Countries

Country	2005	2006	2007	2008	2009	2010
Djibouti	1,571	1,299	1,229	1,206	1,058	1589
Ethiopia	9,475	9,915	13,278	16,795	17,072	18,083
Kenya	148,558	159,907	136,213	140,058	138,656	155,439
Somalia	25,000	30,000	30,000	30,000	30,000	30,000
Sudan*	60,608	58,608	67,467	70,603	73,898	73,908
Uganda	427,575	399,491	482,610	455,750	488,654	508,805
Total	672,787	659,220	730,797	714,412	749,338	787,293

Source: FAO Stat, 2011. This FAO data covers both Sudan and South Sudan. According to Sudan's country report capture production in 2010 was 23350 MT while from aquaculture is around 1000MT*

The fisheries sector in IGAD countries is based mainly on inland fisheries and freshwater fishes like tilapia, Nile perch, Carps (*Cyprinid*) and catfish are the main species harvested. More than 72% of the total fish production consists of these four species groups with tilapias contributing 26.7% followed by Nile perch (20.5%), carps or cyprinids (15.6%) and catfish (9.8%) (Figure 3). While Nile perch is mainly for export to developed markets, the other three species are popular in the domestic and regional markets.

FishStat, Food and Agriculture Organization (FA), 2012.

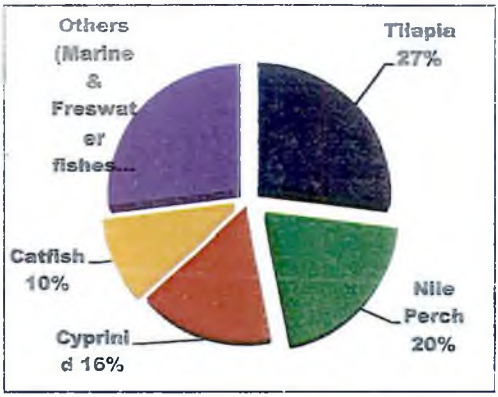


Fig 3 - IGAD Fisheries Production by Main Species

While detailed production trends for each country, is available in the country's reports, the following are summaries for the countries surveyed, based on the National consultant's reports:

A. Ethiopia

With the largest population of 82 million in the region and home of ten lakes and nine rivers, fisheries production in Ethiopia was only slightly over 18,000 MT in 2010, and per capita fish consumption is also very low at about 0.22 Kg/year, among the lowest in the world. Lake Tana, the largest in Ethiopia, produced almost 3,500 MT in 2007, below the productivity level estimated at around 7,000 – 10,000 MT annually. Other major lakes are Ziway, Langano, Hawassa, Chamo Abaya, Turkana (sharing with Kenya), and Lake Koka with total surface areas of 7400 Sq.km. The riverine fisheries and aquaculture contribute only small percentage to the overall fish harvests. Major species harvested from water bodies in the country are Nile tilapia, contributing around 67% of the total harvest, followed by Nile perch, catfish and *barbus*.

Ethiopian fisheries are mainly small scale and subsistence activities, with little attention from the government to develop the sector. Infrastructure facilities like landing sites and road network are generally very poor to support the production of quality end products and efficient distribution. The sector directly employs 13,200 people with over 4000 full time fishermen. Along the value chain, including secondary activities, fisheries sector provides 20,000 jobs.

The main priority for Ethiopia is to increase production for local supply through aquaculture. Some investors have already started to show interest to develop aquaculture in the country and there are now four private enterprises that have obtained licenses to venture into the business. These are: (i) The Ethio-Fisheries Private Limited Company that set up a fish processing plant in ArbaMinch, near Lake Abaya, but has not yet started aquaculture activities, (ii) Vittoria Viezzt Carlo Talaric PLC, which is planning to initiate setting up of fish farms along the shores of Lake Chamo, (iii) MIDGE 2000 PLC Cage Culture and (iv) Ashraf Industrial Group Cage Culture, both planning to operate at Lake Tana. There are also two crocodile farms in ArbaMinch, one under governmental and one with private entity that

raise crocodiles mainly for skin export and possibly meat as well, in the future. it is therefore imperative that a national strategic plan of aquaculture needs to be developed for Ethiopia.

B. Kenya

The fishery sector in Kenya is dominated by inland production which contributes over 85% of the total harvest, even though the country has significant potential for marine fisheries, as it has access to the Indian Ocean. According to the official figures (Fisheries statistics bulletin 2010); fish production was estimated at 140,751 MT and valued at about US $ 197million. However, fish production has been declining from 1999 which recorded 214,709 MT. Harvest from Lake Victoria accounted for 111,868 MT which is (79.5%) of the country's total annual fish production, while Lake Turkana, Kenya's largest freshwater body produced 6,430 MT of fish. The fish species harvested from inland capture fisheries are *Omena* or *Mukene* (*Rastrineobola aureus*) followed by Nile perch (*Lates niloticus*) and Nile tilapia (*Oreochromis niloticus*). *Omena* contributes around 41% of the total harvest from the lakes.

Marine artisanal fish production in 2010 recorded a marginal 8,406 MT, equivalent of 6.0% of the national production, while aquaculture production amounted to 12,153 MT, contributing 8.6% of the total fish production, mainly tilapia. Marine fisheries mainly consists of demersal fishes, which include Rabbit fish, Scavenger, Parrot fish and Snapper ; pelagic fishes consists of Tuna, little Mackerels, Barracudas. Mullets, Sail fish and Crustaceans (shrimps, crabs and lobsters). The potential within the marine sector has not provided optimal value to the country, as its EEZ continues to be exploited by distant water foreign fishing vessels, targeting tuna and tuna like species, in addition to rampant cases of IUU fishing.

The aquaculture sector in the country is being developed at a slow pace. The main fish species cultured are the Nile tilapia (*Oreochromis niloticus*) with total farmed production standing at 75%, African catfish (*Clarias gariepinus*) at 18%, common carp (*Cyrinus carpio*) at 6% and rainbow trout (*Onchorynchus mykiss*) at 1%.

C. Somalia

The country's fisheries are mainly marine capture fisheries. With around 3330 Km its coastline is the second longest in Africa, hosting rich marine resources. A prominent feature of the sea ecosystem is a seasonal upwelling, which gives rise to high levels of biological productivity, which in turn sustains rich fishing grounds, most notably in the area between Ras Aseyr and Ras Mabber, off the Puntland coastline. Somalia is the meeting point of major fauna and flora of the Indian Ocean, the Red Sea and the Arabian Sea. Conservative estimates have put the country's annual sustainable marine fish production in the range of 200,000 MT, with the major commercial fisheries being small and large pelagic, demersal fishes, sharks and rays, as well as crustaceans such as lobster and shrimp.

At present, Somalia comprises three principal administrative areas: South central Somalia (SC); the semiautonomous Somali state of Puntland (PL); and Somaliland, which was unilaterally declared itself as an independent republic in 1991, but is not recognized internationally. Somali fishery is not well developed in spite its rich resources and prolonged

civil war and piracy related problems it has experienced. Most of the fisheries is artisanal without any significant industrial fisheries. There are three major marine fisheries resources namely finfish, lobster and shark fisheries. The finfish fishery is the most important in terms of production, employment opportunities, and revenue generation. The finfish fishery targets both large pelagic and demersal, but largely focuses on kingfish, which is sought after by the local consumers and foreign fishing boats and to a lesser extent on tuna fisheries. The lobster fishery used to be the main foreign exchange earner contributing between US$5 and US$7.5 million/year through the export of lobster tails, with estimated quantity to be 200 – 300 MT/year. It is estimated that fish exports generated US$20 million in export earnings in each year, which account for around 3% of total exports which contributes about 2% to GDP.

It is estimated that the fisheries sector employs over 30,000 fishermen and women, and an additional 20,000 persons are engaged in fish processing and trade. Civil unrest and recurrent droughts have increased competition over marine resources. In recent years, the number of households reliant on fishing has doubled from one percent of the population in 2000, to nearly three percent of the population in 2009. Most of these new fishermen are formerly destitute pastoralists, who have to go fishing to survive. In addition, there has been an increase in fishing by foreign vessels in Somalia's poorly controlled waters. There is no reliable fishery production data available as there is absence of authority in major fishing areas and no proper systems in place to collect statistical data. The available data is mainly based on pre-war official data. Based on FAO's data, fish production has increased by 23.8% from 22,250 MT in 1998 to 30,000 MT in 2010. Out of the total it was estimated that around 18,000 MT was sold locally for human consumption.

D. Sudan

Sudan is mainly a flat plain country consisting of desert in the north to northwest and savannah to rainy equatorial in further south. Nearly over 20,000 Sq.km. of the country's total surface area is under water. Its fisheries sector, as in other IGAD countries, is mainly small scale based on rivers, dams and also a little of marine fisheries from the Red Sea. Sudan has considerable marine fishery resources, centred around the Red Sea, with a coastline of about 853 km long, stretching to an Exclusive Economic Zone (EEZ) of 91,600 Sq.km, including a shelf area of 22,300 Sq.km.

Freshwater aquaculture exists around Khartoum but its production is still insignificant. Freshwater capture fisheries are the main contributor to the sector, harvested from dams and reservoirs built along the Nile Rivers (Blue and White Niles). The old dams are Sennar, Damazine, Khasim El-Girba, Lake Nubia and Jabel Awlia which has a total surface area of 3,000 Sq.Km. Recently Merowe Dam was completed with additional area of about 800 Sq km.

According to FAO data, fisheries production (both Sudan and South Sudan) totalled 73,908 MT in 2010, mainly from freshwater capture fisheries and only about 6,000 MT from marine capture fisheries; while aquaculture production was recorded to be around 2,000 MT. More than 70% of the actual fish production is consumed fresh and which is basically caught from the White Nile before the year 2010, mainly from the Sudd Region (currently under South Sudan). As indicated in the country's report, actual production in Sudan (excluding

South Sudan) from both marine and freshwater capture fisheries was 23,350 MT in 2010. Catches predominated by *Nile tilapia, Lates* and *Bagrus*, considered as high-grade fishes, followed by *Labeo, Synodontis* and other cat fishes *(Clarias sp.)*, as the second grade fishes.

There are five major groups of commercial marine fisheries based in the Red sea area namely coral reef fishes (65 species), bottom trawled fishes, small pelagic fishes mainly sardine, shell fish (oysters and trochus), and sea cucumber are recorded. From around 6,000 MT of fish production in 2010 (FAO Stat), it was estimated that about 35% came from northern area, 40% from southern area and balance 25% from central area. About 2,000 fishermen involved in fishing activities with about 500 mechanized boats, operated either with inboard and outboard engines. A total of 10% of the production has been marketed locally and the rest is exported, particularly high value species, such as sea cucumber. However, data recorded in the country's report indicated that marine capture production declined to below 1,000 MT in 2011, consisting mainly of coral reef fishes. Nevertheless this conflicting figures show that the data and statistics collection system has serious problem in the country.

Aquaculture in Sudan has been practised since the beginning of the past century. Some 30-50 fish farms (formed of solitary small ponds or as few aggregates of small ponds amounting to few hectares) are known around Khartoum and nearby locations in the Gezira Scheme. According to FAO records, production is in the range of 2000 MT per year, mainly Nile tilapia, and only few farms are still functional.

E. South Sudan

According to the Housing Census and Population of the Sudan, the country has an estimated surface area of about 640,000 Sq.km with a population of about 8.26 million during 2008. This figure is still being disputed by many government officials in South Sudan who put the population of South Sudan at about 12 million. Most people are engaged in subsistent agriculture (crop production), livestock rearing, fishing, hunting, forestry and some trade activities for their livelihood.

The Republic of South Sudan is divided into six agro-ecological zones - Equatorial rainy forest, Tropical zone, Savanna woodland, Savanna grassland, Semi-arid zone and the Sudd wetlands region. The Sudd wetlands is characterized by grassy flat plain, swamps and lagoons which covers an estimated area of about 16,500 Sq.km. The wetland is known for its fisheries, biodiversity and contribution to regional climate. Fisheries have therefore become a preoccupation of many and an economic backbone to most communities living along the River Nile systems. About 3.4 million people living along the Nile systems are preoccupied with fisheries related activities.

There are about 136 fish species in the waters of South Sudan belonging to 36 genera of 21 families (Muso 2002). These species are categorized into commercial or economicaly important fish species. The capture fisheries and aquaculture sector are active, contributing to fish production. Potentials for fish production in the country is estimated at 150,000 – 300,000 MT per annum and most of which is comes from the capture fisheries sector (FAO, 1989 and GIS, 2010). The main commercially important species include, but not limited to: *Lates niloticus, Bagrus sp., Gymnarchus niloticus, Tilapia spp., Heterotis niloticus, Clarias*

ssp., Synodontis ssp., Parachanna obscura, Distichodus ssp., Labeo ssp., Citharinus spp., Mormyrus ssp., Protopterus aethiopicus, Malapterurus electricus, Alestes ssp., Hydrocynus ssp., Polypterus senegalus and Tetraodon lineatus.

The above potential has not been fully exploited due to challenges on production capacities and other social and environmental factors. For example fish production and landing sites are situated in the far remote areas of the country, of which access through roads is limited, hindering distribution of fish and fishery products to the market.

Fishing is done by full time fishers, part timers and occasional or seasonal fishers. The fishing methods include the use of gill nets (operated as set and/or drift), cast nets with limited seine nets; hooks; either as hand line, set line or drift lines. Traditional fishing methods are still under practice; these include the use of spears, arrows, traps and baskets.

F. Uganda

Similar to Ethiopia and Kenya, fisheries sector in Uganda is mainly lake based with significant contribution from aquaculture sector. About 20% of country's total (241,000 sq.km) surface area consists of aquatic systems, with major lakes such as Lake Victoria, Lake Albert, Lake Kyoga and Lake George. There are also about 160 minor lakes and many rivers, flood plains and swamps all of which have critical habitats, breeding and nursery grounds for fish and ear marked as suitable sites for fish farming. However, major contribution is still from capture fishery which is basically artisanal fisheries, characterised by traditional small vessels and canoes.

The major commercial fish species include the Nile perch (*Lates niloticus*), Nile tilapia (*Oreochromis niloticus*) and *Mukene* (*Rastreneobola argentea*) of which Nile perch is the major export commodity to international markets, notably to the European markets. Over the last 10 years, the fishing industry has taken a strong position in the country's economy and is currently number two after coffee, in export earnings.

Uganda currently produces close to 400,000 MT of fish from its water bodies, including aquaculture. Since the mid-1980s Lake Victoria fisheries have accounted for at least 50% of total catches, thus accounting for half of the national fish production, followed by Kyoga, Albert, Edward and George (UFCP, 2006). The growth of the fish industry has been affected by diminishing fish stocks in Lake Victoria due to over-fishing and use of illegal fishing methods.

The Nile perch (*Lates niloticus*) fishery has dominated in Ugandan fish production and trade over the past two decades, accounting for 60% of the catches by volume. The composition of other major species harvested include; sardine-like *Mukene* (*Rastrineobola argentea*) accounting for over 20%; the Nile tilapia (*Oreochromis niloticus*) 10%; and other species (of the genera *Bagrus, Clarias, Protopterus, Barbus, Synodontis, Momyrus, Alestes and Labeo*) accounting for the remaining 10% (MAAIF 2001). By 2015 the fisheries sub-sector is expected to produce up to one million MT, mostly through aquaculture and making use of emerging fishery of small fishes like *Mukene* on Lake Victoria and Ragogi/ Muziri on Lake Albert (DFR annual report, 2011). Based on the FAO statistics, in 2010 Uganda produced 95,000 MT of fish from aquaculture, the largest among the IGAD member countries. The main species farmed are tilapia and catfish. The government has given high priority to

developing aquaculture in the country, in an attempt to increase fish supply for the domestic demand and also for export.

G. Djibouti

In spite of having significant marine resources, fisheries production in Djibouti is considered low, hovering around 1,000 MT up to 2009 and increased to more than 1,600 MT in 2011. Dominated by artisanal fisheries, the sector employs around 3,000 fishermen. The major species caught are trevally, wahoo, tuna and grouper. Trevally is the most important fisheries and it is very popular among the local people. The main fishing areas are in the North (Obock, Tadjourah) and in Loyada and most of fishing vessels can stay on the sea for up to a maximum of 2 days. The main landing sites are located in Djibouti and Tadjourah.

2.1.3 Landing Sites

Experience shows that the procedures and standards found at fish landing sites are an accurate indication, allowing understanding the level of the procedures and standards used throughout the whole of value chain in the country. This includes local markets, fish handling, transportation, and processing.

In IGAD countries, the standards vary a lot from the basic procedures of occasional/local landing sites for local products, with little or no sanitary/hygienic control of standards at major landing sites for the Nile Perch, close to processing plants. The latter are subject to checks by the competent authorities in Uganda and Kenya. There is often a substantial difference in the standards at landing sites for local and export markets, even though they are in the same area; sometimes only a few meters apart, on the same river or lake.

Local fish landing sites for fish destined for local consumption or regional markets usually do not have access to ice, neither it is covered and do not have sufficient work-surfaces kept hygienic. The landing centres do not have facilities, for cleaning and processing the fish. However, the biggest problem encountered is the lack of sufficient clean potable water in these landing sites. All these factors contribute to the rapid deterioration of fish products. An additional risk for human health is posed by the practice of cleaning fish at the landing sites. The waste products thereby deposited in the slow moving or stagnant water of lakes and rivers which can creates serious environmental and health problems. This situation is particularly critical in Uganda and Ethiopia, and it should be addressed as soon as possible.

At most local landing sites in the IGAD region, there is insufficient closed storage space for nets and other fishing gears. Equipment is often left outdoors where atmospheric conditions and small animals cause deterioration and contamination. Lack of space in general also contributes to inefficient and unhygienic procedures.

It should be noted that some of the local landing sites have no fixed structures and have no convenient places on a river bank or lakeside for unloading fish products. Clearly, such sites are used for IUU fishing. This kind of practice is particularly widespread in inland waters. The data from the questionnaires distributed by the national consultants in Somalia show that most of the landing sites are well-established, with the same sites being used on a regular basis. This is perhaps surprising that in a country like Somalia, where this sector

is not officially regulated. Also in Djibouti, fish products are usually landed and unloaded at similarly fixed landing sites and the National Report in Kenya indicates a similar situation. In fact, according to this document "Kenya has a total of 331 gazetted landing sites, an increase of 8% in the last 10 years". All of this data therefore recommends for the possibility to introduce proper practices and regulations at these landing sites and to equipping them with appropriate infrastructure facilities and sanitary conditions.

2.1.4 Stakeholders and Gender Analysis

The role of government fisheries agencies in IGAD countries is generally very dominant compared to other stakeholders. These agencies are usually involved in regulating and monitoring the supply chains, starting from providing licenses for harvesting fish, up to the sale and export of the fish. In Ethiopia, the agriculture agency sponsors the establishment of fishermen cooperatives which operate in major lakes, have privilege access to resources, buy and sell the fish, as well as dictate the market and price. The country's state-owned company, Fish Processing and Marketing Enterprises (FPME) used to monopolise in buying, processing and marketing of fish, harvested from lakes around the country. The current government privatised FMPE and it has now competing with growing number of private entities. Nevertheless the role of fishermen cooperatives are still relatively very strong, to the extent that fishermen cooperative in Hawassa lake, bars FPME from operating in the area and it is almost in control of the fish harvest, distribution and selling of the fish from the lake. Fishermen cooperatives are exempted from paying taxes and they have all access to the government assistance.

When the industrial (modern) fisheries companies develop the role of private companies (usually processing and exporting companies) and their associations become important in the supply chains that in many cases influence the market also. A good example of this is in Uganda, where there is a relatively balanced role between various government agencies, overseeing fisheries sector and increasing role of various fisheries associations. The industrial fish processors and exporters are organized under one umbrella organisation, called Uganda Fish Processors and Exporters Association (UFPEA). UFPEA is a voluntary association for industrial fish processors which brings together all industrial fish processors in the country under one umbrella. It collaborates with the Department of Fisheries and Resources (DFR) on issues of fisheries policy development and management, constructs landing sites and its recent innovation is the establishment of a vibrant self policing policy on processing of juvenile fish. Other associations include *Mukene* Traders Exporters and Processors Association (MUTEPA), Walimi Fish Farmers' Cooperative Society (WAFICOS) and Uganda Commercial Fish Farmers Association (UCFFA). The key stakeholders remain government institutions that have related mandates with food safety issues and environmental protection. There are also institutions that provide support services such as research, education, quality control and export promotion.

A similar situation also exists in Kenya, where strong government roles in managing fish resources are balanced by influential private sector, processing industry and associations.

As for gender in fisheries, IGAD countries are no different from other parts of the world, where males are dominant forces in fisheries, particularly in fishing and farming, while there are significant sections of women involved in processing, trading and retailing activities.

Generally speaking, there are certain cultural and economic barriers, where females have no access to fishing activity. For example in Zwai Lake of Ethiopia, out of 300 fishermen, only one female owns and operates a fishing Vessel. Overall the involvement of females in fisheries activities in Ethiopia is relatively low and it is estimated around 10% of the total employment, who are mainly involved in downstream activities like processing and trading.

In Uganda, where more processing plants are operational, females' involvement in trading and processing activities is estimated about 40%. The implementation of fisheries co-management and the formation of Beach Management Units (BMUs) provide ideal opportunities to increase the participation of females, in both fisheries management and development. National guidelines on BMUs now require that at least 3 females serve on all BMU Committees and that BMUs incorporate the concerns and priorities of females in planning and decision-making. Females also benefit from the training and from BMU's activities. In artisanal processing value chain, females play a significant role, especially in processing of freshwater pelagic species such as sun drying, smoking and deep frying. In the industrial fish processing, females are placed in sections like trimming and packaging which require extra care since the product is in the final stage of processing.

Female plays major role in artisanal processing value chain- Photo by: Yvette Dieiouadi

In Kenya, *Omena* fisheries and small scale processing industry are dominated by women. Youth also involve in small scale processing and at landing sites while in Industrial processing industry, men dominate in all sectors. In the Somali Muslim society, there is generally strict separation of men and women and their activities. Almost all fishing activities are carried out by males. Women in the fishing villages provide support in the form of maintaining the home environment in generally harsh conditions. More recently they have also played a role in post-harvest activities, like cleaning, drying, packing and selling of fish, net repair and painting of boats in the monsoon season.

The role of women in fisheries in Sudan is negligible or nil, with no direct share in fishing operation. Only few women in the last decades were involved in fabricating fishing nets through hand braiding. At present in Khartoum State one woman (Huda Fishing Company) is officially involved in processing fish mainly producing wet salted and smoked fish. There are also few households involved in the processing of wet salted fish at house level without

legislation or licensing. In marketing and trade also, women do not appear to take any part.

Meanwhile in an artisanal fishery in South Sudan, the roles of men, women and youngsters are well defined, recognising of the active gender practices in the fisheries sector.

In Djibouti, as in other countries, male is dominant in fishing activity while women dominate domestic trade and markets, men are employed to do cutting and other labour oriented works in the markets.

2.1.5 Fish Utilization and Consumption

Most fish harvested in IGAD countries are consumed in fresh form, whole or gutted. Tilapias, the most popular and easily available fish, are normally sold, to the nearby local market in fresh and gutted form, but there is also significant percentage of the fish sold in frozen fillet and smoked forms, to the local and regional markets, as in other developing countries.

As indicated in Table 1 above, fish consumption in the Horn of Africa (HoA) particularly in IGAD countries is low. On an average it is estimated about 4.0Kg/capita/year, far below the world average of18.4 Kg or even below average fish

consumption in Africa which is at about 9.3 Kg/capita/year. Based on FAO's live weight estimate, only Uganda has highest fish consumption at 13.5 Kg/capita/year, which is higher than average fish consumption in Africa. The rest of IGAD countries consume fish, at less than 5 Kg/capita/year with Ethiopia being the lowest at 0.22 Kg. Various reasons for low fish consumption mentioned in the country's reports are: limited supplies, lack of marketing infrastructure, strong preference towards meat, cultural and religious reasons, lack of efforts by the government to promote fish etc.

Sun dried and salted fish are for traditional markets targeting lower income consumers
Photo by : Ms Ndiaye Oumoulkhairy

Despite limited cold chain facilities, in Ethiopia for example, good percentage of tilapia,

catfish and *barbus* are filleted, packed and sold as frozen products in the local market. There are some frozen fish outlets run by FPME and private companies in major cities like in Addis Ababa and Bahirdar, selling frozen tilapia, *barbus*, catfish and also Nile perch fillets. Smoked and dried/salted tilapia and catfish are sold from Bahirdar to neighbouring South Sudan. However it is difficult to estimate the percentage of fish utilization between fresh and processed products.

In Uganda the scenario for the utilization of tilapia is more or less the same, where most fish is sold in fresh/gutted form, but there is also increasing demand for smoked tilapia and fillets in the domestic market. Meanwhile *mukene* is mainly processed into dried-slated product, for local and regional markets. The bulk of Nile perch is processed into fresh and or frozen fillets/steaks for export markets and only limited quantity is sold as fresh form in the domestic market. By-products of Nile perch like the head, skin and frame are processed into dried and smoked products, mainly for export to neighbouring countries, but recently there has been increasing demand in the domestic market due to the rising costs of many food items.

In Kenya, data from the Ministry of Fisheries development statistical bulletin 2010 indicates that the average per capita supply of fish is 2.7 kg. Tilapia (*Oreochromis niloticus*) is the most consumed fish and is not exported from Kenya, as it is retained for food security reasons. Fish is traded and consumed in different product forms such as whole round fresh, frozen, gutted or filleted, gutted then smoked, sun dried or salted and canned. The whole fresh fish category and the frozen gutted or filleted fish are drawn from Nile perch and tilapia, with the domestic consumptions recorded at 50% and 100% respectively. Most of the marine fishes are also sold, as whole round fresh fish mainly in the local market and hotels along the coast; while a nominal percentage is exported.

The target groups for whole fresh fish category and the frozen gutted or filleted are high end consumers and the products are mainly traded by the retailers and supermarkets. The balance of the Nile perch fillets (50%) are exported fresh or in frozen form.

Smoked, sun–dried and salted fish is sold mainly in the traditional markets, targeting the lower income consumers, both in the urban and rural areas with the most common species being *omena* (*Rastrineobola aureus*). Other fisheries by-products such as swim-bladder, belly flap, fish skin, fish frame, fish head and rejected fish are also being sold for local consumption.

Consumers in the fish sector are categorized into, either industrial or domestic consumers. The industrial consumers are further subdivided into the large scale fish processing companies who receive whole fish for further processing for both human consumption and animal feeds. The animal feed industry which receives whole fish directly as second grade fish. The main fish species and their quantity sold to both the industrial and domestic consumers are:

- Nile perch (*Lates niloticus)* – (38,375 MT)
- *Omena* (*Rastrineobola argentea)* - (47,716MT)
- Tilapia (*Oreochromis niloticus*) – (15,457 MT)

Sudan is another country in IGAD with low per capita fish consumption which is estimated

to be around 1-2 Kg per capita/year. The capital Khartoum is the main market with high demand for fish. Freshwater fish, mainly tilapia, is the most popular fish supplied from several fish producing Sudanese States. Supplies also come from imported fish, both from neighbouring countries, mainly Uganda and Ethiopia. Supply is also sourced from Middle East (like shrimp), Far East and Asia, mainly canned seafood products.

Driven by a changing consumer habits, fish has become an increasingly important part of the Somali urban household's diet, both directly and indirectly. Local fish consumption is calculated at 2.0 Kg per capita per annum, among the lowest in the world and can be attributed to lack of marketing facilities, communication and traditional preference for meat. Recent study in Somaliland indicates at least 900 MT of fresh fish a year, is consumed in Somaliland alone and a similar quantity is exported each year to Djibouti, while about 4,300 MT of tuna caught by artisanal fishers is canned at the Las Korey canning plant.

Surprisingly, the people of South Sudan prefer to eat fish and it has become part of their lifestyle, wherein most of their social occasions fish is served. Fish in dietary requirements is well understood by the urban population and demand for fish is increasing, giving pressure on the production as well as markets leading into short of supply. Recently fish vendors and supermarkets have increased their supplies to meet the growing domestic demand. However, the gaps between demand and supply have prompted fish prices to go up recently and consumers have to reduce their frequency in fish consumption. Most fish production sites are in the far remote areas in the Sudd wetlands, isolated from the urban areas and markets, where purchasing power prevails. Preservation facilities are inadequate, thus most of the products marketed are processed on site into either sundried or smoked products.

In Djibouti marine fish is mainly consumed fresh as there is no drying, smoking and canning process in the country. The popular fish is trevally while wahoo is the most sought after and appreciated by Djibouti people. Tuna is seasonal fish and appreciated by the low income consumers, as it is cheap. Grouper is considered as a high value fish, mainly consumed by expatriates and sold through restaurants.

In general, IGAD consumers with easy access to fish resources, like people who live nearby the lakes and coastal areas, normally consume more fish than those who live far away from production centres. Strong religious sentiment is also a major factor that hinders effort to promote fish as healthy food, as in the case of Ethiopia and some part of Uganda. Fish consumption is also seasonal in some countries; like during Lent period, fish consumption is high in Ethiopia.

2.1.6 Government Policies of Fisheries Development.

Decentralisation is the main driving force for fisheries development in IGAD countries. Central governments usually establish broad national policies and management of fisheries resources in lakes and water bodies while implementations are left to regional or local governments. In the case of Ethiopia, Regional Agriculture Bureaus are given authority for managing lakes under their jurisdiction. In addition, government seems to give full support for fishermen cooperatives to play significant role in harvesting fish resources and to improve fishermen livelihood.

In Uganda local communities and government agencies have also been increasingly

involved in fisheries development. The government has recognised the contribution of the community in fisheries and as result DFR changed the approach to management, from command and control and adopted co-management system, which is called for decentralised management through local governments having partnership agreements with communities. Fishing communities are now active partners in fisheries planning and development in partnership with local governments. They are to control access to fisheries as well as the use of fisheries revenues. Inclusive management structures are mandatory, aimed at poverty reduction through empowerment and increased access to resources and decision-making, by the more marginalised stakeholders in fishing communities.

The Kenyan Ministry of Fisheries development policy outlines the following statements, which aim at enhancing the oceans and fisheries sector's contribution to wealth creation, increased employment for youth and women, food security, and revenue generation through effective private, public and community partnerships. The policy promotes research and development programmes to address appropriate technology and techniques, necessary for sustainable exploitation of fishery and aquaculture resources. It also promotes redistribution of fishing effort to the offshore resources and targeting of the new and under exploited stocks, with a view to realise economic viability and resource sustainability. Resource Management Ecosystem based approach in the management of resources, combined with the operational management plans for each fishery or resource, will be adopted by the Government for better management of fisheries.

Nevertheless, central governments in IGAD countries have established national policies and development plan for fisheries. Given below are some major policy frameworks in various states, related to fisheries development in IGAD countries:

a. **Ethiopia:** National Policy 9th Year, No.32: Proclamation 315/2003 providing the overall framework of operation for the regional states and ministries that have business with water related resources.

b. **Uganda:** The policy framework for the fisheries sub-sector is articulated in the Fisheries Policy, 2004, which has an overall vision "an ensured sustainable and efficient exploitation, and culture of the fishery resources at the highest possible levels, thereby maintaining fish availability for both present and future generations without degrading the environment". However, the implementation of MAAIF-DSIP (Development Strategy and Investment Plan) (2010/11-2014/15), overrides some of the policy statements contained in the Fisheries Policy 2004. The MAAIF-DSIP provides a roadmap to guide government, the private sector, farmers' organisations, other civil society stakeholders and development partners to make public interventions that will help meet the key objectives of growth, food security and poverty reduction in the agricultural sector.

c. **Kenya:** Fisheries are currently governed under the Fisheries Act (Cap 378) (Rev. 1991) but there is a Bill awaiting parliamentary approval in May 2010, after which time it will become the new Principal Act. New Regulations will be prepared following approval of the Principal Act. National policies for the sector are enshrined in the National Oceans and Fisheries Policy, approved by Cabinet in 2008 and the Ministry of Fisheries Development, Strategic Plan 2008 to 2012 (approved in March 2009). Kenya is part of the East African Community (EAC) negotiating group for the Economic Partnership Agreements with the European Union (EU) and does not have a Fisheries Partnership Agreement with the EU.

d. Djibouti: The legal framework for fisheries management in Djibouti is currently set out in the 1985 - Decree 85/103/PR/AG on MPAs, the 1982 (Law 212/AN/82) fisheries regulations and the 1979 (Law 52/AN/78 article 16-19), fisheries regulations. The Strategic Framework recently developed with the support of FAO to overcome food shortage has two components: (i) a single political priority for crisis management in the short term (emergency crisis), and (ii) a structural component designed to remove constraints on food security and considering actions in the medium and long term. The National Food Security Program includes five key policy priorities. (i) To ensure the rational management of water resources, (ii) To enhance the existing potential and reduce food dependency (iii) To ensure food access for the most vulnerable populations, (iv) To promote human resources and capacity building at all levels and (v) To promote a policy of information and impact monitoring.

e. Somalia: Fisheries legislation in Somalia is outdated and is no longer an effective tool for fisheries management. The ability to implement and enforce any fisheries legislation is another serious concern at present. The current Somali fisheries law dates from 1985 (Somali Fishery Law No. 23 of 30 November 1985). There is no national fisheries policy in Somalia but the Government of Puntland, through the Ministry of Fisheries, Ports, Marine Transport and Marine Resources, prepared a Marine Fisheries Policy and Strategy in 2006 for their own coastline.

f. Sudan: The principal rules governing freshwater fisheries are included in the Freshwater Fishing Law (1954), amended in 1960 and again in 1995 and this remains the key management tool for inland fisheries. The Marine Fisheries Ordinance (1937) was aimed at regulating fishing and use of marine resources in territorial waters and was in use until its amendment and renaming as the Marine Fisheries Regulation in 1975. In 2002 Sudan launched the Quarter Century Strategy (2002–2027) setting out a series of guiding objectives for the fisheries sector, including the need to involve stakeholders in the management process. In April 2006 under the GoSS, a fisheries policy was developed for the Southern region together with the strategic plan 2006-2010. Sudan is in the ESA block for the negotiation of the Economic Partnership Agreement with the European Union. *The Sudan Productive Capacity Recovery Programme* (SPCRP) – funded by the European Commission (EC), the SPCRP is a four-year national programme, with the overall objective of strengthening the capacities of state government administrations and non-state actors operating in the agriculture sector, including fisheries projects in some of the most vulnerable areas in Northern and Southern Sudan, as a result of the long-lasting civil conflict or droughts. The EU also funded the project titled "*Technical Assistance to the Fisheries Sector in Red Sea State*" over the period from May to October 2010.

g. South Sudan: Fish marketing and therefore fisheries economics in South Sudan are of rural orientation; this brings the fisheries sector to a significant position in the "National Food Security Planning" (MARF 2006). From the two fisheries sectors, most of the fish and fisheries products landed and marketed are from the capture fisheries, because the aquaculture sector is yet to develop.

2.1.7 Resource Management

As a result of decentralization policy, resource management, particularly in lakes and other water bodies in some IGAD countries, is also given to local authority with active participation from private and all stakeholders. Good example of this is the establishment of Beach Management Units (BMU) in Uganda under the BMU Statute, 2003. A total of 700 Beach Management Units (BMUs) have been established around Lake Victoria. In addition, Lake Management Organizations have been established on Lakes Kyoga (LAKIMO) and George & Edward (LAGEBIMO). The establishment of these BMUs has made it possible to demonstrate responsible fishing, establishing licenses at the national level, which is followed by implementation and allocation of access rights by these community management structures. A BMU committee requires the representation of four stakeholder groups, 30% boat owners, 30% crew, 30% others and 10% fishmongers, with 30% representation of women.

For private initiative in fisheries management, Uganda Fish Processors and Exporters Association (UFPEA) have instituted self policing, in an attempt to combat juvenile fish trade.

At regional level, countries sharing Lake Victoria established the Lake Victoria Fisheries Organization (LVFO) on 30 March 2007. LVFO has a Regional Plan of Action for the Management of Fishing Capacity (RPOA Capacity), acknowledging the need to control fishing effort, after recognizing the dangers of increased fishing effort and capacity on the valuable fisheries resources and its impact on the livelihoods of the fisher communities of Lake Victoria.

To a lesser extent, the fisheries resource management in Ethiopia is also given to the regional agriculture bureaus. The legislation promulgated by the federal government put the management and enforcement of Ethiopian water bodies into the hands of regional agriculture bureaus, which have research and extension offices that provide technical support to fishermen, particularly to the cooperatives. Fishery data collected by the cooperatives are also passed on to the regional offices.

The management of natural resources in Kenya was rejuvenated in 2008 with the creation of a number of new and segregated departments. The management of fisheries in Kenya is led and co-ordinated by the central Ministry of Fisheries Development offices in Nairobi. The Ministry is made up of two departments: Fisheries Department and, Kenya Marine and Fisheries Research Institute (KMFRI). Unlike in Uganda, Kenya has yet to institute the wide ranging decentralisation of powers and as such, the district fisheries officers continue to be firmly controlled and facilitated by the central fisheries department. The collaborative approach is a principle of management, enshrined in national policy and is implemented with partners in industry, the NGO sector, local governments, international donor community, the fishers and resource users themselves. Beach Management Units are important partners in fisheries, in both coastal and inland environments. Marine Protected Areas (MPAs) and Monitoring Control and Surveillance (MCS) are effective approaches for marine fisheries management.

Responsibility for fisheries management in Djibouti is under the authority of the Ministry of Agriculture, Livestock and Hydraulic Resources (MAEM-HR). Within this Ministry, the Fisheries Department is responsible for the management and sustainable development of the sector, the Department of Maritime Affairs being responsible for the registration of

fishing units, while the Maritime Gendarmerie is responsible for control and surveillance of fishing activities.

National jurisdiction (within the EEZ) for fisheries in Somalia is the responsibility of the Ministry of Fisheries and Marine Resources (MoFMR) of the Transitional Federal Government (TFG). The semi-autonomous region of Puntland to the north has its own Ministry of Fisheries, which co-ordinates fisheries management with the MoFMR of the Transitional Federal Government (TFG).

The fisheries regulations were based on the Somali Fishery Law No. 23. However, the regulations and policy came into force only in 1996, for Somaliland and in 2006, for Puntland when the Parliament had finally adopted it after many years of uncertainty. Despite the adoption, the regulations are not enforced due to the fact that the Somali administration does not have the human, logistical and financial resources, required for such undertaking.

The Fisheries General Administration under the Ministry of Animal Resources of Sudan is responsible for fisheries Sector. The Fisheries Administration mandate is to manage and develop fisheries resources (at both state and federal levels), to ensure sustainable utilisation of the resources. The tasks of the Fisheries Administration include the harmonisation between states to ensure effective legislation for integrated sustainable exploitation of fishery resources. The responsibility also covers setting joint policies in respect of foreign aids and operations in territorial waters.

Another important institution is the Fisheries Research Centre which is responsible for research at the Federal level. It is part of the Animal Resources Research Corporation, which is affiliated to the Federal Ministry of Animal Resources and Fisheries. As a national institute its work is based on specialised state research stations, covering Inland and marine fisheries of the country.

A number of management measures have so far been applied to the main fisheries with limited results. These encompass the following:

- Technical measures (e.g., regulation of access through licensing scheme, mesh regulation, banning of destructive fishing methods, increase of fishers' capacity through training, extension and other technical services, closed areas and closed seasons);
- Input control (through vessel and fishing gear registry and import control);
- Output control (through total allowable catch, TAC specification for foreign vessels); and
- Economic incentives to the private sector

The marine fishery in Djibouti is under the jurisdiction of the Ministry of Agriculture, Livestock and Sea (MAEM), who is in charge of water resources. Under the Ministry, the Directorate of Fisheries was established in 2001 and subsequently the Fisheries Regulation was enacted in 2002. The decree laying down the rules for granting fishing licenses (which specifies in particular the prohibition of "industrial" fishing in Djibouti) was implemented from 2007. Decree establishing a Coast Guard Team was established in late 2010, and is currently enforced under the Ministry of Equipment and Transport.

2.1.8 General Issues in Fisheries Sector Development

Generally there is a supply-demand gap for fishery products in IGAD countries. Growing demand in the domestic, regional and international markets has put great pressure on fish resources which depend largely on inland capture fisheries. At the same time aquaculture development in the region, except probably in Uganda, does not have much progress as reflected by limited contribution from this sector to overall fish supplies over the years. This has led to over fishing, IUU fishing, illegal trade practices (e.g. selling undersize fish, illegal cross border trade etc) which threaten the sustainability of capture resources in the region. Exploitation of fisheries resources in the Lake of Victoria is a good example of this scenario.

Another major issue faced by fisheries sector in the region is lack of infrastructure and post harvest facilities, leading to inefficiency in fish distribution, high cost for transportation and preservation of the fish, high post harvest losses and poor quality of fish sold in the market. Monopoly or oligopoly practices as it is happening in Ethiopia in the case of cooperatives given special treatment, is hampering the development of fisheries sector, and also to become a competitive economic activity.

2.2 Review on Fisheries Trade

2.2.1 Domestic Market

As indicated before, domestic markets in IGAD countries are dominated by freshwater species with strong preference towards tilapia, catfish, Nile perch and also small pelagic freshwater species called *mukene* or *omena*, with the exception of Somalia and Djibouti which have access and preference to marine species. Currently the market size for fishery product in IGAD countries is relatively small. Based on FAO's Food Balance Sheet (FAO 2010) and data extracted from the country's reports, the total fish supply (live weight) to IGAD countries was around 697,000 MT only. This was mainly supplied by local harvests. With a total population of around 216 million, the region has a great potential to become huge market for fishery products, driven by increasing purchasing power, changing consumers' life style, health consciousness and increasing supplies from aquaculture.

Table 3: Estimated Total Fish Supply in IGAD Countries (FAO, 2010)

Country	Total Fish Supply (live weight)* for Human Consumption (In MT)
Djibouti	1 666**
Ethiopia	16 528
Kenya	108 000**
Somalia	27 569
Sudan	50 000**
South Sudan	30,000**
Uganda	435 953
Total	697,248

* Total supply= Total production-non-human usage-export + import

** Countries reports

Uganda is the largest market for fishery product in the region consuming around 63% of the

total fish supply. Almost 90% of fish harvested in the country is consumed locally and about 10% is exported, except for Nile Perch which is mainly, about 90%, exported. Uganda's fish supply per capita is the highest in the region and fish is important for food security, as up to 50% of all animal protein comes from fish. The most preferred fish in Uganda (in order of preference) are tilapia, Nile perch, *mukene* and catfish.

Traditionally fish eating used to be high in areas in the proximity of major water bodies. However, due to urbanisation, rural urban migration and high purchasing power, fish consumption is higher in urban centres now, than rural settings including those near water bodies. The domestic consumption pattern is predominantly fresh fish followed by smoked, then sundried and deep fried. Frozen fish for domestic market is mainly marketed through chain stores, which target foreign consumers but this accounts for a very small proportion of the consumption segment.

Having the largest population among IGAD member countries, domestic market for fishery products in Ethiopia is relatively very small, as only around 16,500 MT fish (live weight) was sold in the domestic market. Limited access and availability of fish supply, strong local preference towards meat, cultural and religious reasons are the main factors behind low fish consumption in the country. Tilapia is the most popular fish, followed by *barbus*, catfish and Nile perch, which are mainly harvested from lakes around the country. Though fresh fish is preferred, there is also growing number of fish retailers selling frozen fish fillet products in major cities. Around 65% of tilapia fillet and 95% of African catfish are sold in frozen form in the local market. For cultural and religious reasons, many Ethiopians do not consume molluscs and shrimp. Imported fish products are sold in supermarket to cater mainly foreigners and white table cloth catering sector.

The peak fish consumption is during the Christian fasting months which fall in February, March and August, where they refrain from eating meat and shift to fish. Usually Wednesdays and Fridays even in non-fasting periods, are also time for people to abandon meat and eat fish. This tradition has persisted to date and fishermen increase their fishing efforts to have more supply, thus improve their income.

Meanwhile only recently the Sudanese have adopted a taste and acceptance of fish as food. In response to the increasing demand for fish, particularly in major cities, a concerted effort to develop the capture fisheries resources as well as aquaculture is being taken by the government. The effort to increase fish production is also hindered by the fact that, fishing is regarded as an occupation of low status and meant only for the poor and special groups.

The capital Khartoum is the largest market for fish and it receives fish from all fish producing states (especially White Nile, Northern State, and Blue Nile). With the exception of some shrimp, all fish sold are mainly freshwater fishes. Having a population of around 6.7 million, close to around 9,000 MT of fish is consumed in Khartoum alone.

Promoting fish in the local market is basically hindered and hampered, by long distances between resources and market areas, besides lack of basic facilities at landing sites, transport and storage. The problem is aggravated by difficulties in modernisation and mechanisation of a basically subsistence fishery, dependent on traditional technology; (fishing gears, fishing methods, preservation and curing methods); with the necessity to improve quality control, processing and marketing system.

In Somalia, majority of the population are from pastoralists, therefore fishing activity and fish consumption is limited to the fishing families and those living close to the coastal areas. However, the establishment of fish canneries and cold storage complexes at various locations along the coastlines from 1969 onwards and subsequent fish eating campaigns carried out in Mogadishu through national radios, have led to unprecedented improvement in domestic fish consumption. Through these facilities, good quality fish was made available to the public, encouraging many people to include fish in their diet for the first time in their lifetime. Similarly, marketing of fish products also improved countrywide, with the availability of ice and refrigerated trucks which allowed fish to be transported to the hinterland cities and towns, where there were no ice, freezing and storage facilities. As a result, per capita fish consumption in the country has increased by tenfold from 0.6 kg in 1970s to the current level of 2.0 kg/year (2010).

The biggest domestic market is in the capital, Mogadishu, having the highest concentration of population, about 1.5–2 million, with an estimated consumption of between 9 and 10 MT of fish per day. In other urban centres like Hargaysa, Bosaso and Kismanyo, fish is available in large quantities and one can buy as much fish as one's purchasing ability. Fish may thus form the basis of household meals, as frequently as two or three times a week. In inland markets, fish supplies are very limited and even do not exist, due to lack of infrastructure facilities and proper storage, to service hinterland markets. Small numbers of groups/companies have been formed periodically in an attempt to revitalise or create new markets. Unfortunately, their efforts have not been sustainable, due to lack of management, inadequate cooling systems and a high taxation rate from local authority, which all make it difficult to manage, create and expand domestic fish market.

In South Sudan domestic fish and fishery products marketing routes are closely tight between production areas (Sudd region and the Nile tributaries) to the urban centers of greater regions of Upper Nile, Bahar Ghazal and Equatorial. At present about 45% of the total landings, which is estimated at 30 - 40,000 MT per annum (GIS, 2011), are marketed and consumed within greater Upper Nile region, 35% within greater Bahar Ghazal and 20% within greater Equatorial region. Due to remoteness of production areas to these urban markets, fish price goes higher and depending on species, prices range between US$ 0.8 – 2.2 per Kg, on account of higher transportation cost and taxes. Since there are no mobile freezers and inadequate ice for transportation of fresh fish to these urban markets, fresh fish are commonly transported using trucks with cost ranging from US$ 1,500 – 3,000 per trip, depending on the road conditions and distance of the location.

Kenya is the second largest market for fishery products in IGAD countries after Uganda. Kenyans consume over 70% of their production with a total fish supply around 108,000 MT (Country report, 2012). Thus, the average fish consumption is relatively low at 2.7 kg/year in 2010, as one-third of the population is made up of consumers who, for historical and cultural reasons, are not traditional consumers of fish. The fish consumption also declined from 6.1 kg/year in 1999 as a result of decline in fish production and an increase in population (Smarfish Report, 2011). As in other countries fish consumption varies depending on geographical areas; with the highest in areas close to resources and urban areas, while the lowest rate is in traditionally pastoral areas in the north and parts of the Rift Valley. Fresh fish, particularly tilapia is the most popular fish among the local population. Imported frozen products are also widely available, especially in modern retail outlets in the major cities. Tilapia continues to dominate as the fish of choice, though more and more

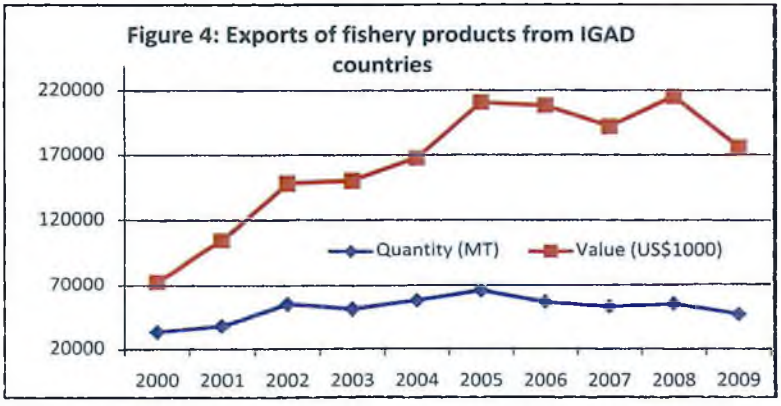
consumers are also started to consume dried *omena* (*Rastreneobola aureu*) and Nile perch (*Lates niloticus*) fillet. Various trends are driving fish consumption in the country, including health reasons, urbanisation and ready availability of fish, in various forms in the markets. Frozen fish fillets are sold in high end super markets targeting the high income group; while smoked, sundried, and salted fish is popular with lower income consumer.

Djibouti is the smallest market for fishery products among IGAD member countries, since it has smallest population (less than 1 million) and local fish landings are also limited (around 1,600 MT). The domestic market is basically dominated by fresh marine products. Currently Red Sea Fishing Company has been given responsibility for the construction of fishing port. It operates freely in buying fish from fishermen. Prices are negotiated between the company, Red Sea Fishing and fishermen and between fishermen and middlemen. Thus in general, it is a free market. Domestic market is rapidly expanding in recent years, with Djibouti City Centre being the main distribution centre for wahoo, dorado and sakla fish. Local consumers normally prefer white skin fish. Suburban markets, dominated by women traders sell low value fish like tuna.

2.2.2 Export Trends

Among the IGAD member countries, only Uganda and Kenya are actively engaged in external trade with significant amount of fishery products exported from these two countries. From the IGAD's total exports of fishery products value recorded at around US$ 176.2 million in 2009, (FAO, 2011), 97.5% originating from Uganda and Kenya, which reflects that other IGAD member countries have officially insignificant exports of fishery products. However, there are fishery product exports from other IGAD countries, like Somalia, but it is mainly done unofficially or illegally.

In quantity terms, exports of fishery products totalled 47,514 MT in 2009 (FAO, 2011) with over 85% from Uganda and Kenya, consisting mainly of Nile perch products. Marine products are mainly exported from Kenya and Somalia and to a lesser extent from Sudan and Djibouti. Fish exports in general have been on the declining trend over the past few years mainly due to the decreasing fish resources, quality related problems, and strong competition from cheaper fish products, in the global markets, like freshwater *Pangasius fish*, from Southeast Asian countries.



Among IGAD countries, Uganda is the largest fish exporter, followed by Kenya and Somalia. The main products exported from Uganda are fillets of Nile Perch (*Lates niloticus*) caught from Lake Victoria. Other products include steak, portion, and loins, headless and gutted Nile perch products. The main product forms are fresh chilled Nile perch which constitute 90%, followed by frozen form (10%).

Overall, fish export has dropped dramatically from 2005 in both volume and value, due to the aforesaid reasons. Fish exports dropped by 46% from a high of US$ 147 million in 2006 to US$ 114.4 million in 2009 (FAO, 2011) and further dropped to US$ 82 million in 2010 (National Statistics).

Table 4: Table 4: Exports of Fishery Products from IGAD (in MT)

Country	2005	2006	2007	2008	2009	2010*
Djibouti	425	590	770	965	1,368	NA
Ethiopia	102	414	755	599	730	849
Kenya	20,192	15,857	17,771	22,638	16,551	17,827
Somalia	14,460	6,286	6,674	2,528	3,456	482*
Sudan	2,764	348	391	1005	719	53*
Uganda	39,324	36,935	31,986	27,269	23,931	15,417
Total	66305	57177	53723	55923	47514	34,628

Source: FAO Stat, 2011 *) and National statistics

Table 5: Table 5: Exports of Fishery Products from IGAD (in USD 1000)

Country	2005	2006	2007	2008	2009	2010*
Djibouti	177	366	458	470	610	NA
Ethiopia	121	384	863	508	408	NA
Kenya	61,873	55,938	61,869	75,594	57,389	61,104
Somalia	9,414	4,637	5,788	1,606	2,246	1,268
Sudan	932	330	-	674	321	24**
Uganda	143,258	146,951	125,890	133,798	114,363	82,037
Total	210953	208571	192356	215641	176167	144433

Source: FAO Stat (2011)
* Country report, **Estimate

Similar to Uganda, Kenya also exports mainly Nile perch, harvested from Lake Victoria and its exports have fluctuated over the years for the same reasons indicated. Export quantity reached the peak in 2002 at 24, 622 MT, then dropped to 17,827 MT valued at US$ 61.1 million in 2010. The key export products were Nile perch fillets, fish maws, octopus, sword fish, marine shells, crab, sardine, shark fins and sea cucumber. Nile perch fillets exports accounted for 85.8% of the total quantity and 85.6% of the total earnings. Fish maws contributed 4.6% by quantity and 10.5% by value, while octopus contributed 5.8% in terms

of quantity and 3.8% by value. Based on the data from Kenya National Bureau of Statistics, the country's fishery products (HS03) exports in 2011 were recorded at 15,520 MT worth US$ 54.6 million. Italy, Israel and the Netherlands were the main markets absorbing almost half of the total exports by value in 2011.

Apart from the above mentioned exports, 9,207 MT of tuna loins were processed and trans-shipped through the port of Mombasa to Spain. This quantity was an increase of 27.8% from the previous year's trans-shipment of 7,209 MT. The increment in tuna exports is attributed to the country getting a derogation of 2,000 MT of tuna loins under the rules of origin 1528 EC. Meanwhile, dried fish maws are almost exclusively marketed to Far East namely Hong Kong and China, while dried fish and smoked products are mainly sold in regional markets.

Fishery exports from other IGAD member countries are insignificant and mainly engaging in cross border trade of traditional products. Ethiopia exported 849 MT of fishery products (Federal Ministry of Agriculture, 2011) in 2010 and almost half of which is dried fish, to neighbouring Sudan. Following the normalization of relations between Ethiopia and The Sudan, exports from the Lake Tana to the latter started actively, which increased from 347 MT in 2006 to 349 MT in 2010 (Berihun Tefera, et.al.2009). It is also believed that there are some illegal fish export trade between fishery resources areas along the borders of Ethiopia and neighbouring countries such as Kenya and Uganda, from the Ethiopian part of Lake Turkana (formerly Rudolf), from Gambela and Benshangul Gumuz to The Sudan and South Sudan.

Fish exports from Djibouti have been on the rise for the past decade, from only 6 MT in 2000 to almost 1,400 MT in 2009. In value terms, the export increased from merely about a half million US dollar to almost US$ 8 million during the same period. Exports were mainly destined to Ethiopia, the Middle East and some Asian markets.

Fish export from Sudan focuses on marine fishery products, including fin fish, sea cucumber, shrimps, trochus and some wet salted fish (mullet) products. The main destinations of these exports are Egypt, Saudi Arabia and Europe. Some high value dried products like sea cucumber and shark fins are also exported to Asian markets. Sudan also export small amount of wild shrimps, sourced by trawling to Egypt and to Saudi Arabia. In 2009 the country exported more than 700 MT of fishery products, which then dropped to 53 MT in 2010. Exports have been on the declining trend from the peak at 4,500 MT in 2004.

From Somalia, on an average of 5,000 MT of fishery products valued at over US$ 4.00 million were exported per year from 2001 to 2010, but exports have been fluctuating during the period. In 2005, as per the national report, fishery exports reached almost 14,500 MT valued at US$ 9.4 million, but there after exports have been showing a downward trend, reaching the lowest at 482 MT valued US$ 1.3 million in 2010. Reasons for this apparent decline in the volume of exports are not immediately known, though explanations have included; declining size of the individual lobsters due to overfishing, piracy, declining quality, poor reputation for Somali products and declining demand from overseas markets. The main export products of Somalia for the previous years were fin fish, lobster, shark and tuna. Among the export products, frozen fish and shark were the highest valued products, which contributed about 54% of the total fishery export by value, while accounting for only 23% of the total export by quantity. The main market for Somali fish exports are Thailand,

United Arab Emirates (UAE), Oman and Yemen. Other markets are Kenya, Ethiopia and Djibouti. The largest share of fishery export by value goes to Thailand, followed by Oman, UAE and Yemen taking around 85.5%, 7.7%, 5.2% and 1.4% respectively.

Lobster is another export oriented product from Somalia and all the catches are processed as frozen tails that are air freighted to UAE. The traders use reefer trucks to freeze and store the tails which they later transport by road to Garowe or Galkayo. From there the product is air freighted to Dubai, UAE. In the UAE, the tails are reprocessed, packed and re-exported to Asia and Europe as product of Oman. Although it was at one time the most important fishery in Puntland in terms of generation of hard currency and creation of employment opportunities, its significance has, in recent years decreased, due to declining catches. Despite the decline in production, however, based on the current price of US$ 25/ kg, the lobster fishery is still an important as it brings in between US$ 5 and US$ 7.5 million/ year to the economy from the export of tails. The current annual production is estimated to be between 200 and 300 MT, which is a fraction of the average 2,000 MT produced in the 1990s.

Shark fins are also well processed, and are exported by air to the Arabian Gulf, mainly to UAE, which fetch high prices, between US$ 90 and US$100 per Kg. Although marketing of other fishery products internationally is lagging, there have been some improvements during the past few years. With a few high quality processed fish products (frozen fillets or whole gutted frozen) and high quality lobster (processed as whole frozen or frozen tails) exported to the Arabian Gulf countries and to Saudi Arabia. Therefore, it seems that export is improving slowly, although it requires heavy financial investments from the government and from international funding sources, for maintaining the momentum of recovery for fishery infrastructure in particular, and for the fishery sector in general.

Though there is no official record of fishery products exported from South Sudan, reportedly traditional fishery products such as fish maws of the Nile perch, hides of Hippopotamus and Crocodile find their way far beyond the Sudan to other Arab countries. The value of these products has not been recorded, since their trading was informal and mostly illegal.

2.2.3 Import Trends

IGAD countries imported 34,783 MT of fishery products worth about US$ 39 million in 2009 (FAO, 2011), thus IGAD as a whole has a foreign trade surplus (in fish) of about US$ 137.1 million.

According to the data from Kenya National Bureau of Statistics, Kenya imported more than 16,000 MT of fishery products (HS03, fresh, frozen and dried/salted) valued at US$ 11.5 million in 2010. Meanwhile imports of prepared / preserved products (HS16) was around 463 MT, worth at US$ 466,000. Seychelles, Singapore, Japan and South Korea were the main suppliers to Kenya. The bulk of imports into Kenya were frozen mackerel and also sardine consumed mainly at household level. The imports are largely driven by the fish deficit in the country and cheap cost of the fish and fishery products.

Official figures show that Djibouti mainly imports canned tuna and crustaceans. Its imports peaked in 2009 at more than 1,700 MT, but declined to 622 MT in 2010. A significant

quantity of frozen products imported into Djibouti is reportedly re-exported to neighbouring Ethiopia to cater to star hotels, high-end restaurants and also supermarket chains.

Imports into Sudan concentrate on chilled *Lates niloticus* (*Ijil*) and dried tilapia (*Bulti*), mainly from Uganda and Ethiopia. Shrimps are also imported from the United Arab Emirates (UAE), Saudi Arabia and Egypt. Canned sardines, mackerels and tuna are imported from different Asian and European Countries. Some Sudanese importers of fish from Uganda claimed that they faced some obstacles which include lack of direct air routes between Uganda and Sudan, which makes it necessary to trans-ship fish consignments through intermediate airports. This leads to additional cost and risks of spoilage due to mishandling, delayed clearance; lack of direct correspondent banking systems between Sudan and fish exporting countries, a situation forcing fish importers to channel their financial transactions through currency exchange agents, with higher exchange rates.

About 1,300 MT of fishery products worth US$ 3.9 million were imported into Somalia in 2010. Imported data shows a considerable increase in the imported fish products, since 2007, of more than 82%, from 307 MT in 2007, to more than 1300 MT in 2010.

South Sudan imports fishery products mainly from its neighbours. Imports of fresh fish especially tilapia spp. from Uganda to South Sudan (Juba & Rumbek) was high between the periods 2006 – 2009, with the quantity imported around 8 – 10 MT per day. Given the distance from production sites in Uganda with poor road network and preservation facilities; most of this fish reaching markets in South Sudan was already in poor quality. South Sudan also imports processed fish (mainly dried/salted/smoked products) from Uganda, the Democratic Republic of Congo (DRC) and some few quantities from Central African Republic (CAR). The common processed fish imported to the country include: *Rastrimeobola argentea, Lates niloticus, Bagrus sp., Distichodus sp., Labeo sp., Citharinus spp., Clarias sp., Hydrocynus sp.* and *Alestes sp* among others. As the government is promoting aquaculture in the country, there are also increasing imports of fish fry and fish feed from Uganda.

In general, fish products imported into IGAD countries are intended for local consumption that can be classified

into the following market segments:

- For local consumers: low value frozen fish, mainly small pelagic such as mackerel and sardines
- For catering sector : high value frozen fish, shrimp, lobster and other shellfish
- For expatriates/foreigners: high value frozen fish, shrimp, canned fish

Table 6: Table 6: IGAD - Imports of Fishery Products, in MT

Country	2005	2006	2007	2008	2009	2010
Djibouti	NA	NA	820*	439*	1709*	622*
Ethiopia	575	1,038	832	1,150	825	NA
Kenya	28,475	35,846	32,909	29,085	21,532	16,000*
Somalia	611	1,642	307	999	1,667	1,301*
Sudan	386	1,998	1,693	1,375	2,412	NA
Uganda	423	326	380	975	626	NA
Total	33184	44242	41446	39311	34783	17301

Source: FAO Stat; *National statistics

Table 7: IGAD - Imports of Fishery products in USD 1000

Country	2005	2006	2007	2008	2009	2010
Djibouti	4,230	5,693	7,639	9,739	16,759	NA
Ethiopia	623	1,080	898	1,157	1,213	NA
Kenya	7,329	8,108	11,189	9,937	10,091	NA
Somalia	1,289	4,829	898	3,522	5,723	3,851
Sudan	572	2,269	2,899	1,970	4,633	NA
Uganda	850	374	798	1,051	874	NA
Total	14,439	21,592	26,092	28,299	39,072	3,851

2.2.4 Regional Trade in Fisheries

The regional trade in fishery products is important, though reports from the national consultants generally showed that it is difficult to get accurate data on the trade. Generally the regional trade for fishery products is characterised by the following:

- It is mainly conducted informally by small scale and traditional traders, across the borders;
- Bulk of the trade is unrecorded, thus many consider it as illegal.
- Bulk of the products traded is dried, salted and smoked products, with limited amount of fresh fish and frozen fish.

Uganda is the main fish supplier to the regional market. Official data indicate that regional fish trade brings in an average of US $ 35 million per year to the country, while the illicit and informal regional fish trade has grown from US$ 10 million a year over the last 5 years, currently to over US$ 70 million (regional fish guidelines, 2010). In 2007, Uganda Bureau of Statistics (UBOS) estimated regional fish trade was at US$ 61.5 million, while in 2008 it was estimated at US $ 69.6 million. The main species traded are tilapia, *Alestes*, *Hydrocynus*, *Bagrus*, *Rastrineobola* and also Nile perch. Nile perch products consist of both undersized fish and by-products (frame, skin and fish head). Due to lack of infrastructure and post

harvest facilities most products sold in the regional fish trade are salted, sundried and smoked products. Exported Nile perch comes mainly from Lake Victoria while tilapia mainly comes from Lake Kyoga, main sources of *Mukene* is from Lakes Victoria and Kyoga and *Alestes sp* and other species are from Lake Albert.

From Ethiopia, dried fish is mainly exported from Lake Tana to South Sudan while frozen fish imported from Djibouti, as indicated before. Though export of dried fish from Ethiopia to Sudan was only 349 MT worth US$ 277800 in 2009/2010 as reported (Berihun Tefera, et al. 2009); it is believed that the actual figure would be much higher, as most of the trade is not officially recorded.

In the case of Kenya, fishery products sold to the regional markets are relatively low, compared to the international markets. The products exported to the regional markets are mainly dried/salted and second grade frozen products. Based on the data provided by Kenya National Bureau of Statistics, in 2011, the country exported fishery products under HS 03 (fresh, frozen and dried products) to some regional markets like Uganda (US$ 773,000), DR Congo (US$ 309,000), Sudan (US$ 33,600), Somalia (USD 26,200) and Ethiopia (US$24.600). At the same time her imports of fishery products from Tanzania was to the tune of US$ 403,000 and from Uganda it valued US$ 111,400.

The improvement in transportation has helped exports from Somalia through the use of cargo boats usually via Mombassa, Kenya. The cargo from Mombassa brings tea to Somalia and in return takes back dried shark meat. The reopening of the high way linking Puntland and Kismayo in 2006 has also made possible for the transportation of dried shark meat by road to Kismayo from where it is exported to Mombasa, which is the main market for dried shark meat in East Africa. Marine fin fish is mainly exported to Yemen, primarily the high value king fish sought after by the foreign boats. The significance of this fishery has been on the rise since the arrival of the Yemeni boats a decade ago, which at first accepted only king fish but have since added fishes like tuna, groupers, snappers and emperors on their list. Having eclipsed the lobster fishery, it is now the most important fishery in Somalia, especially in Puntland.

Recent reports indicate that a total of 120 Yemeni boats carrying ice on board dock at various villages along the coastline, during the fishing season. The boats can carry between 10 and 18 MT of fish on ice depending on the capacity of their individual fish holds. They on average make three collection cycles per month, shuttling between Yemen and Puntland. Some of these boats are jointly invested by Somali and Yemeni fishermen. It is estimated that the Yemeni boats take a total of 3,600 MT of fresh fish/month which translate into around 28,800 MT/year (i.e. 360 boat trips x 10 tons x 8 months).

2.2.5 Cross Border (Illegal) Trade

As mentioned above most of regional trade mainly consists of cross border trade, whether it is legal or illegal. From various national reports, illegal trade usually refers to informal trade, which is traditionally done by small traders from both sides of the border and illicit trade which is done by traders who try to escape from government regulations such as tax and tariff, illegal products (e.g. undersize fish), trans-shipment on the sea or lake etc. The governments in IGAD countries acknowledge the importance of cross border trade and efforts have been made to legalise and help the players of this trade. Illegal

trade, particularly involving IUU fishing and undersized fish, has significant impacts to the management of fish resources.

In Uganda cross border trade is conducted by fish mongers, route managers and transporters who use various means of transport. On the main land it is transacted at main border post but they manoeuvre their ways using unofficial customs entry. In most cases they use bicycle, motorcycles and some are pedestrians especially women. In shared water bodies it is conducted mainly by big time fish traders and transporters and this is common on Lakes Victoria and Albert.

According to Uganda Bureau of Statistics (UBOS) and National Export Strategy (2008-2012), Uganda's informal trade with neighbouring Democratic Republic of Congo (DRC), Kenya, Rwanda, Sudan and Tanzania has been estimated around US$ 1.6 billion. Its contribution to the country's export earnings is also significant, accounting for about 19% in 2009 and 13% in 2010, while its contribution to national income stands at 34%. Reportedly informal export flows to the D.R. of Congo, Rwanda and Tanzania, in particular, experienced the most important annual growth. Women continue to dominate in informal cross-border trade and fish is the main commodity traded in this market and which comprises of both the salted and smoked fishery products (UBOS, 2007).

There are some reports on illegal cross border trade between fish traders in lake areas, along the borders of Ethiopia and neighbouring countries. Nile perch and other fish caught from the Ethiopian part of Lake Turkana (formerly Rudolf) are "exported" to Kenya and Uganda; while fish harvested from Gambela and Benshangul Gumuz cross over to South Sudan.

As in Uganda and Ethiopia, traditionally, products from Kenya sold across the borders are mainly split open dried tilapia and dried Nile perch fillets from Lake Turkana. The Fisheries (prohibition) Regulations 2003 came into effect and immediately banned the fishing, landing, processing, and sale of fish caught from Kenyan waters of Lake Victoria and others. This includes Nile perch of a total length of less than 50 cm, from the Kenyan waters of Lake Victoria; *Rastrineobola aureus* (*Omena*) from the Kenyan waters of Lake Victoria, during the closed season; any species of fish from the Lake Naivasha waters during the closed season, unless approved by the government; and also lobsters of a total weight of less than 250 grams.

The large scale factories responded by stopping the processing of such illegal fish; but an appropriate enforcement at the production levels was not put in place. The measure immediately created is the opening of the marketing channels for these illegal products in the domestic market and the beginning of cross border illegal trade. Unfortunately the data of this trade is not available as there are no border declarations.

It was reported that before and even right after the independence of South Sudan from the Sudan, fish trade route from the south northwards was continuing until recently, when border disputes between the two states erupted and destabilized marketing of fish and other fisheries resources from South Sudan to Sudan. The exit points for these exports include: Raja, Aweil, Bentiue and from Shambe, Malakal and Fashoda to Renk northwards to the Sudan and from Ayod, Pibor, Akobo, Pochalla, Punyido, Burabiye, and Nasier to Ethiopia through Gambella. The most common types of fresh fish species exported to the Sudan include *Lates niloticus, Bagrus sp., Tilapia spp., Heterotis niloticus, Gymnarchus niloticus*

Synodontis sp., Mormyrus sp., Distichodus sp., Labeo sp., Citharinus spp., Clarias sp., Hydrocynus sp., Tetraodon lineatus, and Alestes sp. Processed forms of fish exported to Sudan include: sun dried, fashik (wet salted), salted, and madesha, and smoked products.

Illegal trade in fish and fish products in Somalia mainly happens on high seas. For example, in the areas where the Yemeni boats operate, fishermen who catch sharks as by-catch, during fishing for large pelagic fish, sell them whole, complete with fins to the Yemeni boats for the sake of convenience. However it is not possible to estimate the total production of this fishery and the amount of revenue it generates. In the North-West around Zeila, fishermen sell their fish to neighbouring Djibouti markets through informal arrangements. On a daily basis, about 7 boats, each carrying 500 kilos of fresh fish, cross to Djibouti and market their catch in the city. In addition, 30 - 35 fishermen harvest prawns and crabs near Loado and market the products in Djibouti through similar arrangements. Fishermen operating in the southern regions around the Bajuni Islands and in the North West near Djibouti have developed their own marketing network. The Banjuni fishers catch lobsters and keep them alive in floating cages and then transport them by boat to Kisimayo or to some of the smaller villages along the coast, where they are sold to fish traders. The lobsters are then exported to Kenya mainly to Nairobi using small private planes.

Some Yemeni fishing vessels also come to Djibouti's waters and fish illegally and bring the catches back to Yemen. However, there is no data to support this trade.

In Sudan illegal trading practices are insignificant in freshwater fish, due to the nature of the inland resources, which depend on the Nile system and its tributaries. As per geographical position, Sudan is neighboured by Egypt in the North, and South Sudan in the south. There is a limited amount of wet salted fish traded across the border with Egypt. Some sporadic trials of illegal trading were known across the Red Sea to Saudi Arabia (shrimp, high value fin fish and shell fish) prompted by higher prices and good demand.

2.2.6 Fisheries Trade Regulation

Countries with active participation in international trade in fisheries are usually well equipped with trade regulation, particularly with regard to export regulation and quality related certification. This pattern also applies in IGAD countries where Uganda and Kenya have more advanced and have complete trade regulation in fishery, compared with other member countries. It is understandable as they have to comply with requirements from importing countries, particularly with the EU requirements.

In Uganda, Fish and Aquaculture Products (Quality assurance) Rules, 9th schedule provides for sanitary certification fees of fishery and aquaculture products (quality issues related to storage, handling, display, packing, transportation, processing) and export permit from Ministry of trade. Fish Amendment Rules, 2010 gives provision for licenses and permits to anyone involved in fisheries activities (fishermen, fishing vessels, fish traders, fish mongers, fish trucks, fish processors both artisanal & industrial, fish transport boats & vessels). BMU Statute 2003 provides for issuance of fish movement permits at the rate of 10 shs/kg for fresh fish and 20 shs/kg cured fishery products.

In Ethiopia, with limited participation in international trade, regulation on fish trade is almost non-existent. The main regulation related to fisheries in Kenya is Fisheries Act (Cap. 378

The Act is divided into six Parts and 24 sections and intends to set up the basic principles for the development, management, exploitation, utilization and conservation of fisheries and for connected purposes. Since Kenya shares Lake Victoria, the country is also obliged to regulation on BMU providing provision for the establishment and administration of beach management units. The regulation mandates the Director of Fisheries to facilitate establishment of beach management units for each fish landing station, which are established by the Director in accordance with the provisions under Fisheries Act.

Kenya also has Fisheries (Safety of Fish, Fishery Products and Fish Feed) Regulations 2007, which provides provision with respect to the official control of the safety of fish, fishery products and fish feed and specify health requirements for the production and marketing of (particular) fish products. It is the main fish exporting country in the region. The Ministry responsible for fisheries shall be the Competent Authority for purposes of these Regulations. As mentioned earlier there is also Fisheries (Prohibitions) Regulations 2003, which grants the power to the Director of Fisheries to prohibit fishing, processing and selling selected fish. The Director may also prohibit the use of scuba-diving gear or spear guns to fish for lobsters and Beche-de-mer within the territorial waters of Kenya, as described under the Maritime Zones Act, unless this is done for experimental purposes.

In Somalia, there are only few fish exporters, thus fish marketing regulation is almost non-existent. The fish exporters are the most sophisticated in the supply chain and they implement basic principles of the Hazard Analysis and Critical Control Point (HACCP). Rest of the chain is completely unaware of export-import regulations and safety issues. The exporter is the price setter: the prices move downwards from the exporter to the supplier, to the agent and then to the fisherman on a daily basis. The level of transparency is very low between each of these groups. Even traders are unaware of the selling price of exporters. Nevertheless, exporters receive prices from their buyers in the importing countries.

The Fisheries Code established in 2001, is the main regulation related to fisheries, including in fish trade. It also includes the Customs Department's Tax Code. In the fisheries sector, all inputs other than fuel (fishing gear, engines and spare parts, etc.) are taxed at 5%. Fuel used by fishermen, is made available at zero tax basis and industrial fishing is prohibited in Djibouti.

In Sudan regulations related to fish import and export, are lying with different ministries and governed by the standards and rules, specified and adopted with the different institutions. The concerned agencies related to fishery trade are Departments of Fisheries, Customs Department, Health and Commerce Ministries.

2.3 Quality Assurance

2.3.1 Competent Authority

There are quite wide differences in the way competent authorities organise their control systems over fish and fishery trade in IGAD countries. In Kenya and Somalia the Ministry of Fisheries is responsible for regulating this sector while in Uganda, Ethiopia and Djibouti it is the Ministry of Agriculture and in Sudan the Ministry of Animal Resources is responsible for fisheries activities.

2.3.2 National Regulations in Hygiene Aspects, with Reference to HACCP Principles and Risk Analysis, Accessibility of the Regulations for the Operators.

Almost all the IGAD countries follow national regulations on food hygiene and safety while no common or harmonised IGAD agreement exists regulating these matters that are valid in all IGAD countries.

Each country regulations have guidelines for good manufacturing practices (GMP) and the basic principles of HACCP methods. However, in most cases regulations are very generic and not specific to the fishery sector. Also, most operators have limited access to, and knowledge of the regulations. The situation is somewhat better in Kenya and Uganda, wherein they have a fairly long experience in the export of fishery exports to the EU countries. This has led to a gradual improvement in the regulations and their implementation. One of the biggest problems for the operators in iGAD countries is in gaining access to knowledge of the existing regulations and norms. Most of the operators know about the regulations from hearing about them verbally from colleagues, fishery inspectors etc, but are unable to find a written copy or an internet site, providing a copy of the regulation.

2.3.3 Basic Implementation of Traceability System and Eco-labelling in Fisheries

In the local markets there is no system of traceability or eco-labelling. Following the FAO mission in December 2011 it was noted that this is true even for supermarket chains in large cities (Addis Ababa, Kampala etc.) which are normally more up to date in their controls and hygiene standards.

COUNTRY Kenya
SECTION **Fishery products**

Validity date from
26/08/2012
Date of publication
13/08/2012
00023

List in force

Approval number	Name	City	Regions	Activities	Remark	Date of request
01/1 BMZN	Woodside Motor Product (U) Ltd	Mombasa	Mombasa	PP		
02/LAKEN	W.E. Tilley (Muthaiga) Ltd	Nairobi	Nairobi City	PP		
005/CLEN	East African Sea Foods Ltd	Kisumu	Kisumu	PP		
007/LVICEN	Capital Fish (K) Ltd	Homa Bay	Homa Bay	PP		
008/CREN	Pacha Foods	Kisumu	Kisumu	PP		11/07/2011
009/BMZN	Transatlantic Fisheries Ltd	Mombasa	Mombasa	PP		
045/CLEN	Pacha Fresh Fish (Two Thousand) Ltd	Kisumu	Kisumu	PP		
051/LVICEN	Sea Harvest (K) Ltd	Mombasa	Mombasa	PP		
054/LVICEN	Crustacean Processors	Mombasa	Mombasa	PP		15/01/2009
060/CREN	L. Fish (K) Ltd	Kisumu	Kisumu	PP		30/05/2011
063/LVICEN	Amco Foods Limited	Mombasa	Mombasa	PP		19/03/2009
065/CREN	Victorian Delight Ltd	Kisumu	Kisumu	PP		20/10/2011
067/LVICEN	Precio Investments	Malindi	Kilifi	PP		19/10/2011

Activities Legend :
PP Processing Plant

COUNTRY	**Uganda**	Validity date from 11/04/2012 Date of publication 29/03/2012 **00032**
SECTION	**Fishery products**	

List in force

Approval number	Name	City	Regions	Activities	Remark	Date of request
U024/010	Universal Foods Ltd	Kampala	Kampala	PP		07/12/2010
U025/010	Victoria Food Exporters Ltd	Entebbe	Wakiso District	PP		06/09/2010
U02/91	Greenfields (U) Ltd	Entebbe	Wakiso District	PP		
U03/94	Gomba Fishing Industries Ltd	Jinja	Jinja District	PP		04/12/2007
U04/95	Ngenge Limited	Kampala	Kampala	PP		
U05/96	Lake Bounty Ltd	Kampala	Kampala	PP		
U06/96	Uganda Fish Packers Ltd	Kampala	Kampala	PP		
U07/96	M/S Marine & Agro Export Processing	Jinja	Jinja District	PP		
U08/96	Byansi Fisheries Co. Ltd	Kalliro	Rakai District	PP		21/04/2008
U09/96	FITRA Uganda Ltd	Kampala	Kampala	PP		
U10/96	M/s FishWays Uganda Ltd	Entebbe	Wakiso District	PP		
U12/00	Entebbe Handling Services Ltd. (ENHAS)	Entebbe	Wakiso District	CS		07/12/2010
U16/04	Igloo Food Industries Ltd	Majanji	Buna	PP		
U17/04	Roka Boadr Ltd	Entebbe	Wakiso District	CS		07/12/2010
U18/04	Oakwood Investments Ltd	Kasensero	Rakai District	PP		

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List in force

Approval number	Name	City	Regions	Activities	Remark	Date of request
U19/04	Fresh Water Fish Exporters Ltd	Bukakata	Masaka	PP		
U20/04	M/s Unif[illegible] Ltd	Jinja	Jinja District	PP		
U21/04	Pearl Fish Processors Ltd.	Entebbe	Wakiso District	PP		04/12/2007
U22/06	Tanga Fisheries Ltd	Entebbe	Wakiso District	PP		
U23/09	Mpongo Ltd	Kampala	Kampala	PP		29/02/2012

Activities Legend :

CS	Cold Stores
PP	Processing Plant

2.4 Quality Assurance System for Export Market

2.4.1 Competent Authorities

Only Kenya and Uganda have a quality assurance programme for fish and fishery products for export. In Kenya the Ministry of Fisheries is responsible for the programme while in Uganda the Ministry of Agriculture which receives important support from the Lake Victoria Fisheries Authority. In other IGAD countries there are some checks on fish quality, but these are not part of systematic programme and are not specifically related to the export market.

2.4 EU Approval (List of Approved Companies)

The following table lists only those companies from Kenya and Uganda, who are qualified for export to EU. Kenya and Uganda are the only IGAD countries that can export to the EU.

2.4.3 Control Plan and Certification Procedure for Export

Both Uganda and Kenya have efficient and effective systems for the control and certification of fishery products for export. In Uganda the system is quite simple as there is only one export product, Nile perch, which is mainly air freighted. The system in Kenya is more complex as they have greater variety of products (marine fish, freshwater fish, crustaceans etc) and it is exported by sea and air. In both countries the system requires exporters to notify the competent authority at least one day prior to each shipment.

2.4.4 Implementation of Traceability, Origin, and Eco- labelling System.

Traceability and eco-labelling systems which meet EU standards have been implemented in Kenya and Uganda. The system in Uganda is more consolidated because the country has a long history of exports. Most companies have gained good experience in processing, labelling, packing and storage of fish products as they mainly handle only one product, Nile perch. This has made their task easier. The situation in Kenya is more complex and there are some gaps in the system. It is important to note that apart from the greater variety of fish products handled, some of fish products exported from Kenya originates from other countries, notably Somalia. These products raise great difficulties of traceability, as they normally arrive with little or no documentation.

Lack of official documentation that attests to the quality and identity of the product, in the various phases of its production, transport, storage and sale is a problem in IGAD countries. This is due to the fact that the government and local authorities are often unaware of the importance of sampling and identifying the product and therefore unwilling to give the relevant documentation to operators.

2.4.5 Recall System of Exported Products from the International Markets

At present the only IGAD countries that export to the European Union are Kenya and Uganda and therefore have a recall system for exported products. This system was enhanced following the EU ban on fish products from those countries in 1997. In other IGAD countries this system does not exist.

2.4.6 Laboratories

There are state-run laboratories in Kenya and Uganda that have been regulating and sampling fishery products for many years. There are two key laboratories in Kenya. These are Kenya Bureau of Standard Laboratory and Kephis. The Kenya Bureau of Standard Laboratory is mainly used for microbiological analysis, while the analysis of heavy metals is undertaken by Kephis laboratory. Both the laboratories are accredited for carrying out these types of analysis. SGS laboratories are also being used for some analysis from time to time.

All the fish processing plants producing fishery products for export have their own in-house laboratories for conducting day to day routine analysis.

In Uganda, there are two accredited laboratories used for official sampling and analysis of fish and fishery products and these are: Chemiphar (U) Ltd, accredited by Belgian Accreditation Body, and the Uganda National Bureau of Standards, accredited by South African National Accreditation System (SANAS). These laboratories have acquired international accreditation in conformity with ISO 17025:2005. A memorandum of understanding also exists between the Competent Authority and these laboratories, establishing responsibility to undertake analysis of official samples.

The only other government-run laboratory in IGAD country is in Djibouti, the National Laboratory of Food Analysis (LANAA) which was established in 2009. It was set up in order to conduct veterinary services, improving the quality of products for export, and protecting the health of consumers by conducting analysis and monitoring of products. This laboratory is not yet internationally accredited, but it aims to achieve ISO 17025:2005 by the end of the year.

In Sudan there are no accredited laboratories for testing food products either in the public sector or under in the private sector.

2.5 Preferential Tariffs Received by IGAD Member Countries

IGAD member countries receive preferential tariffs for their fishery products from major markets such as the EU, US and Japan, through bilateral arrangements, as well as from their neighbours through regional agreements. Under the famous Lome and, later, Cotonou Preferential Trade Arrangements, ACP countries received preferential tariffs for the products, including fishery products entered into the EU up to 31st December 2007. The replacement of the agreement, called Economic Partnership Agreement (EPA) has been

negotiated with the ACP countries. Due to various unresolved issues, the progress on EPA negotiations has been slow and so far only South Africa has full EPAs with the EU. Then the EU has embarked on negotiating Interim EPAs (IEPA) which is less comprehensive in scope and time which focuses more narrowly on trade aspects. So far IEPA has been signed only with Seychelles and Mauritius and none from IGAD countries.

Nevertheless IGAD countries still receive duty free access to the EU market for their fishery products, through the Everything But Arms (EBA) introduced in 2001 for Least Developed Countries (LDCs). Under the Generalized System of Preference (GSP), other developed markets like the US and Japan also give duty free access for some IGAD member countries for their export products, including fishery products. Uganda and Kenya, for example, are given duty free access to the US and also Japan for their fishery exports. Other individual countries like Norway, Russia and China also give preferential treatment for products from selected IGAD countries.

IGAD member countries are also members of Common Market for Eastern and Southern Africa (COMESA) and few (Kenya and Uganda) are members of East African Community (EAC) (See Table 8). Established in 1994, COMESA focuses more on wide ranging cooperation than just trade, including priorities for the promotion of peace and security. COMESA also promotes regional economic integration through trade and investment. 19 member countries of COMESA have a total population of 430 million and a total export bill of $157 billion. At the end of October, 2000, an FTA was established by nine countries and by January 2004, two more countries had joined. In addition to the elimination of tariffs on COMESA originating products, which is based on a reduction schedule dating from 1992, the FTA members also work on removing quantitative restrictions and other Non Tariff Barriers (NTB). Fishery products are included in the negotiation and member countries can easily agree to liberalise fish products, as they contribute only small portion of the regional trade. Being member of the East African Community (EAC), Uganda and Kenya enjoy access to a regional economic block of 125 million people.

Table 8: Membership in the Regional Organization of IGAD Member Countries

Country	IGAD	COMESA	EAC
Djibouti	X	X	
Ethiopia	X	X	
Kenya	X	X	X
Somalia	X		
Sudan	X	X	
South Sudan	X		
Uganda	X	X	X

2.6 Trade Policies

Some members of IGAD countries are already member of WTO (Djibouti, Kenya, an Uganda) and Ethiopia and Sudan are in the accession process. As WTO member any trade policies have to be compatible with WTO rules and regulation and abide t

commitments made under that agreed trading system. Similarly for the countries who have already applied (in the process of accession) they will also have to abide by the WTO rules, in order to be accepted as members. Thus, in general, their trade policies related to fishery products are in compliance with WTO rules in particular, with Non Tariff Barriers (NTB) to trade, such as hygiene and sanitary conditions of the Sanitary and Phyto-sanitary (SPS) and Technical Barriers to Trade (TBT) agreements etc.

In addition to active involvement in multi-lateral trade arrangement, some countries in the region are also joining the global trend in pursuing bilateral and regional free trade agreements to liberalize their economies and speed up regional trade development. This is reflected in regional effort by COMESA, EAC and SADC which has embarked upon a tripartite negotiation since 2005, to establish a comprehensive FTA in the region. The partners to the tripartite negotiations aim for strengthening and deepening economic integration of the southern and eastern Africa region. The strategy to achieve this goal can be summarised as the implementation of various initiatives aimed at harmonising policies and programmes of the three participating RECs in the areas of trade, customs and infrastructure development, and implementing these in a coordinated manner, jointly wherever possible (Erik Hempel, 2011).

The EAC member states including Uganda and Kenya have concluded a framework agreement with the EU under EPA in which the fisheries cluster has now been negotiated. Offers have been made by both parties to the agreement. The objectives of cooperation in this area are to promote sustainable exploitation of inland fisheries resources and to promote the development of aquaculture production, which in itself would go a long way in supplementing capture fisheries in the country's water bodies. With regard to inland fisheries, the provisions commit to improve access to the EU market, attract capital inflows and investment into the sector, enhance aquaculture production, remove supply side constraints and improve the quality of fish and fish products to meet sanitary and phyto-sanitary measures/standards in EU markets. Under the market access aspect of the agreement, all exports of fish and fishery products to the EU will not attract any import duty, whereas imports of similar products from countries having no preferential trade agreement with the EU would be subjected to import taxes.

As part of the government policy to develop seafood industry, Kenya for example, employs specific incentives including tax exemption on imported processing equipment and raw materials. The tuna factory, Wanainchi Marine Products Ltd in Mombasa, operates under this regime. Some of seafood factories also imports raw fish products during lean season, through the Tax Remission for Exports Office (TREO) Scheme, which aims at encouraging local manufacturers to export their products by remitting duty and VAT on raw materials, used in the manufacture of products for export.

3. RESULTS OF THE FILED SURVEY

3.1 Methodology

Compilation of findings, results and recommendations from the field surveys carried out in IGAD member countries by the national consultants has been included in this section. The methodologies used in field survey are observation and interview using structured questionnaires, which were jointly developed by international consultants, national consultants and FAO staff. Questionnaires are designed to gather information related to trade, marketing, quality assurance and training requirements from, stakeholders including producers (fishermen), middlemen, traditional and industrial fish processors, exporters, retailers, restaurants, government and private institutions and consumers.

It would be worth mentioning that the questionnaires went through several changes and formatting. The first sets of questionnaires were used in Ethiopia and Uganda, while the rest of the countries in IGAD used revised version with post harvest losses and survey among school children were included into the new version. To capture all the data and information collected in uniform format, tabulation or compilation tables were also given to national consultants. The field survey covered major landing/production centres, processing complexes, market and consumption areas. More than 2,200 respondents were selected to represent the whole spectrum of each stakeholder, but in general fishermen (producers) have more numbers than other stakeholders (see Table 9)

Table 9: Number of Respondents Interviewed in each Country

	Ethio-pia	Ugan-da	Kenya	Dji-bouti	S. Su-dan	Sudan	Soma-lia	Total
Producers	229	74	90	74	90*	32	41	
Middlemen	15	65	25	65	60**	63**	16**	
Processors	14	43	31	43		10		
Exporters	2	18		18				
Retailers	6	25	12	25	60			
Restaurants	12	24	9	24	10			
Consumers & Kids	127	77	130	77	20	104	72	
Institution	4	33	3	33	60*	86	4	
Total	**409**	**400***	**300**	**400***	**300**	**295**	**133**	**2222**

*(Includes *people contacted for obtaining primary and secondary data; **Include traders, retailers an exporters)*

Even though all necessary guidelines were given, due to different fisheries characteristic in IGAD countries, the presentation of data, information and also analysis which may va between the national reports, thus in some cases it is impossible to put the results in uniform format. Nevertheless, this report tries to compile and analyse the findings into th regional perspectives, which is presented in the following sections.

3.2 Fish Trading Practices

3.2.1 Grading Systems

The survey result shows that the grading system is commonly applied when selling fish throughout the supply chains from producer to the retailer in IGAD countries, though it generally involves a very simple grading. For the same species of fish, size, quality and origin are the most common criteria used by stakeholders interviewed with different degree in their application. Size is the most important criteria implemented by 45% of all stakeholders followed by quality/freshness (27.4%) and origin (14.1%) and 6.1% for all the criteria (size, freshness and origin). Around 7.5% said they do not employ any grading system when selling their fish in bulk which is reported in Kenya, Ethiopia and Somalia. In countries where there is a minimum size of fish allowed to be caught, like in Uganda and Kenya, size is more important for fishermen, as it will determine not only the price, but also saleability of their catches. In Somalia, for example, size is the most important criteria for fishermen. In a country where there is no such system is in place or enforced, in Ethiopia, where size is not an important criteria for fishermen while selling fish (20%) and the bulk (40%) is traded without grading.

Down the supply chains, such as middlemen and processor, the quality aspect become more important as the criteria in the grading system. Processors, particularly industrial processors like in Uganda and Kenya, place quality as the second most important criteria after size when buying and selling fish. Origin of the fish is also important in some countries, particularly at retail sector, where consumers sometime perceive that fish from certain origin has better taste or quality. Results from Kenya show that 84% of the fishermen and 87% of the traders confirmed that they undertake grading, with 33% of the traders further confirming to have used both the parameters of size and quality in grading. Traders in Somalia consider size, quality and origin as all important factors in grading.

Fish grading in Sudan is mainly based on the consumer preference of the species and freshness. Freshwater fishes include *Lates niloticus (Igil)* besides *Bagrus bayad* and *Bagrus docmac*, considered as first class species. Second class fishes is represented by tilapia spp, mainly *Oreochromis niloticus*, besides *Sarotheradon galelaeus* and to a lesser extent *Tilapia zilli*; also *Labeo spp, L.niloticus/horie* and *L. coubie*/forskalli.

Species is also an important criteria for grading fish in Somalia, where kingfish and tuna is considered to be grade A fish, while skipjack and bonito are grade B, and demersal fishes has been graded as C. Small pelagic fish is also considered as low grade fish. In Djibouti grading is also done, based on species, followed by freshness and the size.

However, as indicated in the national reports, there are no standardised sizes and quality in grading systems or regulations for fish and seafood on the domestic market in IGAD countries, making the grading fairly subjective. Grading for size is also extremely important for sustainability of the fisheries resources and should be encouraged, like the system implemented for Nile perch in the Lake of Victoria.

Table 10: Implementation of Grading System in Trading Fish (%)

Country	Size	Quality	Origin	All	No grading
Ethiopia	20	30	10		40
Producer/fishermen	19	66.7	14.3		0
Middlemen	42.6	20.2	37.2		0
Traders/Processors	42.9	14.2	42.9		0
Retailer					
Uganda	67.2	25.4	7.4		0
Producer/fishermen	42.2	46.7	11.1		0
Middlemen	57.2	40.6	2.2		0
Traders/Processors	66.7	26.7	4.6		0
Retailer					
Kenya	43	20	15		16
Producer/fishermen	23	7	0		13
Middlemen/					
Traders/Processors					
Retailer					
Somalia	92.7	0	0		7.3
Producer/fishermen	12.5	19.0	0	62.5	0
Middlemen					
Traders/Processors					
Retailer					
Sudan Producer/fishermen Middlemen Traders/	No specific grading system employed and basically based on species freshness and species: Grade I: *Lates niloticus*(Igil) besides *Bagrus spp.* Grade II: *Tilapia Spp*				
South Sudan	NA				
Djibouti Producer/fishermen Middlemen	The catch is graded first, based on species, followed by its freshness and size.				
Average	45.1	27.4	14.1	6.1	7.3

3.2.2 Payment Methods

Cash is still the most preferred mode of payment by all the stakeholders (average 69%) i all IGAD countries. However, in Ethiopia most of the fishermen, about 83%, receive the payment by credit as they are tied up with cooperatives and FPME who get their paymer after two weeks. Middlemen in Uganda, particularly those who supply fish to processor under contract system, receive the payment both by cash and also credit. Fish traders lik retailers, restaurants and even processors (traditional) mainly use cash and carry paymer method when selling their products. In Somalia, payment is also mainly done by cas (62.5%), while the remaining operates credit system.

About 60% of the fishermen in Kenya are paid in cash while 33% supply fish on cre basis. A further 10% was not accounted for and these could be fishermen supplying fi to agents to pay off for the fishing gears. In the case of traders the same percentage

50% each are paid by cash and credit. Two types of credit facilities are also being used in the market, the standard contracts and financial tie-ups. Of the 30% fishermen who supply fish on credit, 50% of them have financial tie-ups with their buyers, while only 30% of them supply fish on contract basis. Conversely of the 50% of the traders who receive fish on credit, 50% of them are on contract, while 30% of the traders have financial tie ups.

The financial tie ups fishermen have with the buyers indicate that some of them do not still own their fishing equipment. As per the survey, one to be a major agent or wholesaler must be able to have start up capital. Since up to 60% of fishermen only deal in cash and only paid once the consignment is sold off, 50% of the traders get fish on credit. Most of the traders reported that they lose money mainly during the peak season, April/May, when there is over supply of fish in the market. This especially affects many traders upstream as all the fish is not sold on arrival, by the time it is finally disposed off after 2-3 days, the quality would be much lower, hence the price also would be lower. The traders downstream also deduct their overheads, leaving a negative balance.

Meanwhile in Sudan, both producers and traders prefer to deal in cash term (73%) while only slightly over 20% receive payment by credit basis and 6.3% of the respondents receive payment both by cash and also credit. Similarly in Djibouti fishermen and traders prefer to settle their trading by cash. If there is any credit, payment has to be made within two days maximum.

Table 11:Payment Method when Selling Fish

Country	Cash	Credit	Cash & credit
Ethiopia Producer/fishermen	13	83	4
Middlemen	100	0	0
Traders/Processors	100	0	0
Retailers	100	0	0
Restaurants	100	0	0
Uganda Producer/fishermen	51.3	17.7	31
Middlemen	38.9	5.5	55.6
Traders/Processors	88.3	2.9	8.8
Retailers	86.7	0	13.3
Restaurants	62.0	12	26
Kenya Producer/fishermen	60	30	
Middlemen Traders/Processors Retailer Restaurants	50	50	0

Sudan Producer/fishermen Middlemen Traders/Processors Retailer Restaurants	73.0	20.7	6.3
Somalia Producer/fishermen Middlemen Restaurants	62.5	37.5	0
Diibouti Producer/fishermen Middlemen	**Mainly by cash (no percentage available).**		
South Sudan Producer/fishermen Middlemen	50	50	0
Average	**69.0**	**20.6**	**28.4**

3.2.3 Price Setting

Fish price fluctuates depending on supply-demand situation, operational costs (e.g. fuel price) and also currency exchange rate of the country, if the fish is meant for export. Therefore, open negotiation is a common practice used by stakeholders along the supply chain. Fishermen, in setting the price of their catch use mainly open negotiation, like wise for retailers and also processors. Based on the survey conducted in Ethiopia, 91% fishermen said they use open negotiation when setting price, followed by Somalia (73.2%), Uganda (58%) and Kenya (40%). In Sudan both fishermen and traders use open negotiation (62%) in their business dealing. In Kenya, higher percentage of traders (77%) use open negotiation. While exporters mainly use fixed price, based on prior agreement with their overseas buyers, where price is set for a period of time to have certain degree of certainty and avoid losses due to price fluctuation. Like in Kenya, the agents of the processing and marketing chain follow prefixed prices set by the processing plants; they could then vary this at the beach level. At the time of the survey there was a stand off between the fishermen and the factory agents, due to the low pricing at KES 160, while the factories were paying KES 180-200 to the agents.

For middlemen, retailer and processors, buyer's position in setting the price level is very dominant, while restaurants are normally price setter, except in Uganda where open negotiation is the main method for setting the price. In Somalia majority of the traders (50%) use fixed price setting based on prior agreement, while around 43% of the respondents use open negotiation.

In Somalia the position of Yemeni fish traders is very strong in setting the price level Lack of coordination among the Somalia fishermen has given the Yemeni fish buyers an opportunity to form cartels that set fish price at will, often in their favour, knowing very wel

that the Somalians will accept whatever price they are offered, as they cannot keep the perishable commodity, fish for more than a few days. The Somalian operators see this as exploitative tactics, but they cannot do anything as they have no alternative markets, or cold storages with the required infrastructure to preserve their catch for long, to bargain.

Table 12: Price Setting at Different Stakeholders

Country	Open Negotiation	Fixed based on Agreement	Decided by Buyers	Decided by Seller	Others
Ethiopia					
Producer/fishermen	91	9	0	0	0
Middlemen	5	78	0	16	0
Individual processors	12	21	67	0	0
Traders/processors	9	91	0	0	0
Exporters	0	0	0	100	0
Retailers					
Restaurants					
Uganda					
Producer/fishermen	57.9	2.6	22.4	17.1	0
Middlemen	33.3	11.1	50	0	5.6
Traders/Processors	0	75.7	24.3	0	0
Industrial processors	53.5	18.4	28.1	0	0
Exporters	0	88.3	11.7	0	0
Retailers	60.1	3.1	23.6	13.2	0
Restaurants	58.5	10.7	2.8	27.9	0
Kenya					
Producer/fishermen	40	7.5	49	2.5	1.3
Middlemen/ Traders/Processors	77	13	7	0	0
Sudan					
Producer/fishermen Middlemen/ Traders/Processors	62	16	11.1	1.6	6.3
South Sudan					
Producer/fishermen Middlemen/ Traders/Processors					
Somalia					
Producer/fishermen	73.2	14.6	4.9	0	7.3
Middlemen/ Traders/Processors					
Average	**43.8**	**50.0**	**0**	**0**	**6.2**

3.2.4 Illegal Trade Practices

The survey within IGAD member countries, revealed the main reason for illegal trade practices or cross border trade is that there is better demand and or better price offered by the neighbouring markets. Most of the respondents interviewed, whether producers, middlemen, traders and retailers, said that cross border markets offer better opportunities in terms of demand and price. The other reason for illegal cross border trade is to avoid government tax and red tapism such as quality certification, license requirement etc. Only small percentage of the respondents gave reasons like no demand in local market for particular fish and products. It is interesting to note that, generally traders have limited tie-up arrangement with their cross border buyers.

In Ethiopia, all the trade carried out by unlicensed fishermen or non members of fishermen cooperatives is considered illegal. However, there are traders who organise their own fishermen, landing sites and marketing channels and sell their fish to hotels and restaurants in major cities.

Like in Uganda, the proximity of the markets in the neighbouring country, especially in the case of shared water bodies like Lake Victoria, Albert and Edward, is also another reason for cross border trade. Fishermen think it is much easier to transact cross border trade as the trader makes savings on transportation cost (fuel) which is a major factor in pricing. Additionally, the trade has a multiplier effect when they bring back other commodities, mainly consumer needs and fuel to be sold to their home countries. Most of the respondents in Uganda do not consider their cross border trade as illegal and gave a number of reasons why this trade flourishes, such as:

- Most of the fish traded is juvenile and therefore cannot be traded through the official channels and borders.
- The taxes that are levied are many and most importantly they are too high, hence the option is to evade taxes.
- The distances between the certifying offices and trade routes as well as markets are generally far apart and this prompts traders to elude the official crossing points.
- The porous nature of border points with limited physical barriers provides a sanctuary for illegal trade to cross the border.

Surprisingly in Kenya, most respondents did not seem to be aware of any other illegal trade practice other than dealing in under sized fish and berried fish. They were aware of the regulations guiding these measures. Up to 30% of the respondents from the production sector felt that the government should undertake monitoring, control and surveillance, while 15% of them felt that there was need to provide incentives such as better facilities and infrastructure at beaches for legally operating fishermen. Most of the traders interestingly dealt in undersized fish but were aware of the consequences of being caught. From time to time they rejected the under size fish but the rejection was only prevalent during the peak season.

Illegal trading across the border from Sudan to neighbouring IGAD countries is unknown except for insignificant cases for fishery products being sent to Egypt (wet salted fish) and

Saudi Arabia (shrimp and high value marine fin fish). The main reasons are reported to be ready demand and higher price offered in these markets.

In Somalia, due to the weak law enforcement in the fishing activities on its waters there are quite rampant cases of cross border (legal or illegal) trading with its neighbours, particularly with Yemen. As mentioned before, there are many fishing boats from Yemen operating in the Somalia waters. The operators of the Yemeni boats are mostly Somalia traders, who in the past operated boats through direct hire and/or on profit sharing basis with the Yemeni owners. They now own more than half of the estimated 120 boats that shuttle between Somalia and Yemeni waters during the fishing season, ferrying fresh fish on ice. However, they opted to register their boats in Yemen in order to get access to that country's seafood market, where there is a high demand for fish. The establishment of several fish canning factories in Mukalla (Yemen) and partly by the reshipment of king fish and demersal fishes to Saudi Arabia also increased demand.

Operators interviewed said that there has been an increase in number of the boats, which competes among themselves to flood the market with fish, without taking consideration of the prevailing demand in Yemeni market, thus pushing down fish price. There is another group of Yemeni boats that do not buy fish from the local fishermen but carry out fishing on their own, as they bring with them Yemeni fishermen who seem to be more skilled than their Somalia counterparts. These boats hire the services of local sponsors who get between 500 and US$ 1,000 from each boat as facilitation (protection) fee, while they are in the Puntland waters fishing for groupers, snappers, emperors and other demersal fishes. Although these Yemeni fishermen employ hook and line fishing method which is very selective, they nevertheless use larger and more powerful boats as well as GPS technology that enable them to fish continuously at offshore reefs that are beyond the reach of the locals.

Table 13 below gives full results of reasons given by traders in each country for conducting cross border trade.

Table 13: Reasons given by Stakeholders for Cross Border Trade

Country	Better price/ demand	Avoid taxes/ red tapes	No demand in local	Practical reason	Tie up with buyers	Others
Ethiopia Producer/ fishermen	67	33	0	0	0	0
Middlemen Traders/	72	28	0	0	0	0
Uganda Producer/ fishermen	73	22	2	0	0	3
Middlemen Traders/	78	19	0	0	0	3
Processors Indust. processors	71	21	0	6		2
Exporters	83	13	0	2	2	1
Retailers	72	22	0	1	5	0
	81	14	1	3	0	0
Somalia Producer/ fishermen	0	0	0	100	0	0
Middlemen Traders/	NA	NA	NA	NA	NA	NA
Sudan Producer/ fishermen	Better price and demand as indicated in the national report					
South Sudan Producer/ fishermen						
Middlemen Traders/						
Kenya	Not available					
Djibouti Producer/ fishermen Middlemen	No or very limited illegal practices as there is no tax as indicated in the country report					

3.3 Fish Handling and Transportation

3.3.1 Usage of Ice by the Stakeholders

When talking about the usage of ice by the stakeholders in the IGAD countries, as with all other aspects of fishing, it is necessary to make a distinction between products for the local market and those for export market particularly to the EU.

In the case of fish products intended for the EU market, the procedures for fish handling, transportation and processing are well established and constantly improved and ensured

adequate use of ice. Sometimes there are some minor problems with the techniques and standards of the fishing/ handling practices used by individual boats. It is common practice of the processing plants, to have their own boats with ice for the collection and transportation of fish to their plants.

However, the situation of fish products for the local market is quite different. The cold chain from fishing to sales is often incomplete, both for freshwater and marine fisheries, ice is not available very often. Lack of clean water, ice and insulated vehicles/covered structures; all contribute to poor handling and transportation of fish in IGAD countries.

As regard transportation of raw material, especially from local landing sites, the use of non-insulated and uncovered vehicles are very common. These are often pick-up van/trucks that are also being used for transporting live animals and a wide variety of other materials. As these vehicles are hardly ever cleaned, chances of cross-contamination are very high, and also due to live poultry transport, *salmonella* can also create severe quality problems.

In IGAD countries plenty of fish is sold in dried or salted form. The major health risk for these types of products comes from environmental contamination such as bacteria, insect infestation etc. As a result of handling these products in the open air, often under a blazing sun, there is also some risk of deterioration of the original product like rancidity.

The assessment with regard to transport of fish showed surprising difference between the various IGAD countries. Ethiopia, for example, proved to be particularly deficient with regard to the quality and cleanliness of the product in the transportation phase, while the questionnaires from Uganda showed a more careful attention to hygiene in this phase, with a good level of understanding of the right quantities of ice required for preservation and transportation. in Somalia the producers interviewed declared that they understood the importance of using ice in the transportation phase, although only a low percentage of them around, 10% used it on a regular basis, due to high cost of ice. However in the case of non availability of ice, most of them tried to effect transportation as quickly as possible, in order to reduce the post-harvest losses. Along the entire Somalian coast there are only three transport companies and seven ice plants producing a total of 820 MT of ice a year. In Sudan the use of ice is very rare. This is especially true for Nile River fishing, where there is only small scale local fishing. On the Red Sea coast ice is used only by a few number of producers.

In Djibouti there are three landing sites that are within one hour reach of the capital city and nobody uses ice for transport or selling fish products, despite high temperatures during most of the year, hence the quality of fish in the local market is low.

In Kenya only one of the 331 beaches surveyed are using ice. Furthermore, only seven percent of the producers declared that they gained any economic advantage from the use of ice.

The survey on the use of ice in the transportation phase showed that the industrial/ commercial processors of products for export in Kenya and Uganda are aware of the importance on the use of ice for preventing post-harvest losses. In fact they often provide ice for those working in the earlier phases of catching and cleaning the fish. Instead the traditional processors, for example, in Sudan and Ethiopia, are largely unaware of the importance on the use of ice during transportation and sale.

3.3.2 Transportation and Costs Involved in Bringing Fish to Buyer or Market.

As mentioned above, the use of ice in IGAD countries during the transportation of fish is generally very low and in the majority of cases it is completely absent.

It is difficult to give a cost for the use of ice as most producers receive ice directly from the processing plants that they are contracted to supply fish. This is the established practice around Lake Victoria for the export trade of Nile Perch.

In general, small scale producers in IGAD countries declared that ice was not easily available and was too expensive. Somalia was an exception as a large number of producers said the price of ice was acceptable. They also stated that they got a better price for fish kept on ice. This could be explained by the willingness of buyers in the Arabian Peninsula to pay premium prices for fresh fish in good condition.

3.4 Stakeholder Analysis

As in other countries, where fish marketing is carried out on a traditional method, middlemen that include agent, trader, retailer and transporter, play an important role in bringing catches from fishermen to the market or for further processing. Middlemen can be grouped into four different categories namely:

a. The local traders/processors who sell their fish in local markets and in most cases more than a kilometre away from the beaches;

b. The long-distance traders who sell to distant markets/towns away from the beaches;

c. The regional traders/processors who sell to markets within the region such as Kenya, DRC and Rwanda and South Sudan, Somalia, Yemen and other Middle East markets.

d. The factory agents who buy fishes for processing plants.

Nevertheless there is a great variety among IGAD countries, fish species and markets as well as the degree of involvement of government institution in fishery trade. For exported fishery products like Nile perch, agents and industrial processors seem to be controlling the marketing chain and trading. In Uganda, fish traders who are considered as the wealthier group within the marketing chain buy fish at relatively lower prices. Currently, (2012) they purchase at an average of UG.SHS 7,000 per kg (approx. US$3) and sell to factories at an average price of UG.SHS 8,000 per kg, profiting an average UG.SHS.1,000 per kg. In the case fish products traded for regional markets, agent plays crucial role in bringing fish and crossing the borders. The agents, mainly men, are those who buy and transport the processed fish to major local markets and also to regional markets like DR Congo, South Sudan and Rwanda. Major fish species include *mukene*, smoked and salted Nile tilapia and second grade Nile perch.

In IGAD member States fish mongers are mainly women- Photo by: Yvette Dieiouadi

In Ethiopia fishermen cooperatives play major role in the fish marketing system and few of them have full control on the overall supply chain of fish harvested from certain lakes. Organisations like Fishermen Cooperatives in Hawassa Lake, bars FPME from operating in the area and it is almost in control of the fish harvest, distribution and sale of the fish from the lake. Fishermen Cooperatives are exempted from paying taxes and they have all the access to government assistance. Meanwhile the state owned company, Fish Processing and Marketing Enterprises (FPME), used to have monopoly in buying, processing and marketing of fish, harvested from lakes in and around the country. Currently there are a growing number of private entities involved in fish business.

Due to lack of intervention from the government and government sponsored co-operatives, which fell into disfavour in the late 80s, a large number of traders and retail shops entered the fish trade in Somalia. Since then, fish traders have largely driven the lobster industry, buying lobsters from fishers, trailing and packing them individually and storing them in freezer trucks that are stationed at fishing centres along the east coast. Currently fish traders, local and Yemeni traders seem to be the most influential actors along the value chain, particularly for high value fish for exports, like lobster, king fish, demersal fishes and shark fin. Fishermen sell their catches as per different types of fish, to the traders or agents without grading, as they do not have adequate knowledge in fish handling. Traders in Mogadishu and Berbera have small depots alongside docks or harbours where products are sorted and cleaned.

Women fish mongers at the market – a usual sight in IGAD countries
Photo by : Yvette Dieiouadi

Like in other IGAD countries, fish mongers in Somalia are mainly women and single mothers from local communities who earn their living from selling fish, mostly in big cities like Mogadishu, Kismayo and Bosaso. Members of this group are the poorest, among the actors in the chain. They buy fish from the fishermen at the landing beach and then sell it as either fresh or dried to the public, at a small profit to support their families.

Within the fish production, marketing and trade chain, particularly around Lake Victoria, there are several chain actors and the key players involved which include:-

- BMUs which issue fish movement permits;
- Local fish inspectors who certify and issue fish health certificates
- Fisheries departments which issue trade license, inspect and certify fish handling area, transport means (boats and vehicles) and certify fish by issuance of fish sanitary certificates.
- In addition, there is public health department which checks personal hygiene and issue medical examination for attestation of health status of fish handlers. Furthermore, for exports, there is Export Promotion Boards which issue export permits.

- There are also fish traders associations and cooperatives at both industrial and artisanal levels that coordinate activities of fish trade and marketing.

3.4.1 Dependency to each Other and their Relationship

As in other parts of the world, in IGAD countries also fisheries stakeholders have strong linkage, especially between fishermen (producers) and their buyers (traders) and also between fish suppliers (agent) and processors. The dependency is mainly in financial terms, but there is also a social aspect involved. In Kenya the financial dependency through the value chain is remarkable. The Nile perch value chain in Kenya is one of the best examples to be cited for dependency in the fisheries sector. The fish processing factories give the agents trucks with insulated containers containing ice up to 7 MT and a driver. They are also given money to purchase the fish and the minimum given out per factory, per day, is estimated to be around US$ 25, 000. Most fishermen supply fish to specific agents either because they have been provided with fishing gears or they have a MOU. Fishermen are also paid up-front; therefore a factory must be highly liquid to venture into this trade. Efforts have been made to get fishermen to associate for common disposal of their products so that this dependency on daily payments is reduced. Not much result commensurate with the effort has been achieved.

In Somalia it is a common practice that fish traders provide financial assistance to fishermen for mutual benefits, as fishermen usually have limited access to loan from commercial banks, while fish traders need fish supply. These traders also sell fishing gear and other inputs and thus provide necessary supply of goods, which are otherwise unavailable in the villages. In most cases, fishermen obtain the inputs they need for their fishing operations from the traders on credit basis, with the tacit agreement that they will exclusively sell their catches to the concerned traders. Local fishermen also have financial arrangement with fishermen from Yemen to get better market access to Middle East markets.

In Sudan, some fishers have special contracts with wholesale traders or companies, who have the transport facilities (mainly insulated trucks, or trucks carrying large insulated fibre containers with ice). In remote fishing areas on the shores of reservoirs and lakes (e.g. Damazine) fish is carried by fishmongers, using motorcycles or bicycles to the nearby local markets of larger villages or the small towns in the state.

In Uganda traders are a major source of credit to fishermen, who may not have adequate capital to develop and maintain their operations. The obligation to sell their catches to certain traders however, is minimal, as fishermen are migratory, thus it works only during the peak harvest seasons. However, if fishermen get loan from boat owners, then they need to sell their catches to the boat owners, who need to recover their money, thus it obviously restricts the freedom of fishers to sell to any buyer offering a better price.

In Ethiopia, fishermen cooperatives around the lakes with strong support from the government play important role in providing assistance to their members for fishing operation and marketing their catches. A cooperative in Hawassa Lake even carry out market intervention by directly involving in processing and selling fish caught by fishermen from the lakes. With increasing number of private entities, fishermen who are not members of cooperatives also have alternative access to the market by selling their products to them. In other lakes however, the FPME plays major role in fish marketing in the country, as it has

the capacity and facilities to buy, process, distribute and sell fish, harvested by fishermen from major lakes, except from Hawassa Lake.

Nevertheless, the dependency among stakeholders will be more transparent and balanced with the establishment of fishermen cooperatives, BMU, fish traders associations, processors and exporters associations, which are now common trends in some IGAD countries. With the availability of micro credit, accessible to small scale fishermen, fish traders and fish processors, the patron-client type of relationship between stakeholders will be minimal. Like in Uganda, following the formation of fish trader's cooperatives, BUFA, members can now access loan facilities at 2.5% interest per calendar month and this has boosted their business. The interest is much lower than the one charged by money lenders, which is as high as 10% on daily basis. The establishment of fish traders associations notably, Uganda Fish Processors and Exporters Association (UFPEA), also give its members, advocacy on issues of fish processing and trade. The Department of Fisheries Resources, Uganda has been working closely with the association, especially on issues of sustainability of the resource and fish exports. However, there is still a lot of work to be done to strengthen the associations and cooperatives, particularly small associations for certain fish species, to enable them function efficiently and effectively to help their members.

3.5 Access to Marketing Information

In general stakeholders in IGAD countries, from fishermen to retailers have a common complaint; there is limited access to fish marketing information. Fortunately, with the wide spread usage of mobile phone, fishermen and small scale traders and processors nowadays can get access to market information from their contacts such as buyers, traders and other sources. Though it is an encouraging development, this type of information dissemination (through buyers or traders) is not very transparent and can lead to biased or inaccurate information that will benefit only certain players in the value chain. Industrial processors and exporters have better access via internet or other means to get up to date market information. Nevertheless, the fact remains that mobile phone is the most common method of getting market information for all stakeholders, particularly fishermen and small traders.

Government in IGAD countries have established different types of market information system, but mainly focusing on agriculture products while limited attention is given for fish and fishery products. In Ethiopia, for example, there is a regular broadcast on price information on crops and coffee, aired through national radio channel, but no fish price information is covered in the programme. In Uganda, however, FIT Uganda establishes Info-trade which covers also price information on Nile perch and tilapia, accessible on subscription basis, which is too expensive for small scale fishermen and fish traders.

In Kenya information on the fish quantities landed per beach and value per kilogram for the key fish species is easily provided through Electronics Fish Marketing Information System (EFMIS) now. The system disseminates key fish market information from about 150 fish landing sites and markets. The database of market information is updated on a daily basis, with information on quantities and prices of fish around the country. EFMIS releases market information principally on demand by SMS sent to a special code 556 and also disseminates synthesised market information through various media, including radio and internet. EFMIS monthly Market Bulletin is the summarised price information

of Lake Victoria fisheries, distributed free by e-mail to over 1,000 stakeholders across the world. Survey results show that 29% of the fishermen and 60% of the traders access market information. Unfortunately, market information for most of fishermen does not come from the EFMIS system but from agents, who set the prices.

Similarly in Sudan 100% of respondents interviewed said that they receive market information from fish dealers/traders. Considering the scenario in IGAD countries, it would be ideal to develop regional fish marketing information system, using both SMS and internet based systems, which could be easily accessible to all stakeholders. The cheapest and easiest way to establish the system is to expand the existing systems like Info-trade (FIT Uganda) and EFMIS Kenya, into a regional system. The detailed proposal for establishing Fish Marketing Information Network (FMIN) as one of the output expected from the project has been submitted by the International Marketing Consultant. There are some options that IGAD countries can choose, to set up FMIS in the region namely: set up entirely new network as part of the global Fish Info Network (FIN), join the existing FIN in the region, such as INFOSA and INFOPECHE; establish joint network with INFOFISH; and expand the existing country's market information system into the regional system.

Table 14: Existing Fish Marketing Information System in IGAD countries

Country	Existing Market Information providers	Type of Services	Accessibility for Fishery Stakeholders
Ethiopia	National radio	Prices on agriculture crops and coffee	No fish information provided. Information such as price obtained through personal contacts (mobile phone)
Kenya	The Kenya Marine and Fisheries Research Institute (KMFRI) in partnership with Beach Management Units of Lake Victoria and based at KMFRI Research Centre in Kisumu manages EFMIS	The fish market information service package disseminates key fish market information from about 150 fish landing sites and markets. The database of market information is updated on a daily basis, with information on quantities and prices of fish around the country.	EFMIS releases market information, principally on demand by SMS, sent to a special code 5565 and also disseminates synthesized market information through various media, including radio and the internet. Most of the respondents were not aware of the EFMIS system
Somalia	NA	NA	NA
S. Sudan	NA	NA	NA
Sudan	Informal (traders) using mobile phone	-	Fishermen get price information from their buyers

Uganda	Uganda National Bureau of Statistics (UBoS). FIT Uganda Ltd (Info-trade)	Monthly market prices of food commodities in selected markets *AGMIS* (Agricultural Market information System) was built in 2011 providing an online platform that allows users access up-to-date and historical market information collected from within Uganda. SMS dissemination method is planned. Information provided includes prices, fuel, organic prices, contacts of buyers and sellers. The system covers only fish like Nile perch and Tilapia.	No fish price information Market information through Info-trade can be received on all mobile networks in Uganda, and also accessed via the internet at a subscription fee. Access to information is limited since they cannot meet the cost of subscription of already existing private market information systems. The use of mobile phones is the common.
Djibouti	NA	NA	NA

3.6 Product Forms

The main species harvested in IGAD countries, are Nile perch, tilapia, catfish, carps and small freshwater pelagic species like *mukene* are processed and sold in the following forms, fresh (whole round and gutted), chilled, frozen, dried/salted and smoked products. Nile perch has more variety of product forms than other species, as it is sold in the local, regional and international markets. In international markets, Nile perch is exported in chilled and frozen gutted, fillet, portion and steak forms, while by-products like head, frame and skin are dried, salted or smoked and sold to the local and regional markets.

Tilapia is mainly sold as fresh in local markets, but there is also significant amount of frozen fillet sold in the local market like in Ethiopia. For regional markets tilapia is sold in fresh, dried and smoked forms, mainly though cross border trade. Catfish and carps are mainly sold fresh in the local market, but large size of African catfish caught from the lake in Ethiopia, for example, is sold as frozen fillet form in the domestic market.

Mukene, harvested mainly in Uganda and Kenya, is sold in dried and salted form; marketed to both the local and regional markets. Some are smoked and deep fried as well as grounded (powdered). Marine fish and shellfish are mainly sold as whole fresh form in the domestic market and regional market. For exported products, marine fish are sold fresh, frozen and even live like live lobster from Kenya and Somalia. Some high value marine fishes from Somalia are chilled and transported to neighbouring Yemen and Saudi Arabia by boat.

In Sudan, the major portion of fish catches, (more than 70%), both freshwater and marine is marketed as fresh and chilled with ice. First grade fish *Lates niloticus* and *Bagrus Spp (bayad and docmac)* are mostly filleted. Third grade fish like cat fish is often sun dried (kajeek). Marine commercial fishes are also basically marketed as fresh (*Plectropomus spp, Lethrinus spp, Lutijanus spp*) and only smaller quantity as wet salted fish (*Arabi*). Table 15 indicate product forms for different species as adopted from the national reports.

Table 15: Product Forms of Major Species for International, Regional and Domestic Markets

Fish Species	Products for International Export Markets		Products for Regional and Domestic Markets	
Nile perch	Chilled • Skinless Fillets; • Skin on fillets; • Loins; • Portions; • Steaks;	Frozen products • Headless and gutted; • Fillets; • Whole gutted	Fresh Products • Frozen second grade fillets; • Fresh Nile perch chunks;	Cured products • Salted & sundried Nile perch fish frames & Heads; • Salted and Sundried Nile perch skins; • Smoked Nile perch fish frames & Heads; • Smoked Juvenile Nile perch; • Nile perch Fish oil; • Deep fried Nile perch fish; • Sundried Nile perch sheets;
Tilapia	• Fillets • Whole and gutted	• Whole fish	• Fresh Tilapia	• Salted and sundried; • Smoked Tilapia; • Deep fried Tilapia;
Catfish	• None	• Fillet	• Fresh, whole, gutted	• Smoked • Salted and sun dried
Carps	• None	• None	• Fresh	• Dried
Marine fish/ shellfish lobster	• Whole, gutted • Live (lobster)	• Whole, gutted, fillet • Tails (lobster)	• Live, fresh, Frozen	• Dried, salted
Mukene (Omena)	None	None	None	• Sundried mukene; • Deep fried mukene • Salted and deep fried; • Smoked mukene; • Grounded/powdered mukene

3.7 Marketing Chain of Major Species

As could be seen in Figure 3, the four main fish species harvested in IGAD countries are Nile perch, tilapia, catfish and *mukene*. Therefore, discussion on the marketing chain is focusing on these species based on the descriptions reported in the country reports.

3.7.1 Nile Perch

Majority of Nile perch landed is from Uganda and Kenyan side of Lake Victoria and lesser quantity from Ethiopia and Sudan. Nile perch from Uganda and Kenya are mainly destined for exports, while the fish caught in other countries are consumed locally. The fish is normally caught using either gillnets or long lines, which are set in deep waters during sunset to dawn. In Uganda and Kenya, Nile perch fishermen sell their catch to middlemen operating within the lake or on islands or brings their catches to the mainland where fish is sold to retailers or middlemen/factory agents. Middlemen using insulated fish transport boats with ice, sell their fish directly to industrial processors or to their agents at landing sites. The industrial processors produce chilled and frozen fillets, steak and portion of Nile perch and export the products to the international markets. The main market for Nile perch is Europe, but significant quantity is also exported to other markets such as Japan, USA, Israel and Middle East. Based on the report from Kenya, export market absorbs around 50% of the production while the domestic market takes the rest. All by-products from the Nile perch industry is sold locally, except the fish bladder (fish maws), which is exported to Far East markets.

The low quality or under sized Nile perch is usually rejected at the landing sites or factories and are sold to retailers for the domestic marketing. It is also sold to artisanal processors who process it into traditional products for the local and regional markets. The by-products from factories are also bought mainly by artisanal processors targeting the regional market and some of it is sold in fresh form in the local market.

In Ethiopia Nile perch is harvested from the two lakes at ArbaMinch (Chamo and Ababya) and Lake Turkana as well as from the Blue Nile, the rivers in Gambela and Benshangul Gumuz. Fishermen land fish on bare ground, slaughtered there and transported in public transport to the nearest trader or retailer who may not have cold chain facilities. As Nile perch are harvested far remote from the market, products are packed in plastic bags, frozen overnight, put into sacs, and transported in insulated vehicles, and sent to star hotels in Addis Ababa. Reportedly, fish is also sent illegally to Kenya and Uganda from Lake Turkana.

3.7.2 Tilapia

Tilapia is the most consumed and dearer fish in IGAD countries, mainly harvested from the water bodies within the countries. There is no export of tilapia reported from IGAD countries to the international market, but significant quantity is traded within the region through cross border trade. Tilapia is harvested from the lakes and also produced through aquaculture. If it is wild tilapia, the fish is caught using gill nets and the fishing operations in most cases are similar to that of Nile perch except that is found in shallow waters. In Uganda, fishermen normally sell their catch to middlemen or to retailers at the landing sites. The retailers transport the fish using bicycles/motorcycles or pickup vans to urban centres mainly where it is sold in local markets. A limited quantity of tilapia is processed into smoked/sundried salted products and is sold in the local or regional markets. Similarly, limited quantity of fresh tilapia is also sold in the regional markets, mainly to Kenya, Rwanda and South Sudan.

In Ethiopia, fishermen sell their catch to cooperatives and FPME, which processes the fish into fillet, packed and sold in frozen form through FMPE's outlets, retailers and to catering (hotel and restaurants) sector in major cities. Dried tilapia is also exported from Lake Tana to Sudan. Currently at Hawassa, all the stakeholders are involved in capture and maketing of tilapia. These integrated activities are also conducted at the Amora Guedel landing site, where the consumer comes to buy fish not by weight, but by head count and then pay extra to fillet it.

In Kenya tilapia remains as the main fish consumed, either in fresh or as dried form. Unlike in Ethiopia, tilapia is mainly sold as whole round form. Due to the low yield of fillets which is at about 30%, making the filet is extremely expensive and it is sold in major cities across the country. However the biggest challenge faced by the traders is the lack of cold chain facilities and therefore traders depend on ice bought from the Nile perch value chain. Lack of insulated containers to transport the fish has also been a bottleneck, with most of the traders relying on open trucks and buses to transport the fish overnight. The dried and smoked tilapia from Lake Turkana, bordering with Ethiopia, finds its way through Lodwar to Nairobi and other cities. A good percentage of the dried tilapia is also transported in Busia market for export in the region.

3.7.3 Mukene

Mukene (Uganda) or *Omena* (Kenya) is mainly harvested from the Lake Victoria. *Mukene* fishing is carried out at night using light attraction. Floating paraffin pressure lamps are used to attract and congregate the fish which are then scooped from the water using scoop-nets or lampara nets. In Kenya, *Omena* fishing is mainly carried out by men using boat seine. Though some women, less than 5%, also own fishing crafts and gears but it is still men who venture into the lake to carry out actual fishing activity. When landed, the fish is sold to artisanal processors, who are mainly women, process it into sun-dried product. Depending on the target market, sun-drying fish which is done by spreading it on the ground, on mats/ tarpaulins or on raised racks. The practice of spreading on bare ground is deliberate to gain extra weight, but it usually results in poor quality end product, with a lot of sand and other foreign materials, including stones and animal droppings. Such product is usually sold to fish meal industry. In Uganda, the main customers for *Mukene* are feed producers and to a lesser extent domestic consumers.

Mukene dried on racks fetches a higher price – Photo by: Yvette Dieiouadi

Mukene dried on mats and racks for human consumption fetches a higher price, than that is dried on the bare ground. The sun dried *Mukene* of varying sizes is packed in tins or sacks depending on the quantity that is required by the buyer. A large quantity of *Mukene* is sold in the regional markets mainly Rwanda, South Sudan and DR Congo. Recently some individuals and women groups have started packing sundried, salted, deep-fried and powdered *Mukene*, for sale in shops and supermarkets.

As in Uganda, some of the low quality *Omena* also goes to animal feed marketing channel in Kenya. This marketing channel goes through small scale milling (posho mills) by individual farmers to produce compounded feeds for poultry, dairy and fish. *Omena* products meant for human consumption are sold in estate markets, municipal or county markets and can also be purchased at the beaches directly from small scale processors or traders. Kenya also imports dried *Mukene* from Uganda and Tanzania for human consumption. Imported products are partly sold in the domestic markets and some are reprocessed and re-exported to neighbouring countries. Exported products are high quality and integrity with better packaging and labelling.

3.7.4 Catfish

In Uganda, the wild catfish is mainly found in three major water bodies but the highest quantity is recorded from Lake Albert while in Ethiopia it is mainly caught in Lake Tina. Catfish is caught mainly using long lines (Hooks) and when the catch is landed, most of it is gutted, salted and sundried. Limited quantities are also smoked while others are sold as fresh to traders, who take it to nearby rural domestic markets. Generally catfish is consumed in domestic markets with in Uganda, especially in the northern and eastern parts of the country.

Large size catfish is usually not preferred by Ethiopians, who consider its appearance as not appealing and it is not normally brought to market as a whole fish. Therefore once it is landed, the fish is filleted, packed in plastic bags and sold in major cities. To give better perception to consumers, Bahir Dar fishermen changed its name to *Kay Assa*, meaning "red fish" as the flesh of it appears to be red in colour. This has added considerable value to the fish and today, it is consumed widely. Catfish is sometimes cooked mixing with tilapia in restaurant to maximise the profit margins, who claim to sell tilapia dishes.

In Sudan and South Sudan harvested catfish are consumed as fresh form locally and some are traditionally processed into dried and smoked products. These processed products are marketed to major cities far from the production areas. Some products from South Sudan also find their way to Sudan through cross border trade.

3.7.5 Marine Finfish

In order to give an overview on the marketing chain of marine finfish, seafood industry in Somalia is often taken as an example, since the country is the main producer of marine products in the region. The fin fish fishery in the country is multi species that targets both large pelagic and demersal fish. Drift netting, trawling, hand lines are the main methods employed in this fishery. Drift nets and trawl nets are used to harvest large pelagic species, while hand lines are used for the demersal fishes. Fishermen using drift nets set off in the afternoon, leave it for the whole night and come back in the following morning. Catches are sorted out at sea and only target (accepted) species are taken to the boats for sale, while the rest are discarded, especially in areas where there are no local buyers.

Prior to the fall of the Government in 1991, in Somalia all the fish catch had been marketed domestically as the Government made little effort to export except small shipments of lobster to Europe particularly to Italy and Shark fin to the Far East markets. By law, all fishermen were required to sell their catch through fishing cooperatives to fish processing factories and/or designated fish retail outlets, which in turn sell the fish to consumers. The marketing chain was therefore short but well-structured, comprising five stakeholders namely, producers, middlemen, wholesalers, retailers and consumers. However, this marketing channel ceased to function due to collapse of the government and subsequent disintegration of the fishing cooperatives and looting of the country's fishery infrastructure, including cold storages, ice plants and refrigerated trucks.

Nowadays fresh fish is sold either directly on the beach when the boats return from their fishing trips or in markets situated in the vicinity of the fish landing sites. Fishermen operating off the coast around Mogadishu bring approximately 2 MT of fresh fish daily to

the auction hall for sale at Mogadishu and Xamarwayne fish markets. Fish mongers buy fish from fishermen at the landing beach and then sell it as either fresh or dried form to local consumers. They also act as agents for other women fish sellers and restaurant owners, who give them a small commission for every consignment of fish they deliver.

Fishermen who have tie-up arrangement with traders sell their catches to the traders or agents normally without grading. The traders/agents transport the fish to their facilities where they are cleaned and graded in three to four grades, based on size, quality and defects. Traders often deal with single or few types of fish, unlike fish mongers, who deal with the complete range of fish from the fishermen.

Traders in Mogadishu and Berbera have small collection depots alongside of docks or harbours where products are sorted and cleaned. Many traders sell the fish to few exporters, who are based in big cities such as Berbera, Bosaso and Mogadishu. The exporter is the price setter; on a daily basis, the prices move downwards from the exporter to the supplier, to the agent and then to the fishermen. The level of transparency is very low between each of these groups. Even traders are unaware of the selling price of exporters. Nevertheless, exporters receive prices from their buyers in the importing countries.

In Puntland, one of the main marine fish production centre in Somalia, domestic fish marketing is not well established and as a result there are generally no intermediary players between the producers and consumers operating in the chain. Even in Bosaso which has the biggest landing site, bulk of the fish landed is sold directly to the general public at the landing site, without the involvement of any intermediaries. Even though there is a group of women fishmongers, who act as middlemen at the landing site, most fish buyers prefer dealing directly with the fishermen, mainly due to quality concerns. Because of this, less than 10% of the fish landed goes through fish mongers. Elsewhere along the coastline in Puntland, fish landed for domestic consumption is rarely sold, but distributed among the villagers who happened to be at the beach at the time of landing especially when there are no outside buyers. Any surplus of fish like tuna and king fish is smoked and later sold in Bosaso or exported to Yemen.

Fishermen operating in the southern regions around the Bajuni Islands sometimes sell fresh fish directly to traders from Kenya also. However, demersal fish and sharks are usually gutted, salted and dried on the beach, and then exported to Mombasa by boat. Fish traders will pay about KES 800 for a 16 kg bundle of dried shark meat, while KES 20-150 are paid per unit of dried fish, depending on species and size as large pelagic species fetch the highest price. As indicated before, fishermen in the North-West around Zeila, also sell their fish to neighbouring Djibouti markets through informal arrangements.

In Djibouti, most of the fish are landed in night and then sold in the following morning. Marketing chain is usually very simple, as most of the catch is sold to markets nearby the coastal areas and there is hardly any fish going to interior markets.

3.8 Mapping Fish Trade Flows

3.8.1 Domestic Trade Flows

Domestic trade flows of fishery products in each country of IGAD greatly vary and are explained in detail, in the country reports. Since this report focuses only on the regional perspective, domestic trade flows will not be discussed in detail. The common pattern of trade flows in the domestic markets, after landing the fish, shows that it is mostly transferred to major cities as the main markets (destination). Like in Ethiopia, most of the fish products from all over the lakes and rivers will be sold in the main markets of Addis Ababa and Bahirdar. In Uganda most of the fish sent to major cities like Kampala, Entebbe and Soroti and to major processing areas around the country. In Kenya the major markets are Mombassa, Nairobi and Busia. In Somalia, Mogadishu, Bosaso and Berbera are the main consuming areas for fishery products, while the urban centers of greater regions of Upper Nile, Bahar Ghazal and Equatorial in South Sudan are the main markets for freshwater fish harvested from Sudd Wetlands.

The capital Khartoum receives fish from several fish producing states, as it is the largest market for fishery product in Sudan. Other major markets in the country include Kasala, Medani, Sennar, Dongla, Atbara, El Obeid and Gadarif.

In Djibouti the main fishing areas are the Gulf of Todjuara to Obock. The main market is the capital Djibouti and also coastal areas near the landing sites. There is no flow of fish to the country side as fish is consumed only by coastal communities. This is mainly due to the fact that consumer habits related to their nomadic traditions show their preference for meat to fish.

Table 16: Summary of Domestic Trade Flows of Major Species in IGAD countries

Country	Main Fish Species and Products	Main Producing Aeas	Major Domestic Markets
Ethiopia	Tilapia (fresh, frozen fillet, smoked)	L.Tana, Rift Valley lakes, Lake Bishofu-Guda	Addis Ababa, Bahirdar
	African Catfish (frozen fillet)	L.Tana, Rift Valley lakes	Addis Ababa, Bahirdar
	Nile perch (frozen fillet)	Rift Valley lakes, Gambela, L. Rudolf	Addis Ababa
Uganda	Tilapia (fresh, dried/salted, smoked)	L. Victoria, Kyoga, Albert	Kampala, Entebbe, Masindi, Soroti,Masaka, Kabele
	Nile perch (fresh, under size and 2nd grade fish, salted/ dried, smoked of frame, head, skin)	L.Victoria, Kyoga, Albert	Kampala, Jinja, Entebbe (processing centres) Mpondwe,Ninule (borders for dried products)
	Mukene (dried, salted, deep fried)	L. Victoria	Kampala, Entebbe, Busia, Kabale, Butiaba.
Kenya	Tilapia (fresh, dried/salted, smoked)	L. Victoria, Turkana	Nairobi, Mombasa, Busia, Dominion
	Nile perch (fresh, under size and 2nd grade fish, salted/ dried, smoked of frame, head, skin)	L.Victoria,	Mombasa Busia, Kitale
	Mukene (dried, salted,)	L. Victoria	Nairobi, Mombasa, and other cities.
Somalia	Marine finfish small pelagic and demersal fishes (fresh, frozen, dried/salted, smoked)	Ras Aseyr, Ras Mabber of the Puntland Coastlines, Bajuni Island, Zeila	Mogadishu, Bosaso, Berbera, Kismanyo
Sudan	Freshwater fish: Tilapia, Nile perch, *barbus, Labeo*, Catfish-fresh, dried, smoked	Along the White and Blue Nile rivers and dams	Khartoum, Kasala, Medani, Sennar, Dongla, Atbara, El Obeid and Gadarif.
	Marine fish (small pelagic fishes): fresh	Red Sea	
South Sudan	Freshwater fish: Tilapia, Nile perch, *barbus, Labeo*, Catfish-fresh, dried, salted and smoked	Sudd Wetlands area (Main landing sites: Bor, Terekeba, Adobakar)	The urban centers of greater regions of Upper Nile, Bahar Ghazal and Equatorial
Djibouti	Marine fish: Wahoo, tuna, trevally, grouper	Todjuara, Obock, Djibouti, Lovada	Djibouti and cities in the coastal areas.

3.8.2 Regional Trade Flows

The regional trade flow generally maintains the following pattern: In the case of freshwater fish, Uganda and Kenya are the main exporting countries to the region, while, Sudan, South Sudan, Ethiopia, DR Congo, Burundi and Rwanda are the main importing countries. Somalia is the main player exporting its marine products to Kenya, Djibouti and Yemen. As mentioned in the previous sections, regional trade within IGAD countries for fishery products are dominated by traditional products like dried, salted and smoked fishery products. However, small portion of live, fresh and frozen products are also traded among IGAD member countries. Dried, salted and smoked tilapia products are exported from Uganda and Ethiopia (Northern Lake Tana) to South Sudan, Kenya and DR Congo. Kenya also exports dried tilapia to Sudan and DR Congo. Dried/salted and smoked by-products of Nile perch such as frame, skin and head are exported from Uganda to DRC Congo and the Western part of Kenya. Similar products from Kenya are also exported to DR Congo and Sudan. Interestingly fish maws from Kenya is also sent to Uganda, most probably for re-export to Far East markets. Dried, salted and deep fried *Mukene* from Uganda is exported to Kenya, DRC Congo, Rwanda and Burundi and dried *Omena* is sent to Sudan from Kenya. There is one commercial processor in Uganda who exports salted sun-dried *Mukene* to SADC market. In addition to this, *Mukene* Traders Exporters and Processors Association (MUTEPA) is also generally promoting marketing and trade of *Mukene* products in both domestic and regional markets.

Fresh tilapia is also exported from Uganda to South Sudan and Kenya, Rwanda and Burundi while fresh Nile perch is shipped from Ethiopia (Lake Rudolf) and Uganda (Lake Victoria) to Kenya. In Kenya, the traders prefer to import fish as there is ready market available. The districts receiving most of the imported fish are Busia, Amagoro, Kisumu and Kuria, although regional fish imports are also destined for the major urban centres of Nakuru and Nairobi. Kenya is also actively exporting fresh, chilled and frozen fishery products to neighbouring Ethiopia, Somalia, Sudan and Uganda.

There are also second grade frozen fish that is sold from Uganda to regional markets especially Rwanda, Burundi and South Sudan. Imported frozen fish from Djibouti is also re-exported to Ethiopia to cater to hotels, restaurants and modern retail outlets.

As mentioned earlier live lobster from Somalia's Bajuni Islands, sent by chartered flight to Kenya while fresh fish from Zeila is transported to Djibouti. Fresh, smoked and dried products from South Sudan are also reportedly "exported" to Sudan and Ethiopia. Regional trade is carried out by both men and women and the main means of transportation are boats and trucks.

Figure 6 : General Trade Flows of Fishery Products in the Horn of Africa

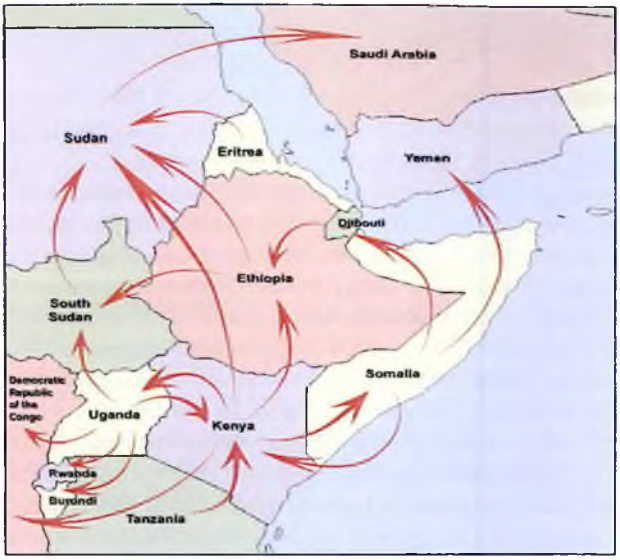
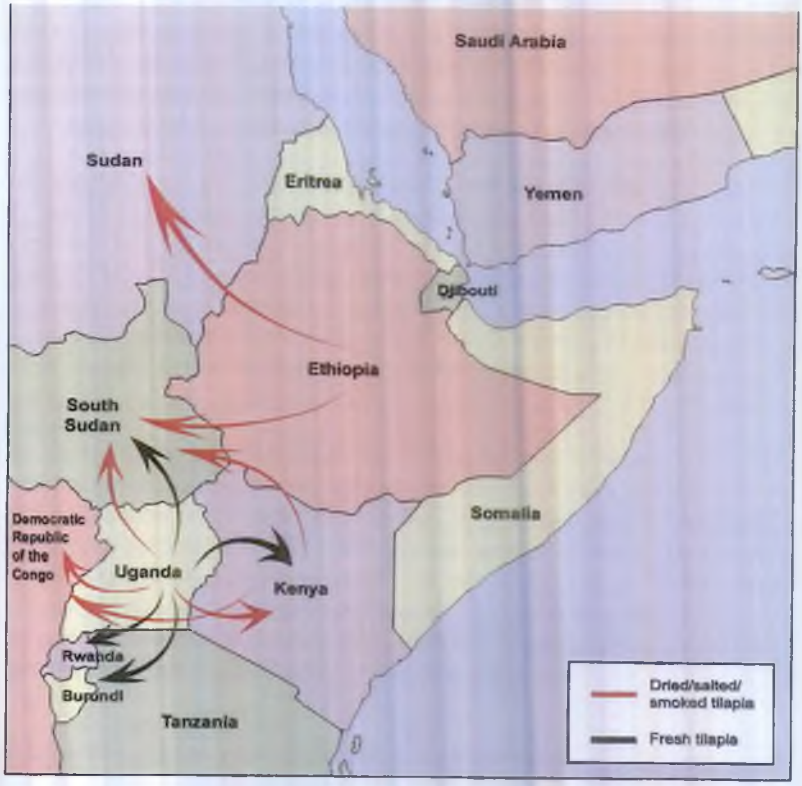


Table 17: Regional Trade of Fishery Products in the Horn of Africa

Products	Origin	Destination	Remarks
Dried fish	Ethiopia (lake Tana)	Sudan/South Sudan	Dried catfish, barbus
By products of Nile perch: Dried, smoked of frame, head and skin	Uganda, Kenya	DPR Congo, Sudan	Uganda is the main supplier
Smoked/dried Tilapia	Uganda, Kenya, Ethiopia	DPR Congo, Sudan, Rwanda	
Dried/smoked catfish	South Sudan	Sudan, Ethiopia	
Dried *mukene/ Omena*	Uganda, Kenya	Rwanda, DPR Congo, Sudan, Tanzania, Kenya	Imported mukene into Kenya is also re-exported to the region
Fresh Tilapia	Uganda	Sudan, Rwanda, Kenya	Small amount
Fresh Nile perch	Uganda, Ethiopia	Kenya	Transshipment/cross border trade
Fresh/chilled marine fish	Somalia, Sudan	Djibouti, Yemen, Egypt, Saudi Arabia	From North-West Zeila to Djibouti, By boats to Yemen
2nd grade frozen fish	Uganda, Kenya	Rwanda, DPR Congo, Sudan, Ethiopia, Uganda	Small quantity for catering, retailers and humanitarian organizations
Live Lobster	Somalia	Kenya, UAE	By air
Dried Fish maws	Kenya	Uganda	For re-export to Far East
Dried Shark meat	Somalia	Kenya	By boat to Mombassa
Dried Shark fins, Sea cucumber	Somalia, Sudan	Middle East markets	For re-export to Far East. Sea cucumber mainly from Sudan

Figure 7 : Regional Trade Flow of Tilapia in the Horn of Africa



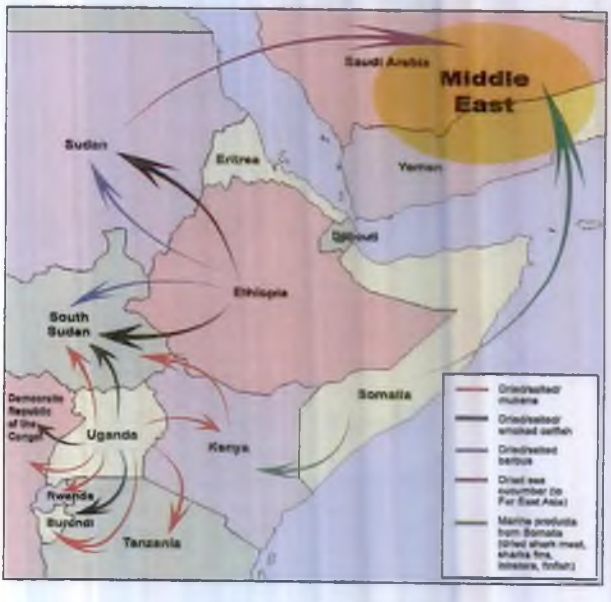


Figure 8 : Regional Trade Flows of Dried/Salted/Smoked Products from IGAD Countries

3.8.3 International Trade Flows

Trade flows of fishery products from IGAD countries to the international markets are dominated by Nile perch products from Uganda and Kenya such as chilled and frozen fillet, steaks and portions as well as Nile perch maws. There are also, however, significant amount of marine fishery products exported from Kenya, Sudan and Somalia.

From Uganda, chilled products are mainly shipped through Entebbe International airport, while frozen products go by road and shipped via Mombasa sea port in Kenya. The main international market is the European Union, which takes almost 72% of the fillet and the rest is sold to Non EU Countries. Meanwhile dried fish maws from Nile perch are exported to premium Asian markets like China and Hong Kong. Currently there is no export of fishery products from Ethiopia and South Sudan to the international markets. Certain products, such as Crocodile skin, from these countries are finding their way to international markets via third country.

As indicated earlier, Kenya's main fish product export is also Nile perch products. However, the country also exports significant amount of various marine products to the international markets. The main export destinations during 2010 were Israel accounting for around 38.5% or 3,962 MT, followed by the Netherlands 1,860 MT (18.1%), Portugal 763 MT (7.4%), Spain 598 MT (5.8%), UAE 499 MT (4.8%) and Germany 459 MT (4.5%) in that order. New and emerging regional and international markets continue to spring up every year. Lately this has been driven by the Euro crisis, leading to a drastic drop in the export prices by 50%. As a result, most of the processing factories have started exploring diverse markets like Japan and China.

Somalia exports its marine fish to international markets in Asia, notably to Thailand (mainly tuna) and Middle East (Saudi Arabia and UAE) for lobster and also for other marine fin fish. Meanwhile Sudan exports marine fishes mainly to Middle East and dried sea cucumber to Far East markets.

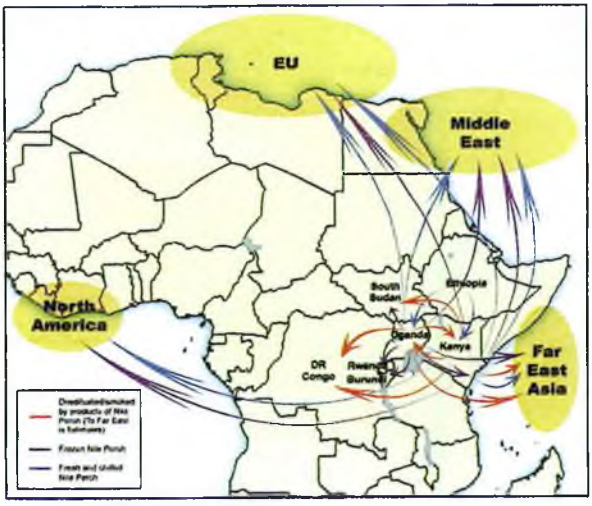
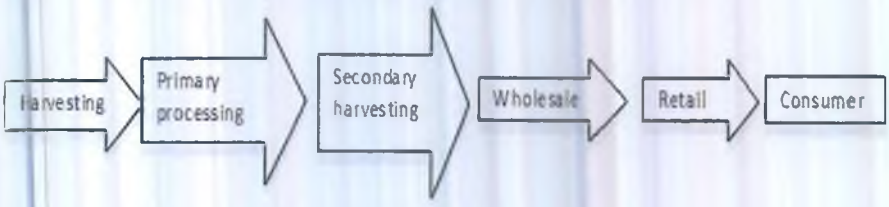


Figure 9: International and Regional Trade Flows of Nile Perch and it's By-products from Uganda and Kenya

3.9 Value Chain Analysis for Major Species

The value chain concept which was introduced by Michael Porter in 1985, links all the steps in production, processing, and distribution together, and analyse each step in relation to the preceding steps and the steps that follow. The value chain can be a very useful conceptual tool, when trying to understand the factors that impact the long-term profitability of business operation and when developing a successful strategic plan for business entities. Value chain analysis provides a systematic and analytical tool that can help management understand the processes in the company and especially to assess the costs related to various steps in the chain. This concept can be adapted to the fisheries and aquaculture activities. FAO published a study entitled "*Revenue Distribution through the Seafood Value Chain*" in 2006 that gives a general value chain in fisheries as illustrated in Figure 10.

Figure 10: The General Value Chain in Fisheries



Source: Frank Asche et. al (2006)

It should be noted, however, that in reality, the value chain does not restrict itself on a straight line as given above. There are external activities that influence activities within the value chain, including upstream and downstream activities. Upstream activities provide inputs into the industry, while downstream activities relate to the outputs from the industry.

The fishing vessel catches the fish and brings it to the landing site; where there is some primary processing steps are involved like sorting, grading, gutting and icing. From there the fish is transported to secondary processing, such as filleting, trimming, packing and freezing. The product is then shipped to the wholesaler, who distributes it further to the retailer, before it ends up with the consumer.

3.9.1 Description of Value Chain of Main Species

A. Nile perch

Many studies have been carried out on the value chain of Nile perch, particularly from the Lake Victoria covering Uganda, Kenya and Tanzania as the main production centres for Nile perch. Therefore, in addition to information extracted from the country's reports, other published information are also used in this report to analyse the value chain of Nile perch. Among the IGAD member countries, Uganda is the main producer and exporter of Nile perch having more than 40% of the total surface area of the Lake Victoria. Therefore, Uganda's Nile perch industry will be used as the main reference in this report.

As reported in Uganda's country report, licensed Nile perch fishermen land their catches at various landing sites for sale to middlemen/agent or sell their catches on shore (or islands) to fish collectors or boat traders. The latter are also licensed and use insulated fish transport boats for transferring fish to landing sites. Legally both fishermen and the fish collectors (boat traders) have to land the fish at one of the gazetted landing sites, for inspection and certification. However, catches collected directly from fishers by collecting boats at the fishing grounds, is also be transferred directly to the fish processing plants without passing through the landing sites. Under such circumstances, there would be designated local fish inspectors, who will inspect and certify the fish by issuing a local fish health certificate.

Fish merchants and boat traders are middlemen who use mainly motorized and iced boats. They buy export quality fish directly from fishermen, especially on the Lake Victoria islands or at inaccessible landing sites and transport it to other landing sites for sale to processing factories. Transport boat operators commonly own several fishing boats in the islands and transport fish together with other merchandise. In most cases, processors provide ice to fishermen and boat traders.

Fish processing establishment is the next important actor in the value chain of Nile perch. This segment receives all fish (raw material) collected by fish traders and collectors or their agents. It is worth noting that Nile perch processors are of two categories: Industrial and artisanal processors. Industrial processors produce high value chilled and frozen products intended for the international markets, mainly to the EU markets. The artisanal fish processors aim exclusively at the domestic and regional markets, processing mainly by-products or rejected fish from industrial processors. The following Figure 11 gives process flow of Nile perch at industrial processors

Figure 11. Nile Perch Industrial Online Process Flow

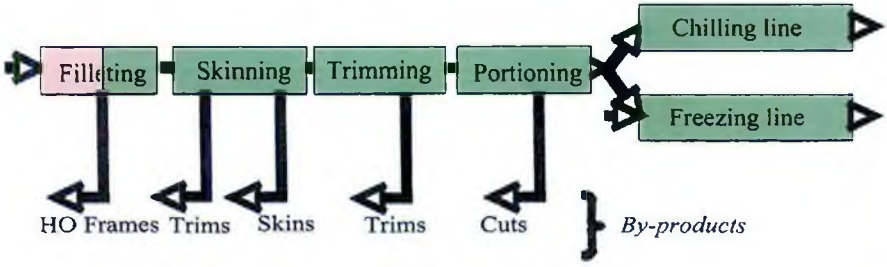


Figure 11 above illustrates process steps of Nile perch in the industrial processing sector with final products primarily being fresh/chilled and frozen fillets. However, there are other chilled and frozen products from Nile perch that include steak, portion, loin and HGG (Headless Gilled and Gutted) fish. Nile perch exports account for over 90 percent by value of Uganda's fish exports and the European Union absorbs about 72 percent of Nile perch fillets exported. Meanwhile, Kenya exports around 50% of its Nile perch harvested from Lake Victoria. The above figure also shows that at each process/step generates different by-products. Whole fish constitutes about 37- 40% fillet and the remainder is by-products, which include frame, skin, fat, trimmings, air bladder, (fish maws) and rejects from the processing line. The frames account for 40 - 43% of the by-products weight, followed by red meat, skin, fat, air bladders (fish maws), trimmings and eggs at 7.8%, 6.8%, 2.6%, 2%, 0.3%, and 0.2%; respectively (FRRI 2003).

The fish which do not meet the criteria for grade A and B are usually removed from the processing chain and this is commonly referred to as fish rejects which will be sold to domestic market or to artisanal processors. The fish rejected by the exporter can be of low quality grade, by-products or under size fish and later sold as low grade fish. Thus, artisanal fish processors provide various product forms, including fresh, smoked, sun-dried, salted and deep fried products.

After fish is processed, industrial operators sell the fish to exporters or directly export to overseas buyers. From Uganda frozen fish is exported by road/sea and chilled fish by airfreight from Entebbe international airport. Chilled and frozen fillets make the largest proportion of fish products export to the affluent markets.

Industrial processing of Nile Perch – Photo by : Yvette Dieiouadi

The final market segment is the export market. Usually, Nile perch is sold in bulk to EU importers who in turn sell it to wholesalers, supermarkets, processors, etc. The fillets are also re-exported straight away with the same or different identity to other destinations like USA, Australia and South America. Fillets are also sold to re-processing factories for further processing into value added products.

Air bladders (fish maws) are dried or frozen and exported to Asia, mainly to China and Hong Kong where it is a delicacy for making soup or special dish. Air bladders are also used in the food industry as a source of collagen. They can be made into strong, water-resistant glue, or used to make isinglass for the clarification of beer.

By-products, particularly the fish head, frame and skin are sold to agents, who in most cases take them to artisanal processing establishments mainly for salting and sun drying. Some fish frame and head are smoked to a lesser extent while the viscera and fats are

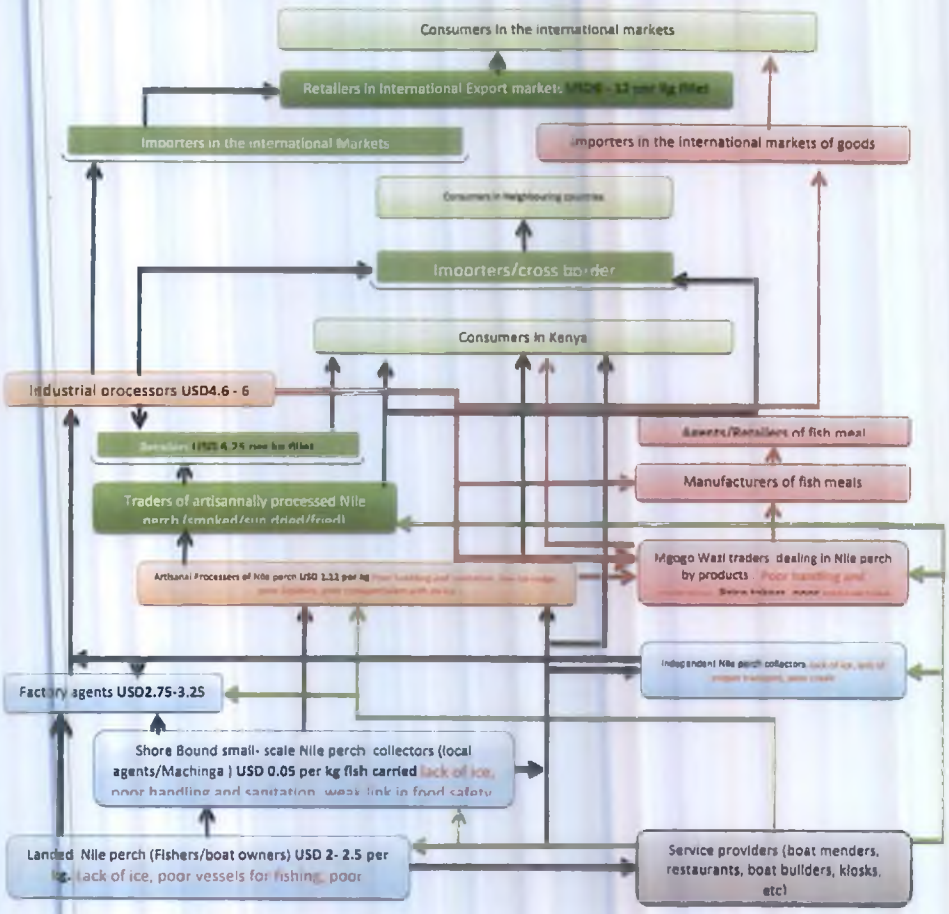
washed and heated to extract oil. Since the oil does not undergo further processing like bleaching and deodorization, it is mainly used for deep frying fish and by-products from Nile perch in the busy landing sites and the fried products are sold directly to domestic market. A small portion of by-products, head and frame, are also sold directly to consumers in domestic market. Overall, majority of by-products are targeted for regional markets, where processors sell them through agents. Congo is a main destination for salted heads, frame and skin of Nile perch.

As in Uganda, Nile perch is the main exported fishery product from Kenya too, mainly harvested from Lake Victoria. Industry structure and value chain is more or less same as of Uganda, with slight advantage on the shipment cost, as it has Mombasa port for shipment. Typically fishermen will use drift nets, set overnight, although some fish is also caught with baited lines. Industrial fishing technique is banned in the Kenyan side of the lake. Fishermen usually land their catch at numerous small landing sites, where they are bought by traders or directly by processors' agents, for onward road transport to the factory or market. Prices are negotiated based on quality assessment by the trader. There is limited use of ice by fishermen in the boats and on the landing sites. Ice is usually provided by the industrial processors to the agents or trader.

Kenya, along with Uganda and Tanzania, is one of the few non-EU countries that can competitively deliver fresh (chilled) fillets of Nile perch as per the exact specifications required by EU market (e.g., food safety standards, delivery schedule). The broader market potential for Nile perch fillets was further underscored when Kenya, faced with an EU import ban in the late 1990s, could readily find buyers in other markets like Israel, Australia, the US and Japan, which today combine for more than 40% of their sales. However, Kenya's competitive position is undermined by declining Nile perch landings, which resulted from over-fishing and the fishing of undersized fish (Erik Hempel, 2010).

Industrial processing companies are concentrated in Kisumu and they operate a fairly an integrated channel in Nile perch fish value chain, comprising mainly of agents who collect and deliver the fish, for processing, packaging, wholesaling and exports, that can be considered as a direct channel operation. As competition has increased with the decline of Nile perch supplies from the lake, the processing companies and their agents have become more innovative, sometimes in the form of providing credit/cash advances to purchase fish, fishing nets, supply of fishing gears and engines to clients with whom they have well established trade relationship.

Figure 12: Value Chain of Nile Perch in Kenya (Source: Kenya's country report)



In Ethiopia, most of Nile perch caught is sold mainly in the domestic market, particularly to star hotels and high end restaurants in major cities like Addis Ababa. Nile perch harvested from Lake Rudolf is also sent to Kenya and Uganda. Nile perch, locally known as *Nech Assa*, the fish is highly sought after in star hotels in the country and used to be an important export commodity before the introduction of the stringent quality control measures in importing countries. Today, there are limited water bodies in which the fish thrives. These are the two lakes at ArbaMinch (Chamo and Ababya), Lake Turkana, the Blue Nile; the rivers in Gambela and Benshangul Gumuz, both of the latter two are in the south western parts of the country. As these areas of the Nile perch are far remote from the central market in Addis Ababa, products are packed in plastic bags, frozen overnight, put into sacs, and transported in insulated vehicles, when available, or placed on pickups and driven to star hotels like Hilton or Sheraton in Addis Ababa. This has no match to the international requirements and the practices seen in Kenya and Uganda.

B. Tilapia

Tilapia, as indicated before, is the most popular fish consumed in IGAD member countries particularly in Ethiopia, Uganda, Kenya and also in Sudan. Tilapia, constitute about 27% of the total fish harvested in the region, mainly comes from wild catch. There is also growing proportion from aquaculture even though its contribution remains relatively small. As it is mainly consumed in the local market in fresh form, and some are processed into dried/ salted and smoked forms for regional markets, the value chain of tilapia is relatively simple or rather not as complicated as Nile perch.

In Uganda the value chain for tilapia from fisherman to landing site is almost similar to the Nile perch. At landing sites, agents buy fish from fishermen through auctioning. The head of the fish are bundled together for sale. Over a period of time and owing to decline in fish catch, fish traders have also invested in fishing activities and own some fishing gears. This boosts their target trade volume and reduces on ever increasing competition for fish at landing sites. Generally fresh tilapia is transported to domestic markets, especially in urban areas using open pickups/small trucks. While in domestic markets fresh it is either sold directly to consumers, supplied to restaurants or through agents sold to buyers, who later take fish to other destinations. Middlemen also send fresh fish to Rwanda and South Sudan, using insulated vehicles or trucks.

Notwithstanding the above, in remote landing sites, there are bicycles and motorcycle fish mongers who buy directly from fishermen and transport fish to rural markets and finally to consumers. Unsold fresh tilapia at landing site due to low quality and under size is usually sold to artisanal processing value chain, where fish is deep fried, sundried / salted (*Makayabu*) or smoked. This chain is mostly dominated by women with low purchasing power. They buy such fish in small quantities, process, store and sell mainly to agents. There is also a category of fish mongers dealing in cured tilapia products who buy fresh tilapia and engage mainly women to process. This group finally transport the fish in lorries, not necessarily approved fish trucks, to domestic urban markets or regional markets. In both, domestic and regional markets they sell tilapia products through agents or to buyers, who later sell to retailers and finally to consumers. As regard deep fried tilapia, it is commonly consumed at landing sites, or nearby local market but smoked and dried tilapia is sold to the regional markets like South Sudan, DR Congo and Kenya.

As indicated in the previous section, Nile tilapia (*Oreochromis niloticus*) is the most important species harvested from lakes and water bodies in Ethiopia. In most cases licensed fishermen harvest and sell their catches to fishermen cooperatives or to FPME at designated landing sites. Some fishermen who are not members of cooperatives sell their fish to private companies. The main product forms in major towns and cities are gutted tilapia for roasting, as this is the most desired fish dish in Ethiopia. Nile tilapia are filleted and packed into one kg bags/blocks for deep freezing and sent to local shops and distant markets, like Bahir Dar to Addis Ababa which are over 500 Km away. As for a good part of the catch is sent to remote areas, where there are no preservation and transport facilities, fish are dried and stored for later use.

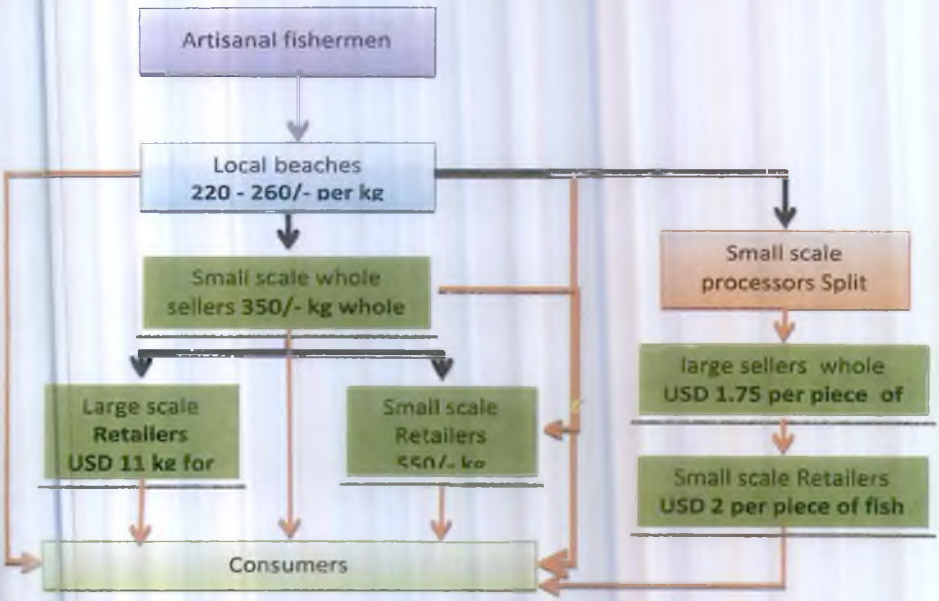
The freshwater capture fisheries in Sudan, is at small scale artisanal level, using traditional gears and methods of fishing and their catches are multispecies. The catches after landing at first marketing level, from producer to trader and then to retailer are not sorted based on

species. Instead they are weighed and sold mixing *Lates* with *Bagrus*. The first grade fish consists of tilapia and *Labeo* including other fishes. Only at consumer's level, separation by species and product forms are clearly distinguished. As a result of this practice, it is not possible to establish fish trade and follow marketing chain for separate species (*Lates*, Tilapia, *Labeo*). Even the estimated actual annual production levels of fish catches were all inconsistent and not regular; therefore not reliable.

Wholesalers using their transport facilities will carry chilled fish or other forms of fish products, namely sun dried "kajeek" and wet salted "feseikh" to the consumption centres, for marketing in central markets, mainly Khartoum. Fish received by traders or fish mongers within the markets, will be sold again to retailers. Some of the fish are taken to hotels and large restaurants, for serving to the consumers.

Processing is normally partial and traditional and is not adopted separately as a profession. Except for two or three traditional small processing units in Gebel Aulia, which process mostly wet salted fish with few trials on fish smoking and drying, there are home based processors (women) specifically for wet salted fish. These women processors are working informally without license and do not follow any hygienic practices.

Figure 13: Value Chain of Tilapia in Kenya (Source: Kenya's country report)



However, fishermen in Kenya use the same technique as Nile perch, in catching tilapia which involves the use of long lines or gill nets. The fishermen normally sell the fish to wholesale traders at the landing sites, who in turn transport the fish to various local and regional markets in open trucks stacked with ice. Transporters use pick-up vans for markets in the lake region while for more distant regional markets such as Nairobi and Mombasa, large wholesale traders use trucks with different carrying capacities ranging from 4-7 tons of fish, covered with ice flakes for preservation. Fresh tilapia is the most

preferred and widely consumed fish in Kenya. There is no official import competition in this market, but unknown quantities of tilapia and Nile perch enter Kenya through water ways from Uganda. Unsold fresh tilapia is processed into dried and smoked products, both for local and regional markets.

C. Mukene or Omena

Mukene (*Rastrineobola argentea*) in Uganda, also known as *Omena* in Kenya and *Dagaa* in Tanzania belongs to the sardine family, *Cyprinidae*. *Mukene* is a small silvery fish that measures up to 9 cm long and caught at night with the use of Kerosene lamps and lift nets or seine nets. *Mukene* fishery is the second to Nile perch (*Lates niloticus*) and is the most important commercially exploited species from Lake Victoria. The first peak season for *Mukene* fishing in Lake Victoria, begins during the period of June to August and there are insignificant catches from September to November while December to February is the second peak season (Edward et al, 2003).

In Uganda, the most common chain for *Mukene* is where fishermen, who either own boats or are employed by boat owners, land their catches at landing sites, process them and later store for sale. The catch weighed in basins and on this basis, the fishermen get paid for their labour. Under this chain, the catch is taken by the boat owner, who then processes the fish, store and sells at landing site or transport to domestic or regional markets. The most common practice is where traders sell the products at landing site to agents, who later transport it to domestic or regional markets using trucks.

In the domestic markets, agents sell processed *mukene* to retailers, who eventually sell the products to consumers. On the other hand, under the regional market chain, processed *mukene* is sold to buyers through agents at border posts. Though not very prominent, there are also bicycle traders and local dealers who buy *mukene* at landing sites and transport to rural areas. In both cases, after processing *mukene* and packing, it is bought by fish traders, who transport to various destinations using trucks.

As a result of various efforts taken to promote value addition of *mukene*, there are small scale artisanal processors, especially women in Kiyindi (Uganda) who prepare it in deep-fried, smoked, salted and dried form, pack and finally distribute the product to supermarkets in urban areas.

Besides the value chain for processed *mukene/omena* for human consumption, there is a value chain for animal feeds. During sun drying, *mukene* is deliberately adulterated with sand to increase the weight since it is sold by weight. Highly adulterated *mukene* is sold to agents, who transport it to animal feed mills to manufacture feeds, which is generally used as poultry feed.

Figure 14 : The Value Chain of Ugandan Mukene

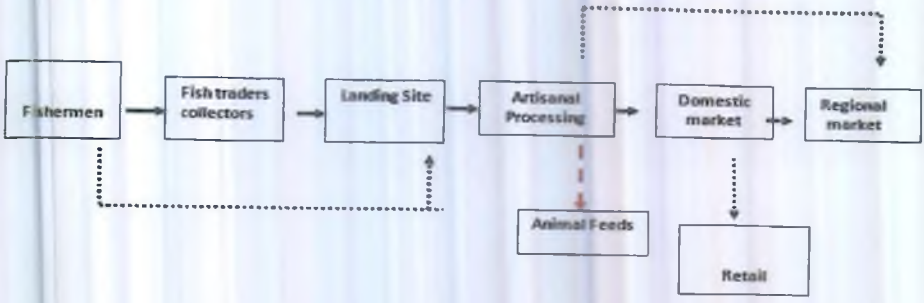
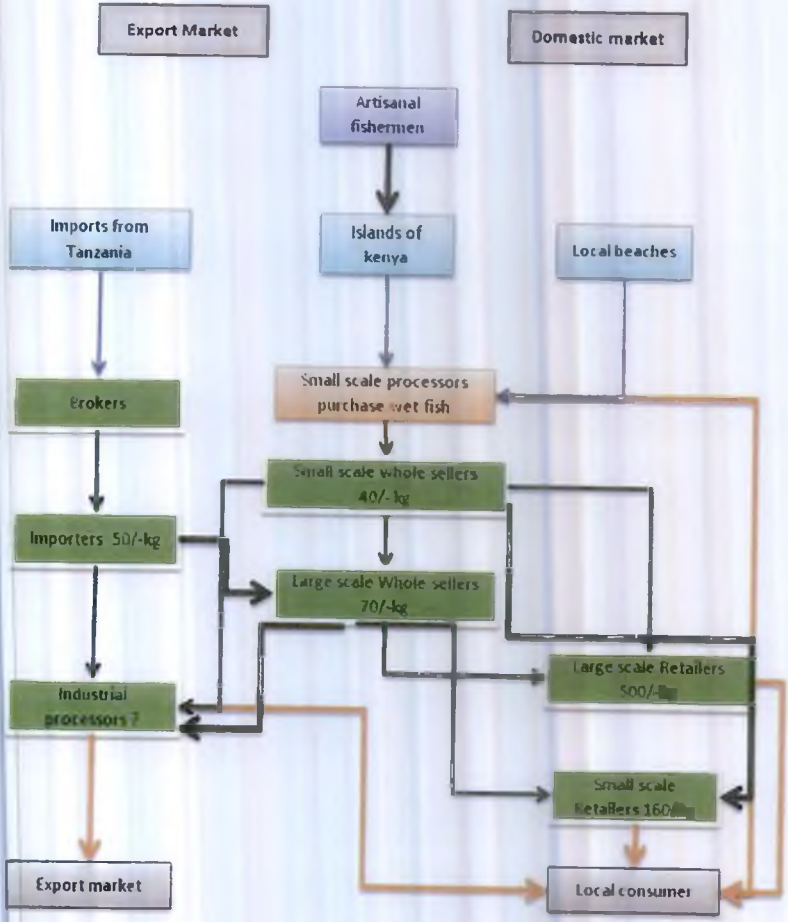


Figure 15: Value Chain of Omena in Kenya



D. Other Fishes (Catfish and Cyprinids)

Catfish is mainly caught from lakes, swamps and rivers using different fishing methods, namely hooks, gillnets, beach seines and traps. Certain quantity of supply also comes from aquaculture farms, as in Uganda and Kenya. Catfish is sold to the market as table fish for consumption, as bait for fishing and as fry or fingerlings for stocking purposes in aquaculture sector.

Though catfish is not as popular as tilapia, consumers in some IGAD countries generally prefer them because of its fleshy nature with fewer bones, than other species. Whole fresh form of the fish is preferred in Uganda; while in Ethiopia large size catfish is filleted and sold as frozen form. On the other hand, farmed catfish is smoked or salted for sale within the region. Processing is mainly carried out by artisanal processors and consumption is in the local and regional markets.

In Ethiopia there is a general feeling among fishermen that catches of the African catfish is slowly showing an increasing trend in pace with tilapia, and in some instances, it is taking it over. The major reason being that Nile tilapia is under strong pressure from high demand, whereas the African catfish is having less demand. It is thus increasingly taking over the ecological niche left open by Nile tilapia, with the added sturdy nature of the catfish to survive in hard conditions like low oxygen, turbid waters, flexibility in food selection, etc. The food shortage among the increasing population in Ethiopia and the relatively cheap value for African catfish (*kay assa*) is attracting more people to consume it. Currently, one kg of catfish fillet costs 48.3 Birr (US$2.8) only, while tilapia and Nile perch fetches 83.95 Birr (US$4.9) and 176 Birr (US$10.4) respectively. Catfish fillets can be flexibly used in Ethiopian dishes such as making different kinds of stews and grills, as the fillets recovery from cat fish is substantially high percentage, than that of tilapia. Catfish is also having high demand in the regional markets such as the Sudan and South Sudan, who are now getting it legally or illegally in dried form.

Another important fish caught in water bodies around IGAD countries is cyprinid. In Ethiopia, one of the main species caught is barbs or barbus (*Barbus* spp).This fish has a strong diversity and have very low popularity in the Ethiopian market. Its consumption also varies from place to place. In Lake Tana area, for example, there are more than 20 different species of the *cyprinids* and the population in the area is also much accustomed to consume it. One reason for its low consumption in the Rift valley is that, the meat contains a large number of small bones and do not allow that flexibility enjoyed at cooking and consumption of the fillets of Nile perch or African catfish. Currently, *Barbus* makes a considerable portion of dried fish export to The Sudan. These *cyprinid* fishes face the same fish handling problems discussed for other fishes. Species like the common carp (*Cyprinus carpio*), *Bagrus docmac*, and those remarkable species recorded from the Gamblea and Benshangul Gumuz areas need proper value addition efforts, to bring them into markets.

E. Marine Finfish (Somalia)

The value chain for marine finfish is extracted from Somalia report, as the country who is the main producer and exporter of marine products, though it does not represent in the actual picture of marine fisheries sector in IGAD countries. A full description of the value chain of marine fin fish is covered in the country's report, so a brief analysis is taken from the report

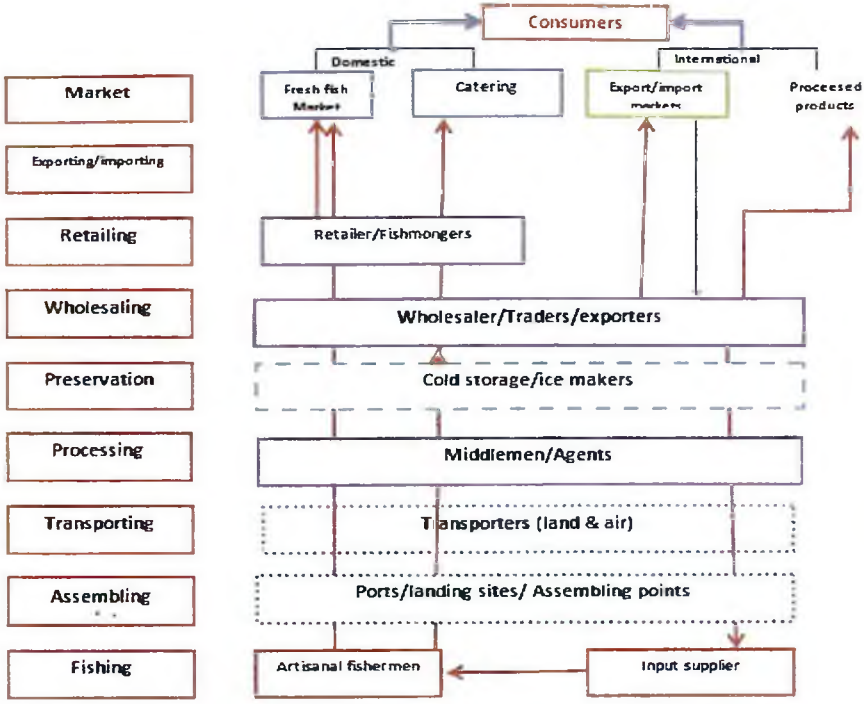
which is given below. Various types of market operators are involved in the value chain of marine finfish in Somalia namely, fish producers (fishermen), traders, processors and exporter, fishmongers or retailers, catering sector (hotel and restaurant) and consumers.

Producers form the largest number of actors in the value chain, as it comprises the fishermen (producers) who can be further divided into embarked fishermen, foot fishermen and boat owners. Embarked fishermen are those who are hired to work on boats of other people, foot fishermen are those who work on foot targeting lobsters in shallow waters during the fishing season. Traditional fishermen include in the latter group who set their nets in the inshore areas mainly for subsistence fishing. The fishermen sell their catches to traders or agents and also to fish mongers, depending on fish species caught and their markets. High value pelagic and demersal fishes are sold to traders or agents for overseas or regional markets. When selling to traders/agents there is no grading system followed. The traders have trucks to transport products to their facilities, where fish are cleaned and graded. The fisherman is the beneficiary, since the price moves from international market via the exporter to the lowest actor in the chain; the fishermen. Fishermen are also the risk bearers as they bear all fishing expenditure and shoulder the risk of a poor catch. In most cases, fishermen obtain the inputs they need for their fishing operations from traders on credit basis, with the tacit agreement that they will exclusively sell their catches to the trader.

Traders in Mogadishu and Berbera have small depots alongside docks or harbours, where products are sorted, cleaned and sold to exporters. In Somalia, there are few fish exporters. The fish exporters are the most sophisticated group and they are the price setter. The prices move downwards from the exporter to the supplier, to the agent and then to the fisherman, on a daily basis. The level of transparency is very low between each of these groups. Even traders are unaware of the selling price of exporters. Nevertheless, exporters receive the contracted price from their overseas buyers.

Meanwhile, fish intended for local market is sold through fish mongers or fishermen and directly sold to consumers. Fish mongers buy fish from fishermen at the landing beach and then sell it, either as fresh or fried form to the public at a small profit to support their families. They also act as agents for other women fish sellers and restaurant owners, who give them a small commission for every consignment of fish they deliver. In big cities like Mogadishu, Kismanyo and Bosaso, fishmongers are mostly women and single mothers from local communities, who earn their living from selling fish. Members of this group are the poorest among the actors in the chain. Figure 16 gives a general value chain for marine finfish in Somalia.

Figure 16: Value Chain of Marine Finfish in Somalia (Source: Somalia's country report)



3.9.2 Analysis of Price (Costs) Trends

Fish price in general has been on the upward trend, both in the local, regional and international markets. Details given in table 18 below illustrate increase of fish price in Ethiopia. The price of Nile tilapia fillet, for example, has increased from merely Birr 12.19/ Kg in 2002 to Birr 83.95/Kg in 2012. Similar trends are recorded for catfish and Nile perch products too.

Table 18: Price Trends for Popular Fishery Products in Ethiopia (Birr/Kg)

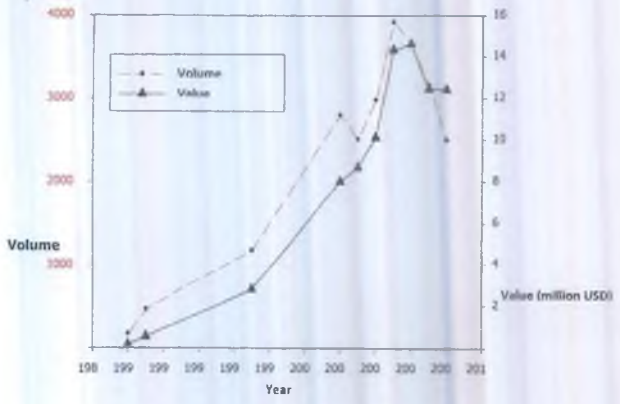
Year	Nile tilapia fillets	African catfish fillets	Nile perch slices
2002	12.19	6.48	27.00
2003	14.70	8.20	29.55
2004	25.00	9.20	37.80
2005	34.50	13.80	34.50
2006	36.80	15.55	43.70
2007	41.40	21.95	54.35
2008	41.40	21.95	54.35
2009	41.40	25.00	54.35
2010	42.00	31.00	78.00
2011	60.00	31.00	100.00
2012	83.95	48.30	176.00

Source: Federal Ministry of Agriculture, Ethiopia.
(Data for 2011 and 2012 are original).

Local fish price, in Djibouti, has also been on the rise for the main popular species. For example wahoo, the most sought after fish in the country, its average price in retail market increased from Franc 700 (US$3.9) in 2007 to Franc 900 (US$5.0) in 2011.

The value of exported fishery products generally fluctuates, depending on the international prices. As reflected in Figure 17 below, export value of fishery products from Uganda increased sharply upward during 2006, and then declined afterwards, indicating softening of fish price, particularly for Nile perch in the international markets.

Figure 17: Trends in Export of fishery products from Uganda



Due to shorter value chain for fresh fish form without further processing, fishermen or producers are better positioned in determining the price in the domestic or regional market. As indicated in the previous section, trading practices, the price is mainly set through open negotiations. In the case of exported fish like Nile perch, however, price at the landing sites or at beach level is not determined by fishers but by collectors, who are directly influenced by the processing plants/exporters. Factors like transportation costs, availability of transportation vessel or vehicles at the time of landing, will automatically influence the price at this level.

In Uganda for example, fishing boats that fish in most of the major water bodies are usually owned by a relatively small number of boat owners, who employ fishermen. Returning from a day of fishing, boat owners sell the day's catch to a fish trader on the beach and the crew share the daily total revenue as 50/50, with each side being responsible for 50 percent of costs as well. Table 19 below gives an example of value distribution for different fish among the stakeholders in Uganda.

Table 19: Estimated Market Prices for 3 Major Commercial Fish Species (Shs/Kg)

Stage	*Mukene* Estimated Market price	Tilapia Estimated Market price	Nile perch Estimated Market price
Fisherman	1500- 2000	3,000- 3,500	4,000- 5,000
Landing site	2,000- 3000	4,000- 4,500	5,000- 7,000
Fish agents	Not applicable	Not applicable	7,000- 8,000
Fish factory	Not applicable	Not applicable	8,000- 10,000
Domestic Fish markets	4,000- 4,500	8,000- 10,000	6,000- 8,000
Regional markets	5,000- 6,000	8,000- 12,000	10,000- 15,000
International markets	Not applicable	Not applicable	12,350 (based on USD5/Kg of chilled fillet)

The indicative market price shown above is based on fresh fish for tilapia and Nile perch, while *Mukene* is based on sun-dried product. Secondly the prices have not taken into account other costs that are incurred and therefore the difference should not be considered as profit margins. However, it may be noticed that market price for fish and fishery products vary across regions, towns, landing sites, distance to markets, product forms and fish species.

The market price of Nile perch is influenced by the orders from international markets, exchange rate, as well as the size of the fish. As the demand for fish maws is associated with the size of the fish, an equivalent weight of large sized Nile perch may cost almost $ 0.5 higher than several numbers of small fish having the same weight. The price of Nile perch at domestic market are lower than the price at fish processing plants, because the latter takes first grade fish for further processing.

At factory level, apart from the monthly variations in price paid to agents, there are also price variations between factories and even the agents within the same factory, as the price paid to agents vary from different beaches/landing sites. The price variation between factories could be attributed to competition for fish, while the reason for variation among agents may be due to volumes supplied, consistency and loyalty of some suppliers, to specific factories. The bottom line is that, prime quality fish fetches better price than lower quality fish. Juvenile fish equally fetches lower price than the recommended sized fish, because yield from juvenile fish is low. In general, Nile perch fetches better price at all stages of the chain, compared to other fish species.

In case of *Mukene*, the prices vary according to the season and market. *Mukene* for human consumption has higher price than that of the same used for animal feeds. Secondly, the prices for *mukene* for human consumption also vary according to the processing method employed. Salted deep fried and salted sundried *mukene* is more expensive than normal sundried one. Price of tilapia also follows the same trend along the value chain. However, due to increased domestic demand, especially in urban centres, the price for tilapia is higher than Nile perch, in the domestic market.

The table 19 above shows that fishermen obtain about 37-44% of the value of the retail price for *mukene*, 35-37% of the retail value for tilapia and 32% for the export value of Nile perch. As regards Nile perch sold in the domestic market, however, fishermen receive

higher percentage at over 66% of the retail value. Therefore it can be concluded that in general, fishermen in Uganda get fair portion of the value chain of all species, provided the above data are accurate. The value distribution among the actors along the supply of Nile perch, tilapia and *omena* in Kenya, are shown in Figure 12, 13 and 15 above, under paragraph value chain analysis.

However in Ethiopia the scenario is entirely different. Although the value chain is short and overlapping in this count and fish prices are increasing as shown in the table 15 above, the benefits got by the fishermen is extremely low. It is a general observation that no fisherman in this country lives on revenue he/she obtains from fishing activity alone. All of them resort to other forms of livelihood during different seasons. This has been revealed at various interview sessions. Examining the fish prices at various levels and the transport costs indicate that the revenue generated at each level is extremely low. With improvements along the value chain, benefits received by all stakeholders can be dramatically transformed. The unfortunate scenario that must first be changed is the lack of awareness of the fishery managers at the federal and regional levels. On one hand, lack of platform for market information exchange for the fishery sector, has aggravated the situation, giving middlemen the opportunity to manipulate prices. On the other hand, the intervention made by regional trade and industry development federal and regional offices in what they call "market stabilization" compel fishermen's cooperatives to sell their products to specific middlemen or traders. Although the intentions of the offices are probably to avoid any civil unrest based on an increase in food price, the action however limits cooperatives ability to sell their products at their true value, if they were presented to an open auction market.

Due to short and simple marketing chain, value addition along the supply chain in Somalia is either small or nil for fresh fish in the domestic market. In most cases producers and consumers deal with each other without involving other intermediaries. In few cases where there is an intermediary actor (e.g. women fishmongers) between the fishermen and the general public, the value added is so small that it does not warrant a full analysis. For example, a 5kg fish sold by women fish mongers as by piece at the Bosaso landing site with an initial purchase price of US$ 5, accumulates a value addition of only 4.5% between the fishermen and the customers, even when 2% municipal tax is included.

Therefore, as a case study, marketing of canned fish is taken as an example, as it is relatively well developed in Somalia as compared with fresh and frozen fish with a sizeable number of intermediaries, operating between the canneries and consumers. The country's report from Somalia analysed the value addition to the product along the supply chain in terms of costs and margins for different actors, based on a carton (48p x 185g) of Las Qorey canned tuna fish sold in Bosaso (Table 20). Such a carton costs UD$29.6 to produce at the factory and is retailed in Bosaso at an equivalent of US$60 in Somali Shillings. This shows that a carton accumulates a total value addition of US$30.4 (or 103%) as it passes through different actors along the supply chain between production and consumption. Of the total value added, US$20.2 is added as profit margins for the actors and the rest (US$10.2) as overheads and sales tax. Among the intermediaries, the retailers earn the highest profit margin (US$10.0) followed by the factory (US$8.4). These two marketing levels also account for more than 93% of the total value added to the product. The distributors and wholesalers receive the lowest profit margins of US$0.9 each. Similarly, the value addition taking place at the latter two marketing levels is also small, representing only 6.6% of the total value added to the product.

Table 20: Costs and Margins for the Actors Involved in the Production and Marketing of a Carton of Canned Tuna (48x185 gm)

Marketing Level	Cost Item	Costs and Margins (USD)		
		Carton	Tin	Share (%) of Value Addition*
Factory	Production cost	29.60	0.620	34.2
	Transportation	1.00	0.020	
	Sales Tax	1.00	0.020	
	Total cost	31.60	0.660	
	Factory price (to distributers)	40.00	0.830	
	Profit margin	8.40	0.180	
	Value added at this market level	10.4	0.22	
Distributor	Purchase price	40.00	0.830	3.3
	Overheads	0.10	0.002	
	Distributer price (to wholesalers)	41.00	0.850	
	Profit margin	0.90	0.019	
	Total value added at this marketing level	1.00	0.021	
wholesaler	Purchase price	41.00	0.850	3.3
	Overheads	0.1	0.002	
	Wholesale price (to retailers)	42.00	0.880	
	Profit margin	0.90	0.19	
	Value added at this marketing level	1.00	0.021	
Retailer	Purchase price	42.00	0.880	59.2
	Overheads	8.00	0.312	
	Consumer price	60.00	1.250	
	Profit margin	10.00	0.063	
	Value added at this marketing level	18.00	0.38	
Total value added = (consumer price – production cost)		**30.4**	**0.630**	**100**

Sources: Kulmiye (2010) as reported in Somalia's country report

3.9.3 Description of Service Providers

Service providers vary from country to country and their roles are also entirely different. Therefore it is impossible to compile them as regional services providers. The following section gives details of service providers in each country, based on whatever information available in the national reports.

A. Uganda

The following Table 21 is the list of private and government service providers in Uganda identified by the National consultant:

Table 21: Government and Private Service Providers in Uganda

TYPE	NAME	DESCRIPTION
Private sector organizations-Processors	Uganda Fish Processors and Exporters Association (UFPEA)	UFPEA is a voluntary association for industrial fish processors which brings together all industrial fish processors in Uganda. Collaborates with the DFR on issues of fisheries policy development and management, Private sector has constructed landing sites & recent innovation is establishment of a vibrant self policing on processing of juvenile fish.
	Mukene Traders Exporters and Processors Association-(MUTEPA)	MUTEPA is a one of the key associations of *mukene* fish processors. It brings together all *mukene* fishers for sustainable exploitation, processing and marketing.
Producers Private sector organizations	Uganda Commercial Fish Farmers Association (UCFFA)	UCFFA brings together commercial fish farmers to support and promote the industry.
	Walimi Fish Farmers' Cooperative Society (WAFICOS)	Provide its membership with essential services such as technical advisory services, input supply, and equipment rental for pond construction, fish harvesting and transport, collective marketing, information dissemination and value addition of farmed fish products. Collaborates with DFR on all issues of aquaculture development and management.
Public institutions Research	National Fisheries Resources Research Institute (FIRRI)	FIRRI is a research institute operating under the National Agricultural Research System; It provides fresh water fisheries production data. Generates the knowledge base and develop fisheries technologies for increased but sustainable fish production, conservation of the fisheries genetic resources, water quality and fish habitat, and ensure product dissemination and quality, develop and manage research and required linkages with stakeholders. It is the research arm of DFR where decisions on management of the resource are benchmarked.
	Aquaculture Research and Development Center (ARDC)	ARDC is affiliated with FIRRI and carries out research in aquaculture, aquatic environment health.

Public regulatory agencies	Local Government	The Local Government Fisheries Departments (LGCA) is the fish inspection body responsible for the statutory inspection, certification and control of fish and fish products under delegated or authorisation by the CCA.
	The Department of Fisheries Resources (DFR) of the Ministry of Agriculture, Animal Industry & Fisheries	The Department of Fisheries Resources (DFR) is responsible for all matters relating to fish including quality and safety. As the Central Competent Authority (CCA) DFR is responsible for statutory inspection, certification, monitoring and control of fisheries activities, aquaculture and the analysis and monitoring of fishery products. Also the Department retains the responsibility for setting and enforcing the standards and regulations for practices pertaining to fisheries.
	Uganda National Bureau of Standards (UNBS)	UNBS is mandated to develop and promote standardisation, quality assurance, laboratory testing and metrology. It is the national apex body on standards formulation in all fields including fish. DFR collaborates with UNBS in formulation of relevant standards like labeling and packaging, fishery products, potable water etc.
	National Water & Sewerage Corporation (NWSC)	Operate and provide water and sewerage services. The Department relies on NWSC to supply potable water supply and management of effluent in fish processing plants
	NEMA	The principal agency, charged with the responsibility of coordinating, monitoring, regulating and supervising environmental management. It spearheads the development of environmental policies, laws, regulations, standards and guidelines; and guides Government on sound environmental management. DFR relies on NEMA on issues of Environment impact assessment for newly constructed fish processing plants and commercial fish farms including cages. In addition, approves waste management plants for fish processing plants.

	Directorate of water Development -DWD	DWD is responsible for providing overall technical oversight for planning, implementation and supervision of the delivery of urban and rural water and sanitation services across the country, including water for production. DWD is responsible for regulation of provision of water supply and sanitation and the provision of capacity development and other support services to Local Governments, Private operators and other service providers. DFR collaborates with DWD on issues of waste discharge permits, monitoring of effluents, water abstraction permits as well as permits for cage fish farming/ cage culture.
	Uganda Bureau of Statistics (UBoS)	UBoS is the principal data collecting, processing, analyzing and disseminating agency, responsible for coordinating and supervising the National Statistical System which ensures collection, analysis and dissemination of integrated, reliable and timely statistical information. DFR collaborates with UBOS on issues of fish trade and contribution of fisheries to the Economy.
	Beach Management Units (BMUs)	Organization of fisher folk at the beach (boat crew, boat owners, managers, charterers, fish processors, fish mongers, local gear makers or repairers and fishing equipment dealers) within a fishing community.
Regional Bodies	Lake Victoria Fisheries Organisation (LVFO)	The LVFO is a regional organisation under the East African Community, responsible for coordinating and managing fisheries resources of Lake Victoria.
Education institutions	Fisheries Training Institute (FTI)	FTI provides fisheries training at the community level as well as for staff in fish processing industry, fish farms, Government departments & development.

A list of service providers for laboratory testing for exported fishery products in Uganda is given at table 22.

Table 22: Service providers on Quality Assurance and Certification in Uganda

Name	Status	Testing Capacity	Products Tested	Responsible Ministry or Institution
1.Uganda Fisheries Laboratory	Public with National recognition	Microbiology: pathogens and spoilage bacteria, Moulds and yeasts; Sensory evaluation.	Fish , ice and water	Ministry of Agriculture, Animal Industry & Fisheries.
2.Chemiphar (U) Ltd	Private accredited lab for both microbiology and chemistry	Microbiology : pathogens and spoilage bacteria, Moulds and yeasts; Chemistry: Heavy metals, hormones, pesticides, PCBS, Dioxins, PAH, substances	All Food including fish , water and ice, farmed fish samples	Privately owned
3.UNBS - Microbiology Laboratory	Public lab with accreditation for food microbiology	Microbiology : pathogens and spoilage bacteria, moulds and yeasts	All Food stuffs both fresh and processed including Fish , water & ice	Ministry of Trade Industry & Cooperatives
4.UCDA - Quality control laboratory	Public with National recognition Microbiology/ Chemistry	Coffee in terms of Coffee/Moisture, Size, Sensory, Ochratoxin, Mycology	Coffee	Ministry of Agriculture, Animal Industry, Crop Department.
5.Uganda Industrial Research Institute –Food Science and Technology Laboratory	Public with National recognition Analytical Chemistry, Microbiology and Mineral laboratory	Undertakes research in industrial processes and technology for adding value to food products. The division is responsible for running pilot plants for processing dairy, meat, bakery, fruits and vegetable products. ***Note: currently this lab is supporting a private woman processor in fish sausage making***	Fish sausages dairy, meat, bakery, fruits and vegetable products	Ministry of Trade Industry & Cooperatives

6.Makerere University Food Technology and Business Incubation center -FTBIC Laboratory	Public with National recognition Microbiology	Food Technology and Business Incubation center is the first university based technology and business incubator in the East and Central African region.	All foods especially juices and fruit drinks, confectionary products.	Ministry of Education
7.Food Biosciences Research Centre (FBRC),under the National Agriculture Research laboratories-Kawanda	Public with no recognition mainly carries out proximate analysis of food products and certification	FBRC is one of the nine units under National Agricultural Research Laboratories (NARL) mandated to conduct research in food preservation, processing, storage, quality, safety, hygiene, nutrition and marketing	All foods	Ministry of Agriculture, Animal Industry, NARO
8.Ugandan Government Chemist and Analytical Laboratory	Public with National recognition mainly in Microbiology and Chemistry.	Vitamin, Proximate analysis, Fat characterization, water analysis, Assay, Contaminants, Acid/Peroxide values, Iodine No., Pesticide residues, poisons, forgery, identification, foreign matter, DNA, etc	All foods	Ministry of Internal affairs
9.Makerere University College of Veterinary Medicine Microbiology laboratory	Public Teaching / Research Laboratory not accredited	Microbiology	Animal food products	Makerere University School of Veterinary Medicine
10.Pesticide Analytical Laboratory	Public and in the process of being operationalised	Pesticides	Food crops	Ministry of Agriculture, Animal Industry & Fisheries

B. Ethiopia

Federal Ministry of Agriculture - The Federal Agriculture Bureau develops policy guidelines to the sector and liaise with implementing institutions such as Regional Agriculture Bureaus and Regional Trade and Industry Development Offices.

Regional Agriculture Bureaus - The regional bureaus and offices develop their own fishery policies and implementation guidelines, to assist fishermen organise themselves to improve their livelihoods.

Fisheries and Other Living Aquatic Resources Research Centres (at Hawassa, Sebeta, Addis Ababa, Zwai, Oromia Region ,BahirDar, Amhara Region) - The federal and regional research and extension office ensure that national and international assistance for fishermen are delivered to cooperatives, middlemen or others involved in the fishery business. They also look after any technical and capacity problems and help the fishermen to improve their incomes and provide support from governmental or regional resources. They also engage themselves in consultancy services sponsored by donor organizations, to generate scientific information and provide training to help Ethiopian traditional fishermen.

Ethiopian Chamber of Commerce - The Ethiopian Chamber of Commerce, Addis Ababa, issues soft copies and directory of business firms operating in Ethiopia with their addresses. It does not however issue any periodic bulletins on market information of any commodity, including fishery products.

Fish Processing and Marketing Enterprise (FPME) - The state owned company, Fish Processing and Marketing Enterprises (FPME) used to monopolise in buying, processing and marketing of fish, harvested from lakes around the country. The current government privatised FMPE and it has now to compete with growing number of private entities in doing their business.

Addis Ababa City Administration Marketing, Investment and Health Offices - This office provides service in quality control regulations for the administration of hotels, marketing of agricultural products and others is being compiled. However, the office does not have any specific regulations to control and standardise fish shops in Addis Ababa. The certifications provided for business permit and quality control is the one that has given to the main fish processing centre of the FPME and this certification is the same as the one given to butchers of any restaurant. It was learnt that the office is currently developing quality control regulations for butcheries and for fish shops. At present, fishery is not in their priority list.

The municipalities - The municipalities of adjacent fishing grounds are involved in the management of fishermen's cooperatives by taking some control on the sanitary issues of some fish retail shops, fish restaurants and the health status of the workers there.

The Ethiopian Environmental Protection Agency (EEPA) - conducts research on the ecology of the aquatic systems.

Arba Minch Multipurpose Basic Cooperative - It was established by the Trade and Industry Development Office of the region to supply its catches to selected middlemen

and major hotels keeping behind some portions of the stock to individual ArbaMinch city dwellers and to supply to the fish restaurants run by the same cooperative. ArbaMinch through the office of fishermen cooperative collects fresh gutted Nile tilapia and filleted Nile perch.

Fishery cooperative at Lake Hawassa - This cooperative is organised in such a way that it handles its catch all the way from collection centers from fishermen, to supplying it to individual consumers and star hotels.

C.Kenya

Table 23 summarizes the role of key service providers in Kenya related to the fisheries sector development in the country.

Table 23: Fisheries Service Providers in Kenya

Ministry of Fisheries Development	The lead Government agency responsible for utilisation, development, exploitation, and management of fish and fisheries development - Enforce the Fisheries Act Cap 378 - Enforce management standards recommended - Training and capacity building of BMUs & extension staff - Registration and follow-up on fish marketing commodity associations
National Food Safety Coordination Committee (NFSCC)	It is a multidisciplinary committee bringing together experts from different agencies. Coordination of fish safety issues
Government Chemists and Public Health Laboratories	Capacity to conduct laboratory analysis; this especially affects players in up country. Laboratory analysis for the fish and fish products
Local authorities	Mandated to plan and approve physical developments within their areas of jurisdiction - Survey of access roads and - Approval of infrastructure development plans - Development of Infrastructure (roads & markets) - Provision of portable water & sanitation facilities
Kenya Bureau of Standards	KEBS is responsible for metrology, standardization, testing and quality management issues in Kenya. The aims and objectives of KEBS include preparation of standards relating to products, measurements, materials, processes, and their promotion; certification; assistance in the production of quality products; improvement of measurements accuracies and dissemination of information relating to standards. As regards fish, the KEBS undertakes microbiological laboratory testing for fish and fishery products.

Kenya Fish Processors and Exporters Association (AFIPEK)	AFIPEK, which was established in the year 2000, is a professional association of the fish subsector with membership drawn from processors and exporters of fish and fishery products from Kenya. All fish processing/exporting companies are members of the Kenya Fish Processors and Exporters Association (AFIPEK). It is coordinated through a secretariat based in Nairobi, which serves the various members located in Kisumu, Nairobi and Mombasa.
Kenya Marine Fisheries and Research Institute (KMFRI)	KMFRI is specifically in charge for conducting research on fisheries and general aquatic systems in Kenya. KMFRI conducts research in six broad areas, namely fisheries biology (stock and catch assessment, fish production, genetics and breeding etc.), aquaculture (pond construction, stocking, reproduction, feed formulation etc.), aquatic environment (water quality, pollution etc.), fisheries socio-economic status (fisheries development, management, livelihoods etc.), fish quality and post-harvest fish technology (fish quality standards, fisheries products development etc.), and fisheries database management (fisheries statistics, data management etc). The main beneficiaries of KMFRI's research are the Department of Fisheries, IFPs, artisanal processors and traders and fishermen.
Lake Victoria Fisheries Organization (LVFO)	The LVFO is a regional organisation whose objectives are to foster co-operation among the supporting parties (Kenya, Uganda and Tanzanian governments); harmonise national measures for the sustainable utilization of the resources of Lake Victoria; and to develop and adopt conservation and management measures to assure the lake's ecosystem, health and sustainability of the living resources. Its secretariat is based in Jinja (Uganda). Its responsibilities include: Promoting the proper management and optimum utilization of the fisheries resources of the lake, enhancing capacity building of existing institutions and develop new ones, and provide a forum for discussions of the impacts of initiatives dealing with the environment and water quality in the lake basin and maintain liaison with existing bodies and programmes among others.
Lake Victoria Fisheries Research Project (LVFRP)	The LVFRP was funded by the EU with a total budget of approximately EURO 9.3 million. The first phase of the project started in 1989, initially scheduled to run for a period of one-and-a-half years. The first phase principally focused on the rehabilitation of the existing research vessels in Kenya and Uganda and to construct a new one in Tanzania. Phase II of the project commenced in 1997 and was scheduled to end in 2002. The objective of this phase was to create a viable regional fisheries management framework and the creation of the knowledge basis required for the regional management of the lake fisheries.

OSIENALA	(Also referred to as Friends of Lake Victoria) is a national NGO registered in Kenya in 1992 and currently operates mainly in Nyanza and Western Provinces. The main objectives of the NGO are: to create environmental awareness for the conservation and protection of Lake Victoria and its catchment area from further degradation; to serve as a forum for exchange and expression of the views on environmental matters in the lake; provide necessary training to community members involved in reducing environmental degradation around the lake region; to encourage and carry out research in relevant areas of environment with the aim of finding practical and sustainable solutions; to establish and maintain a resource center on matters and issues relating to the lake for purposes of improving the knowledge base of the community around it; and to articulate the views, concerns and aspiration of the lake resources and stakeholders through the establishment of collaborative linkages with similar organizations; with the aim of harmonising issues related to the lake for the purpose of exploiting the resources judiciously
Young Women Christian Association	This is a national organization of young Christian women whose corporate vision is to build a society where girls and women are able to fully exploit their potential. The association mobilizes women to participate in development activities by assisting them to raise funds and manage the investments (e.g., hostels and conference halls etc.). The organization's program focus is on capacity building, through integrated Youth and Women development programs, whose aim is to improve the living standards by providing training in leadership, training in business and credit management skills, vocational skills and exchange programs. The organization is also involved in youth issues (reproductive health/HIV Aids); economic empowerment, advocacy and awareness on topical issues, and water and environment issues.
IUCN	The IUCN contributes to Kenyan fisheries, mainly through its program on socio-economics of Lake Victoria fisheries, which is implemented in collaboration with government research institutions and local NGOs in Kenya, Uganda and Tanzania. The program promotes involvement of the local community in management. The objectives of the project include: understanding the socio-economic conditions of various stakeholders and building capacity of the stakeholders to manage the fisheries in a sustainable manner. At the international level, the main institutions currently providing support to the fisheries sector around the lake and the country as whole include FAO and IUCN

Community Based Organisations

Beach Management Units (BMUs)	Currently, these are the most active and effective of the Community Based Organizations. They are present at all designated landing sites. Each BMU committee is made up of 5 to 9 persons, about half of whom are elected by the local fishing community, while the rest are nominated. BMUs are independent of government and lack legal authority. They are maintained through a levy of 1 Ksh/ kg imposed on all the landed fish catch. They have been found to be highly accountable to their communities and to be effective. The functions of the BMUs include resolving conflict, punishing offenders, convening community meetings, establishing beach hygiene and sanitation facilities, providing security on the beach and in the fishing ground, receiving visitors, registering beach members, facilitating search and rescue, and the establishment and maintenance of beach infrastructure. Since members of these units come from the community, it can be easily recognized when the BMU's have failed to deliver, according to the community's expectations.
Fishermen Associations	During 1950s, fishing was managed under loose community based associations, often under an existing clan constitution within the framework of traditional structures. Some fishermen have remained as members of both; though many are inclined to market under the Associations. By 2002, there were only 35 active cooperative societies with approximately 7,900 members with Kisumu, Suba and Migori, accounting for about 73% of the membership. In every beach, a beach leader supported by a committee of 5 to 9 people is appointed by the community to ensure that fishing is undertaken in compliance with the laid down rules and regulations, promote peace and security at the beach, resolve conflicts, receive and approve immigrants. The committee intermediates between the community and the Fisheries Department, although the committee is not recognised in the Fisheries Act.
Fishermen Co-operative Societies	In most fishing clusters, fishermen have formed cooperative societies which are responsible for marketing fish for their members as well as ensuring that members' interests are protected. Unfortunately, these cooperatives are often ineffective and most members tend to evade marketing through them. There are about 46 fishermen co-operative societies around the Lake Victoria districts alone. They operate under the authority of the Co-operative Societies Act. Their functions include providing fishing gears, material for boat maintenance, fuel, fish transport, fish preservation facilities and organized marketing. Just like all the cooperative circles in Kenya, most of these cooperatives have not been doing well and to survive, some of them are dabbling in providing banking services.

Source: The Kenya's national report and The Kenya Capture Fisheries Value Chain: An Amap Value Chain Finance Case Study

D. Sudan

The following Table 24 gives summary of service providers related to fisheries sector in Sudan

Table 24: Major Service Providers in Sudan

The Ministry of Animal Resources	The ministry is responsible for fisheries sector development under Fisheries General Administration whose director reports to the minister, through the Under Secretary for Animal Resources.
Fisheries Administration	The FA mandates the management and development of fisheries (at both state and federal levels) to ensure sustainable utilization of resources .The tasks of the FA include the harmonization between states to ensure effective legislation for integrated sustainable exploitation of fishery resources .The responsibility also covers setting joint policies in respect of foreign aids and operations in territorial waters. The FA has a number of Federal Departments (Capture Fisheries-Aquaculture-Legislation Regulation and Conservation- Statistics and Marketing) all centered at Khartoum, working in connection with the Federal government.
The Fisheries Research Centre	The research centre is responsible for research on fisheries at the Federal level. It is part of the Animal Resources Research Corporation, which is affiliated to the Federal Ministry of Animal Resources and FA. As a national institute its work is based on specialized state research stations, covering Inland and Marine Fisheries of the country.
Institute of Environmental Studies and Faculty of Science, Faculty of Science (U. of K.), Oceanography and Fisheries Department (U. of Red. S.) and Fishery Departments and sections (Universities of Juba now "Bahri", Sennar, Nelein and Gezira).	The main task of these institutions are for education, training and research related works, including in fisheries

3.9.4 Challenges and constrains (weak links)

Challenges and constrains faced by the fisheries sector in IGAD member countries are enormous and vary from country to country, as well as from one species to another. Uganda and Kenya which have relatively advanced fisheries industry face different level of challenges and constrains, compared to Ethiopia, Somalia, Sudan and South Sudan, where artisanal fishery is very dominant with lack of appropriate infrastructure facilities for handling and distribution. The following Table 25 gives a compilation of challenges and constrains along the value chain in IGAD member countries, based on country reports.

Table 25: Challenges and Constraints along the Value Chain in IGAD Countries

Country	Major Species	Main Challenges/Constrains
Ethiopia	Tilapia, Catfish, Nile perch, *Barbus*	• There is no free market in the value chain and limited free competition having government intervention through fishermen cooperatives. • Producers are not treated on equal basis by government institutions (cooperatives are given incentives, but private producers are subject to various taxes and denied access to landing sites). • Quality assurance programme at all levels of the chain almost non existent • Most of the stakeholders do not have much appreciation of the life cycles of fisheries resources • There are no association of various actors in the market chains • There is a severe shortage of recorded data. Most of the available data come from the recently privatized fish processor and trader, the FPME • In practice, fishermen almost have no access to resources, which affects the parties involved in the market chain.
Uganda	All fisheries sector (general)	• Limited supply of quality fish for exporters and processors • High Post-harvest losses (poor storage, lack of cold chain, sanitary facilities and handling methods) • High Fuel and freight costs since Uganda is a land locked country. • High operational costs make it difficult to compete with other competitors in the export markets

	• High initial capital costs to comply with export markets e.g. verification of HACCP systems and conducting residue monitoring programme • Proliferation of private standards. • Inadequate infrastructure(landing sites, potable water, ice) • Lack of standards and laws for pelagic fish species • Limited value addition • Low demand in the local market • Static fish consumption pattern targeting mainly fresh fish • Low acceptance for farmed fish • High initial cost of fish farming: • Poor seed quality and expensive feed, inadequate capacity to produce high quality seed and feed. • Lack of data on regional fish trade for planning and decision making. • Limited infrastructure at border points • Limited awareness on market information by regional fish traders • Lack of harmonized measures (policies, standards, procedures, recommendations, guidelines and laws) by regional trade partners. • Trans-boundary conflicts over shared water resources.
Nile perch	• Declining catch over time, due to increased number of boats • Use of undesirable and illegal methods that destroy fish breeding grounds (destructive, resource crunch, unfriendly gear) • juvenile fish catch • High post harvest loses • Inadequate infrastructure – fish markets, storage, ice production.
Tilapia	• Cross border trade to evade taxes • Trafficking juvenile fish, which is the main cause of IUU.
Mukene	• High post harvest losses due to poor handling and processing method
	• Lack of drying racks and the use of traditional, rather than improved processing technologies • Limited value addition, with the main processing method being sun-dried.

		• Short shelf life of the product due to limited processing technology. • Limited harvesting technology based mainly on light and lampara nets, which do not allow inshore fishing of good quality *mukene*. • Makeshift packaging materials and practices and inappropriate transport facilities cause substantial quality as well as physical post-harvest losses. • Lack of national standards against which processing of *mukene* can be regulated. • Lack of appropriate storage facilities to keep the products in hygienic and safe manner. • Poor transport means for *mukene*. • Insects Infestation that affect acceptability of *mukene* products, especially among the high social status group who have a strong purchasing power.
Kenya	All fisheries sector (general)	• Poor Post harvest handling • Insecurity • Poor Roads • Inadequate supply of ice • Transportation (expensive, unreliable, limited) • Price fluctuations • Non-availability of clean water • Power tariffs • Multiple taxes • Undersized fish • Post harvest losses
	Nile perch	• Scarcity of the raw material (L. Victoria) • Unpredictable pricing regime • Global economic crisis
	Tilapia	• Poor marketing arrangements, • Trade barriers in the regional markets • Insufficient market Information • Inadequate supply • Post harvest Loses • Lack of branding • Cheap imports
	Omena	• Poor drying methods • Poor packaging • Lack/ inadequate/inappropriate storage • Many police road blocks

		• Unclear export/import procedures
	Marine products	• Training entrepreneurs • Storage facilities (storage tanks) • Capture of berried lobster • Use of wrong fishing gears • Value addition • Campaigns to eat beyond coast in the country
Somalia	All fisheries sector (general)	• Low price and lack of market information are the main problems for fish producers • Lack of fisheries infrastructure, particularly jetties, fish markets, feeder roads and airstrips as well as complementary post-harvest facilities in the bigger towns that can serve as outlets for the existing facilities on the coastline. • Lack facilities in fish markets • Most of the fish/ fish products do not meet required international standards of hygiene and quality, suitable for exports • The absence of governance and a regulatory fisheries management framework. • Lack of local and international marketing outlets • Absence of credit facilities for the stakeholders • Lack of certification mechanism owing to the absence of a competent authority in the country. • Fishermen's lack of knowledge on modern fishing techniques including fish handling and preservation • Lack of sanitation and hygiene in packing /storage houses and fish shops. • Direct and indirect negative effects of the activities of piracy and anti-piracy of foreign natives • Irrational and unsustainable exploitation of the fisheries resources by IUU foreign fishing vessels and by local fishermen, who target coastal resources. • Lack of implementation of laws for sanitation and hygiene along the supply chain • Internal demand for fishery products in Somalia is still very low, due to traditional diet (which is biased toward meat).
	Lobster	• Its significance has in recent years decreased due to declining catches, occasioned by high fishing pressure exerted on the stocks, since commercialisation of the fishery in the 1980s. • The fishery is open access with no restrictions at all, on catches

		• Due to limited freezing space, traders freeze the catches of the day in the same reefer trucks that have already contained frozen products from previous fishing operations. This makes the frozen tails to eventually develop black spots as a result of temperature fluctuations. • Dependency on UAE market (buyer) since the product has no access to other lucrative markets.
	Shark	• Free access to shark fishing that can lead to over exploitation, due to high demand for its dried meat and fins. A number of shark species (e.g. saw shark, hammerhead shark, white shark and macho shark) have totally disappeared in some areas, while the average size of some other shark species landed has decreased over the last 5 years • Because of improper handling, processing and storing, dried shark meat produced in Puntland is of poor quality with attendant post-harvest losses, estimated to be as high as 40%.
	Finfish	• Highly dependent on Yemeni boats and markets, particularly for high value large pelagic fishes. Based on an average cargo of 10 tons of fish/boat/trip, the Yemeni boats buy and export a total of 3,600 tons of fresh fish/month which translate into 28,800 tons/year (i.e. 360 boat trips x 10 tons x 8 months). • Catches are sorted out at sea and only target (accepted) species are taken to the boats for sale, while the rest are thrown away, especially in areas where there are no local buyers. • Lack of marketing and post harvest facilities for selling fresh marine finfish in the local market. • Market for fresh fish in certain areas is not well developed, making the fish being sold at very low price. • Due to poor distribution network, fresh fish is not easily available in major cities which are far from landing sites.
Sudan	Freshwater fishes and marine	• Weak institutional capacities in terms of manpower and research (specially in terms of stock assessment). • Weak policy framework and fisheries legislation • Poor data collection and inadequate information on fishery resources. • Poor organisation of the artisanal fisheries and their low socio-economic profile. • Low development of aquaculture in spite of its potential.

		• Relatively high post-harvest losses in fish handling. • The development and management of the Sudan fisheries is basically hindered by long distances between resources and marketing areas. • Lack of basic landing, transport and storage facilities. • The problem is aggravated by difficulties in modernisation and mechanisation of a largely and basically subsistence fishery, dependent on traditional technology (fishing gears and methods and preservation and curing practices). • The situation is even worsened by the often localised demand for fish (basically at Khartoum and other main cities) and the unwillingness of a large portion of the Sudanese population to accept fishing as an occupation (despite possibly, the highly promising economic rewards of the work) • Fishing is regarded as an occupation of low status and standard, meant only for the poor and special groups. • Lack of direct air routes between Uganda and Sudan, which makes it necessary to transship fish consignments through intermediate airports. This leads to additional costs and risks of spoilage, due to mishandling, preservation and clearance. • Lack of direct correspondent banking systems between Sudan and fish exporting countries, a situation forcing fish importers to channel their financial transactions through currency exchange agents, with higher change rates.
South Sudan	Freshwater fishes (Tilapia, Catfish, Nile perch, *Barbus* etc)	• Preservation facilities are inadequate, most of the products marketed are processed on site into either sundried or smoked products, constraining production expansion • Marketing facilities are too inadequate, thus very negligible quantities of fresh fish are sold on cash basis within the landing sites and to closer urban markets. • There are inadequate market information system and the extension education service are limited. Fishers and fish dealers have limited market information and price negotiation skills; these hinder the economic feasibility of the fisheries sector.

		• Most fish production sites are in the far remote areas in the Sudd wetlands, isolated from the urban areas and markets, where purchasing power prevails. • Most dealers in the sector are trading on seasonal basis because of inadequate fish business facilities and lack of fisheries financial institutions. • Fish handling and preservation constitute major challenges in promotion of fresh fish • Facilities are inadequate for energy supply in the country, making ice production and supply almost unavailable. Fishers in the country could not access ice nor have ice handling facilities and when ice is available, then it is expensive • During peak season of fishing, higher transportation cost and unregulated and unlimited taxes frustrating traders in the sector. Fresh fish are commonly transported using trucks with cost ranging from USD1, 500 – 3,000, depending on the road conditions and distantnce of the location. • For imported products due to the distance from the origin, inadequate quality control measures (inspection) at the borders, poor road networks, and due to lack of preservation facilities; most of the fish reaching markets in South Sudan are already spoiled.
Djibouti	Marine fish: trevally, wahoo, tuna and grouper	• Lack of infrastructure and facilities (e.g. fishing port and handling facilities) • Lack of storage facilities and ice. • Lack of quality assurance programme in place

3.9.5 Opportunities for Improvement along the Value Chain

The followings are the compilation of opportunities available and improvements needed along the value chain, as identified by the national consultants in their reports:

A. Uganda

In general, the national consultant suggested the following measures to improve the value chain for exportable fishery products:

Construction of post harvest handling facilities like storages, cold rooms, drying racks, landing sites and fish market stalls should be made available to the sector. Other suggestions include strengthening the capacity of officers for conducting official controls

e.g. providing them with fish inspection tools. Construction of public sanitary facilities such as toilets, waste disposal bins; provision of clean potable water sources; training of fishers on post harvest handling along the value chain and undertaking appropriate value addition technologies are also suggested. However, for products sold in the domestic market, it is important to improve value addition techniques and support towards formation of traders associations. In order to improve regional trade within IGAD countries, a regular transboundary meeting is also necessary, in addition to strengthening and implementation of EAC customs union and tripartite agreements of RECs (EAC, SADC, COMESA, IGAD) are suggested. Building synergy with other authorities like customs and immigration, and conducting joint enforcement operations with neighbouring countries is also suggested.

The followings are the list of opportunities available for Ugandan fisheries sector, identified by the national consultant:

- Increasing demand in the export market for Nile perch products.
- High premium prices offered for Nile perch.
- Approval of exports of aquaculture products from Uganda to EU.
- Huge market potential of fishery products in the domestic, regional and international markets.
- Liberalised economic policy framework.
- Existence of 21 EU approved and certified fish processing establishments and 32 gazetted landing sites.
- Designated, well structured and resourceful Competent Authority (DFR)
- Access to accredited laboratories.
- High demand for fresh fish in the local market.
- Increasing population growth rate.
- Enabling Government policy framework towards enhanced production and productivity of fish and aquaculture (NDP, MAAIF- DSIP and CAADP)
- Abundant fresh water resources that can support fish farming and restocking of capture fishery.
- Increase in Developing Partner support with International Organisations (ICEIDA, UN FAO, UN WFP, WB, EU, USAID, China etc)
- High demand of fish among regional markets.
- High population of regional markets.
- Limited production potential for capture fisheries among main regional market and niche markets
- Uganda's subscription to various regional RECs (EAC, COMESA, NEPAD, IGAD, LVFO)

B. Ethiopia

As indicated earlier, fisheries sector in Ethiopia needs major overhauling and structural changes to increase fish supply for its huge population. Thus, in general, there is a great opportunity for the sector to further develop as the consumption of fish among the locals is still very low. Promoting fish among the consumers will require more supplies, particularly from aquaculture. Hence therefore there is an opportunity in developing aquaculture in the country. The national consultant suggested the following measures to improve the existing system:

- Like any other agricultural commodity, there should be a platform where producers, processors and traders exchange market information. Presently, transactions are taking place at discrete level for short-term benefits for individuals or a unit of operators, such as cooperatives.

- The formation of trade unions will open up many doors for stakeholders, whereby they can promote their interests as a single unit and pay the due cost for the appropriate use of resources.

- Each operator needs to be aware of the importance of the other. Each needs to be aware that they are the part of a big puzzle. The whole puzzle can only be solved if all appreciate the value of the other, to enhance the value in the next link in the chain. For instance, it is only when the producer provides the processor, a clean well preserved fresh fish, that processor packs healthy fillet by adding the product value. It is such a service wherein the end result convinces the consumer to pay the right price for the right quality product. Such an exercise would eventually produce long-term strategic advantage to all operators and sustain the resources and the market chain for a long period.

C. Kenya

Based on the constraints/problems identified by the national consultant, following are some suggestions to improve the value chain for each species in the country:

i) Nile perch:

- Self regulation by all actors to ensure sustainability
- Enforcement of MCS
- Purchase of insulated vehicles and pooling of fish to increase economies of operation
- Purchase of ice making machine

ii) Tilapia:

- Purchase of insulated vehicles
- Pooling of fish to increase economies of operation
- Purchase of ice making machine
- Policy direction on cheap imports

• Training on handling and sanitary condition to be observed in the value chain

iii) *Omena*:

• Adoption of improved drying technologies

• Purchase of transportation vehicles

• Policy direction on other trade impediments

iv) Marine Fishes:

• Self regulation by all actors to ensure sustainability

• Purchase of insulated vehicles and pooling of fish to increase economies of operation

• Purchase of ice making machine

• Enforcement of MCS

• Training on handling and sanitary condition to be observed in the value chain

• Value addition

• Campaign to increase fish consumption

D. South Sudan

The consultant reported that the country has a huge potential to develop fisheries sector further which is estimated to be about 350-450,000 MT per year. However, inadequate production and management capabilities, coupled with lack of modernisation and/ or commercialisation of the fisheries sector, has crippled its prosperity and decreased its contribution to national and regional economies. This study found a sharp increase in number of fishers and fish dealers (vendors and fish supermarket operators) and it is estimated that 3.4 million people of South Sudanese communities are directly or indirectly affiliated to a given fishery, either for food, source of livelihood or on economic basis.

Therefore, the consultant has made the following suggestions to increase fish supply in general and improve marketing aspects in the domestic markets in particular:

• Revitalization of fisheries policy and management in the country

• Capacity development both in soft and hard forms to help increased production and prosperity of the fisheries sector.

• Establishment of National Fish Trade and Market Information Network to link with regional fish trade.

• Its worth to establish a regional database system and formal data sharing mechanism that will support the current and future regional and global food instability.

• To unify fisheries taxation and marketing policy in the region.

• To attain better quality and benefit from the labour as it is very important to work on fish handling, right from production stage to stop rigor mortis and subsequent spoilage of the catch.

• There is an urgent need to improve infrastructure facilities at landing sites

E. Somalia

Understandably, there are a lot of problems and challenges in the country, as result of prolonged civil war that badly affected the development of fisheries sector, which has a huge potential. The following are the areas for improvement, identified by the national consultant:

• The implementation of a proper awareness campaign and improvement of infrastructure as well as better fish markets that would lead to increased local demand for fish.

• There is an urgent need to conduct stock assessment, surveys and other relevant studies in order to establish status, distribution, abundance and fishery resource potential of the target locations / areas.

• Proper and relevant training should be imparted to fishermen in order to enhance their skills in fishing, navigation, fish handling and processing.

• The construction of marketing support facilities such as cold storages, ice making units/ machines etc. in major towns which would boost the domestic fish trade.

• Establishment of price information systems for fishery products in major landing and consumption areas, in order to increase transparency and facilitate transactions.

• Improvement in collection and compilation of fishery statistics system for better fishery resource management, fish marketing management, and planning.

F. Djibouti

Though it is very brief, the country report indicated that the following areas for improvement along the value chains:

• There is urgent need to improve fishing equipment for fishermen and upgrade handling facilities at fishing ports, including catch preservation on board by using insulated fish boxes.

• Strengthening the quality assurance programme.

• Capacity building for fishermen to improve the value of their catches.

• Consumer education programme to encourage more people to eat fish, thus stimulate demand in the local market.

• Value addition of products, not only fresh, but other processed products such as dried, smoked etc.

G. Sudan

The marketing and trade of fishery products in Sudan faces many problems and constraints, as the sector is not given priority for further development. The fisheries production in the country is low, seasonal and inconsistent with inferior quality and high percentage of post harvest losses. The following are some critical areas identified, which needs improvement

• Technical assistance for reducing post-harvest losses, with a strong emphasis on safety, quality and value addition especially to help small-scale operators.

• Establish fishery trade regulation to ensure transparent trading practices among the players.

• Strengthening fishermen association and cooperatives to enable them to participate more efficiently and effectively in co-management and development of the fisheries resources, as well as improvement in fish marketing system and trade.

• Effective maintenance of sanitation systems should be established to include cleaning and sanitation procedures, pest control systems, waste management and monitoring of all facilities and premises along the value chain. All personnel that come directly or indirectly into contact with fish and fishery products should maintain an appropriate degree of personal hygiene and wear suitable protective clothing, head gear and footwear to ensure cleanliness at all stages of handling.

• Improve awareness of stakeholders (especially fishers, traders and processors) on quality assurance programme; improvement on marketing system and trade skill among fishermen, processors and traders, especially for export and import.

3.10 Consumers Preferences

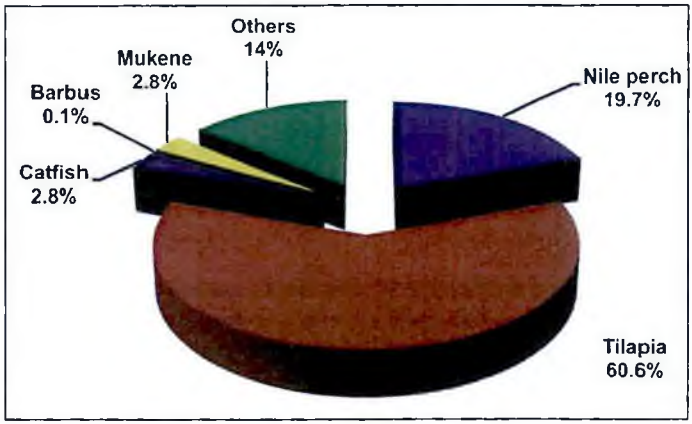
As mentioned earlier, tilapia is preferred and consumed in all IGAD countries with the exception of Djibouti and Somalia where consumers have more access to marine fishes. Except Uganda, fish consumption in other IGAD countries is generally low and meat is preferred to fish. In general, consumers who are close to water bodies have strong preference for fish, compared with consumers who live in other rural areas. Fresh fish is the most common form being consumed locally, but in Ethiopia frozen fillets of tilapia, catfish and Nile perch is also consumed particularly in major cities.

To get more details on the consumer preferences in IGAD countries, the following are the result of consumer survey conducted by national consultants in each country.

3.10.1 Uganda

Results of the consumer survey are in tandem with the results obtained from the existing secondary data sources. Ugandan consumers' preference for fish species are tilapia (60.6%), followed by Nile perch (19.7%), *mukene* (2.8%) and catfish (2.8%) in that order. Under the category of others, fish varieties such as *Protopterus, Alestes,* and *Synodontis* which are commonly harvested from some water bodies like Lake Albert are included. Thus, over a period of time, the consumption preferences by fish species have not changed much, as shown in Figure 18 below.

Figure 18 Uganda - Consumers Preferences by Fish Species

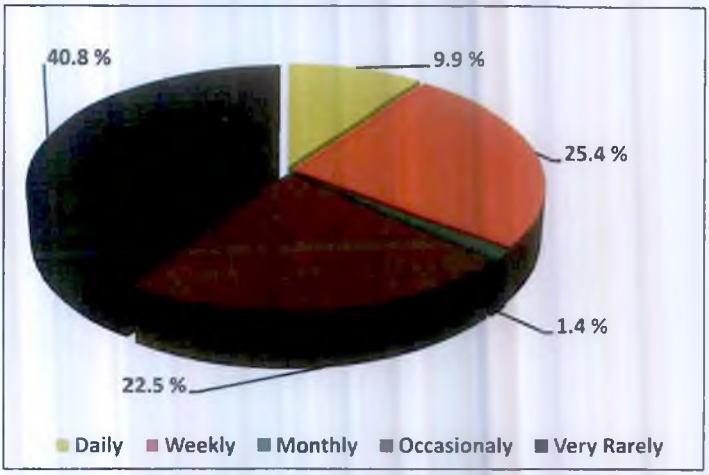


Source: FAO-IGAD Fish quality assessement survey, 2012

Uganda's population is composed of more than 30 ethnic groups and generally tradition of fish consumption is strong in those areas that are in the proximity of major water bodies. However, due to urbanisation, rural urban migration and high purchasing power, fish consumption is higher in urban centres than rural areas. This includes those living near water bodies. Although virtually all species caught in Ugandan waters are edible, some are avoided on certain occasions or by certain categories of people. Even in strong fish-eating localities, for instance, lungfish (*Protopterus*) is not consumed due to cultural norms, where it is a totem, while among some other communities it is not taken by women.

Though fish prices vary according to markets, size of the fish and seasons, the overall prices of fish have been on increase since the beginning of industrial fish processing and subsequent fish exports to international and regional markets, eventually fish has become one of the most expensive sources of animal protein. The survey shows that generally the frequency of consumption of fish is high and is on increase due to the nutritional value and availability. As per Figure 19 below on average 25.4 % of the respondents in Uganda showed consumption of fish on weekly basis. This is in line with high per capita consumption of fish in the country which is at 10.2kg, compared to other IGAD member countries. The domestic consumption pattern is predominantly for fresh fish, followed by smoked, then sundried and deep fried fish. Frozen fish in the domestic market is mainly from chain stores, which target foreign consumers and a few affluent Ugandans, but this accounts for a very small proportion of the consumption segment. However there are also a large percentage of respondents (40.8%) which does not fall under any of the categories (daily, weekly, monthly and occasionally). Therefore there is possibility that these groups do not eat fish or did not give their responses.

Figure 19: Uganda - Frequency of Buying Fish for Home consumption (%)

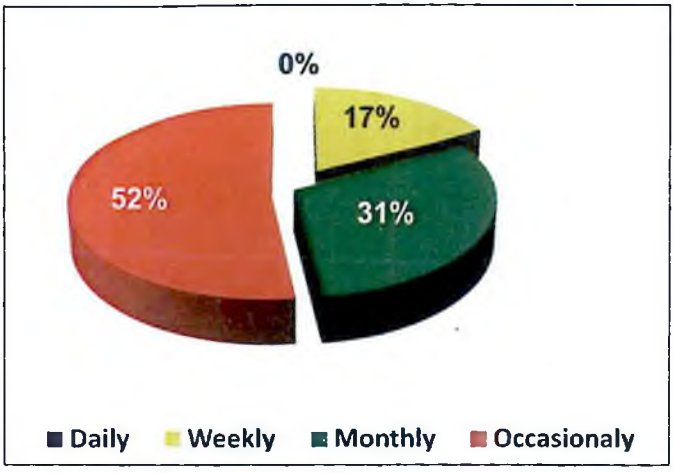


3.10.2 Ethiopia

As indicated before, fish consumption in Ethiopia is very low which is at less than 0.5 Kg per year per person. In general, Ethiopians tend to rely on other protein sources such as beef, mutton and chicken. Tilapia is the most popular fish among Ethiopian and it is confirmed during the survey. A nationwide survey interviewing 127 respondents shows that 93% of them prefer tilapia, followed by catfish (5%) and Nile perch (3%). All the respondents (100%) said that fish is expensive. Though fish is expensive, majority of them (87%) said that the quality of fish sold in the local market is not up to the mark and only 13% said that the quality is acceptable.

Majority of consumers interviewed, buy fish from fishermen (62%) followed by those who buy fish from fish vendor (23%) and only 15% buy their fish from supermarkets. Preparation of fish at home is mainly done by frying fish (90%) and the rest go for other preparations. As fish consumption is low, it is understandable that 52% of the respondents buy fish only occasionally, 30% every month and 17% on weekly basis while no body buys fish on daily basis. As the disposable income among consumers is relatively low, eating out is also a luxury for most of respondents. Around 80% of the respondents said they seldom eat at restaurants, only 9% go to restaurant every week and only 1% eats at restaurant more than once a week (Figure 20)

Figure 20: Ethiopia - Frequency of buying fish for home consumption (%)

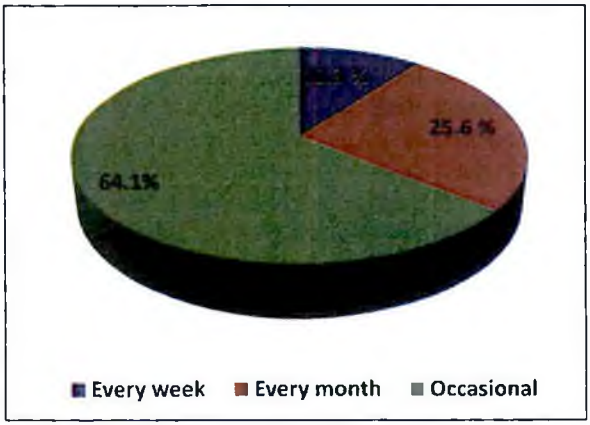


3.10.3 Somalia

As mentioned elsewhere in this report, Somalians prefer marine fish and almost half (48.7%) of the respondents interviewed mentioned tuna as the most preferred fish species, while the rest has shown no species preference and preferred other species such as pelagic species. Since the marketing chain of fish is simple, more than 50% of consumers buy fish from the fish mongers/vendors and 25% buy fish directly from fishermen and the rest gets fish from both sources while nobody purchase fish from supermarkets.

The low fish consumption is also well reflected in the frequency of buying fish, where majority of the respondents (64.1%) said they buy fish occasionally, and 25.6% every month, while only 10.3% buy fish on weekly basis. Eating fish at restaurants is also seldom for most of the respondents as indicated by 46.2%, while 25.6% said they never eat at restaurants. Only about 25.6% respondents eat fish once a week at restaurants.

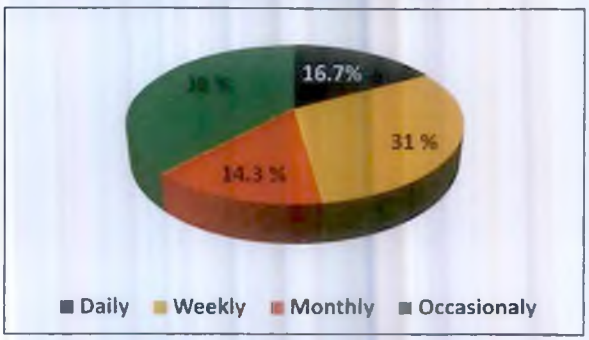
Figure 21: Frequency of Buying Fish in Somalia (%)



3.10.4 Sudan

Though Sudanese are meat lovers, 97.3% of respondents interviewed across the country said that they eat fish, though occasionally. The survey shows differences between states where consumers in Blue Nile state eat fish more often, 54.2% eat fish daily, than other states; while majority of consumers in the Capital Khartoum (83.3%) eat fish only occasionally (See Table 26). At national level, on an average, 38% of respondents buy fish occasionally, followed by buying fish every week (31%) and 16.7% purchase fish on daily basis (See Figure 22).

Figure 22: Frequency of Buying Fish among Consumers in Sudan



Since the disposable income is still low for most of consumers, eating out is a luxury for many of them. Almost 61% respondents said they seldom go to restaurants to eat fish, 27.4% never do so and 1.2% said they eat fish every day at restaurants who are from Blue Nile state, where fish consumption is the highest in the country.

Table 26: Frequency of Buying Fish in Different States in Sudan

Buy fish for home use	Khartoum state		Blue Nile state		White Nile state		River Nile state		Red sea state		Total	
	No	%	No	%	No	%	No	%	No	%	No	%
Daily	0	0	13	54.2%	1	10%	0	0%	0	0%	14	16.7%
Every week	1	5.5%	10	41.6%	5	50%	5	31.3%	5	31.2%	26	31%
Every month	2	11.1%	1	4.2%	3	30%	2	12.5%	4	25%	12	14.3%
Occasionally	15	83.3%	0	0%	1	10%	9	56.2%	7	43.8%	32	38%

3.10.5 Kenya

Surprisingly in Kenya's national report, the result of the consumer survey was not included. The only information on consumer was on general fish consumption per capita and preferences in species. In Kenya, fish is traded and consumed mainly in the following forms:

- Fresh whole round
- Frozen gilled and gutted or filleted
- Gutted, then smoked, sun dried or salted

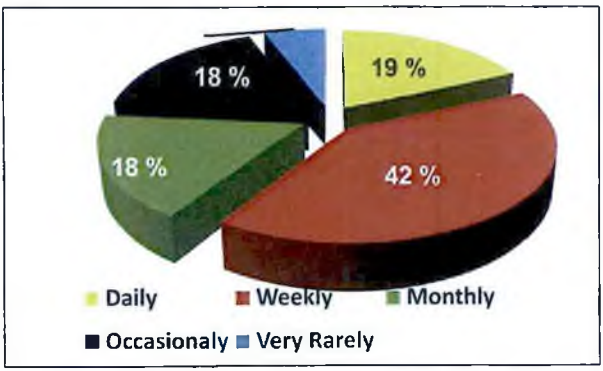
- Canned products

Data from the Ministry of Fisheries development statistical bulletin 2010, indicate that the average per capita consumption of fish in the country is 2.7 kg (108,000MT annually). The whole fish in fresh form and the frozen gutted or filleted fish are drawn from Nile perch and tilapia with the domestic consumptions recorded at 50% and 100% respectively. Most of the marine fishes are also sold as whole round fish in fresh form. The target groups for fresh whole round fish category and the frozen gutted or filleted are high end consumers and the products are mainly traded by the retailers and supermarkets. The balance of the Nile perch fillets (50%) are exported in fresh or frozen condition. The tilapia value chain is fairly straight forward; with the fish being consumed is fresh whole or filleted form. It is not exported from Kenya as it is retained for food security reasons. The smoked, sun-dried and salted fish is sold, mainly for the traditional markets targeting the lower income consumers, both in the urban and rural sectors, with the most common species being *Rastrineobola argentea*. Other fish by-products such as swim-bladder, belly flap, fish skin, fish frame and fish head and rejected fish are also sold for local consumption. The marine fish is mainly sold locally in the hotels along the coast; while a nominal percentage is exported.

3.10.6 South Sudan

As indicated, fish consumption in South Sudan is relatively high, as most cultures of the people support eating of fish and fish consumption have become part of their life style, where most of their social occasions are hosted with special fish dish. Most consumers prefer fresh fish presented either deep fried, fresh soup and/or as pasted dried meal. In the daily meal requirements, the preferred fresh fish species are tilapia and Nile perch. Based on the survey, relatively high percentage of respondents (19%) buy fish daily, while majority of respondents (42%) said they buy fish on weekly basis, followed by occasionally (18%), every month (14%) and only 6% of the respondents said they never eat fish (Figure 23).

Figure 23: Frequency of Buying Fish in South Sudan



Based on the above results, Table 27 gives compilation of buying frequency of fish in IGAD member countries. The majority of consumers (38.9%) interviewed said they buy fish only occasionally, followed by weekly (25.15%) and monthly (38.9%). Only 9.1% respondents indicated that they buy fish on daily basis and these people are basically from Sudan, South Sudan and Uganda.

Table 27: Compilation of Buying Frequency of Fish, among Consumers in IGAD countries.

Country	Daily	Weekly	Monthly	Occasionally	Others/never eat fish
Ethiopia	0	17	31	52	0
Somalia	0	10.3	25.6	64.1	0
Sudan	16.7	31.0	14.3	38.0	0
South Sudan	19	42	14	18	6
Uganda	9.9	25.4	1.4	22.5	40.8*
Kenya	NA	NA	NA	NA	NA
Djibouti	NA	NA	NA	NA	NA
Average	9.1	25.1	17.3	38.9	9.4

* No information on whether this percentage reflects respondents who did give their response of those who do not eat fish.

3.11 Analysis of Post-harvest Loss

There is significant difference between the IGAD countries with regard to the nature of post-harvest losses in the fisheries sector. This is due to the fact that various IGAD countries deal with different types of products, such as fish products from freshwater and seawater salted and dried products. Salted and dried products suffer the greatest loss in terms of value (both nutritional and saleable value). They represent the greatest risk to consumer health, due to low quality of the product and unhygienic standards observed while processing.

This situation is particularly critical in Uganda and Kenya, and to a lesser extent in Ethiopia, where both the freshwater *Dagaa* or *Mukene* fish and the by-products of the Nile Perch (frames) are prepared by small-scale operators. It is generally prepared in the open-air, in sites that are often lack appropriate facilities and exposed to contamination from dust and dirt, as well as from animals such as insects, birds, rodents, dogs and cats that urinate and defecate in the vicinity of the products. The salting and drying of *mukene* fish usually take place directly on the ground, where they are easily inaccessible to vehicles for transportation. Further these areas are with inadequate conditions of cleanliness and sanitation.

Similar to these physical post-harvest losses, there are microbiological risks that can lead to serious gastro-intestinal problems for the consumers which could be fatal, especially among children.

Salted and dried products from Kenya and Uganda are mainly exported to Rwanda, The Democratic Republic of Congo and South Sudan. They are often transported together with other goods, sometimes with non-foodstuffs, which can cause cross-contamination.

The risk of contamination and the consequent risk for consumers' health is much lower in the case of smoked products (mainly *mukene* and tilapia). This is due to the fact that they are treated by a process of smoking, using a very dense smoke that thoroughly dries and seals the surface of the fish, thereby making it less permeable to external agents of contamination.

The greatest post-harvest losses for fresh fish products are caused by high temperatures

to which the products are exposed and lack of ice to prevent spoilage. This is especially relevant to the tilapia, which is transported directly from the landing sites to the large city markets. The product is often transported in open trucks with the fish piled up, one on top of the other, usually covered by leaves or sacks and canvas. This causes a significant reduction of both the products' shelf-life and its value, since it is crushed by the weight of other fish, damaging fish abdomen and guts, causing bacterial contamination.

It is much more difficult and complex to conduct the post-harvest analysis for those IGAD countries that harvest seawater fish such as Kenya, Somalia, Sudan and Djibouti. This is due to the fact that the duration of the fishing trip varies greatly, from as little as one day to as long as a week or two, in the case of large pelagic fish, such as tuna. The greatest post-harvest losses in maritime fishing are caused by failure to maintain the cold-chain, as well as the use of inappropriate landing sites.

Apart from these reasons, fishing activities are largely unregulated. Since unloading of tuna is conducted at sea, it is difficult to assess the exact nature and extent of the contamination of marine fish in IGAD countries. In fact there is no systematic inspection of fishery products by local and government agencies or laboratories and data is therefore lacking or inadequate to assess the histamine content in tuna and other pelagic fishes in general.

The field survey in the IGAD countries and the country by country report clearly suggest that there is an urgent need, particularly among the producers, to gain more concrete ideas with regard to the appropriate quality standards. The questionnaires circulated reveal that fishermen generally have problems answering quality, rather than questions on marketing. In Uganda for example, only 17% of respondents understood the importance of ice in preserving their catch. In Somalia, for example, there is a good level of awareness on the use of ice and insulated boxes, since more than 38% of fishermen understand the importance of ice for preserving the quality of the product and its saleability if kept in ice. Most of the IGAD countries have expressed interest in receiving relevant training in order to enhance their capabilities in fishing, post harvest handling and processing to produce safe fishery products.

In conclusion the scarcity or total absence of ice, used in both marine and freshwater fishing, is certainly the main factor that contributes to the low level of quality of these products and higher post-harvest losses. In addition to this lack of clean potable water at the designated landing sites and the very limited use of isothermic or proper insulated boxes and vehicles, either in the actual phases of fishing, handling and storage of the fishery products or for its transportation to the places of sale, are additional causes for sanitary/quality problems with fishery products in IGAD countries. These latter problems could be more easily resolved than the problem of lack of ice, which requires major investments in setting up of ice plants and lack of willingness by customers to pay a premium price for iced fish products, even though they are of a better quality.

3.12 General Constraints/Problems on Fisheries Trade/ Marketing for each Stakeholder

The followings are compilation of constrains/problems faced by stakeholders in all countries, based on results reported by national consultants.

3.12.1 In Fishing/Business operation

Stakeholders	Constraints in Fishing/Business operation
Fishermen/ producers	• poor catches due to reduced stocks, • free access to resources • theft of gears and other fishing equipment, • fishermen In some countries still using very simple fishing gears • high cost of inputs (engines, nets, fuel, life jackets etc) • lack of affordable credit facilities • problems of accessibility to some landing sites • fishing cooperatives such as in ArbaMinch (Ethiopia) are required to sell their catches to selected middlemen • Landing sites compete with other agricultural and other livelihoods to access the water • Fishermen who do not have any other alternative livelihoods complain that at times of low catch their incomes decrease so much that, they find it difficult to support their families • Co-operatives operate independently and no cooperation between them to conserve resources. There are `conflicts between members of different cooperatives. • Increase in population of crocodile and hippopotamus in water systems, is slowly becoming threats to safely of fishermen and damage to their fishing gears. • Poor marketing skills • Poor sanitation and handling practices • High post harvest losses • Lack of ice and its high cost • Expensive transportation / Lack of insulated containers • Poor grading or no grading at all • Transportation problem during rainy season • No life safety jackets/Insecurity in fishing ground
Traders/ middlemen	• Limited supply of ice, which is also expensive • Fish spoilage, resulting from inadequate supply of ice and prolonged stay on the water or at landing sites, when catches are poor • Lack of market information • Price fluctuation, especially when demand is high and catch is low • Inadequate hygiene at landing sites and market places • Frequent interruption by undisciplined and corrupt fisheries law enforcement officials • high taxation

Processors	• Unreliable supply of raw material. • Fluctuation in demand of fish. • High cost of production due to cost of utilities like power, water and freight. • Uncertain currency exchange. • Unreliable power supply, leading to failure to maintain cold chain or use of more expensive means like diesel generators • Lack of knowledge on hygienic and sanitation aspects
Retailers	• un-calibrated weighing scales • unreliable fish suppliers • competition with the industrial processors for reduced Nile perch supplies • high taxation • poor infrastructure in the markets • lack of affordable credit and • lack of reliable market information

3.12.2 Selling fish

Stakeholders	Constrains/problem in selling fish
Fishermen	• Lack of reliable market information • Beneficiaries /Price takers • High taxation • Price fluctuation, especially when catches are high • Monopoly by certain co-operatives or agents • Low selling price during peak season • Limited alternative outlet for selling fish • Long distance between landing sites and markets
Traders/middlemen/ Processors/Retailers	• Price fluctuation especially when demand is high. • Lack of reliable market information. • High transportation costs • Fixing price by industrial processors based on the international market. • Short supply of fish and poor quality • Lack of credits to improve their business • Shortage of shops in highly populated cities and towns makes consumers reluctant to travel long distances to buy fish • Poor marketing skills • Poor market facilities • No ice for use in the markets • Inadequate storage facilities for both fresh and dry fish • Poor sanitation and handling practices • Post harvest losses • Poor grading • Lack of Ice boxes

3.12.3 Transportation and handling fish

Stakeholders	Constrains/problem in Transportation and handling fish

Fishermen
Traders/middlemen
Processors
Retailers
	• Lack of ice on board.
	• Lack of space for ice boxes/insulated boxes on boats, inadequate hygienic transport facilities at landing sites.
	• Lack of a designated place for fish storage in the boat, especially if the catch is big and lack of ice to preserve the catch.
	• Inappropriate and inadequate transport means for the local and regional markets.
	• Fish transporters and handlers in general lack adequate knowledge in fish hygiene and sanitation.
	• Transportation Barriers in Uganda Roads (to Kenya)
	  • Lack of information on cross border trade
	  • Limited air cargo connectivity between IGAD member countries that discourage more trade on fresh fish in the region.
	  • High transportation costs (air and truck/lorry).

3.12.4 Infrastructure

Stakeholders	Constrains/problem in Infrastructures
Fishermen Traders/middlemen Processors Retailers	• Inadequate hygiene facilities at landing sites. • Poor infrastructure in the market. • Poor road network, especially access roads leading to landing sites. • Unhygienic processing facilities used by artisanal processors • All season road access to fish landing sites is a major problem in IGAD countries • Need for Cost effective machinery for ice production in both the markets and landing sites • Inadequate Storage facilities • Road networks are not good, particularly to cross the borders

3.12.5 Others

Stakeholders	Constrains/problem
Fishermen Traders/middlemen Processors Retailers/restaurant/ consumers	• High fish prices, • Poor quality of fish, • Unhygienic facilities in markets; • Weak law enforcement in fisheries management • No proper regulatory framework related to fish marketing and quality assurance programme in some countries, except in Uganda and Kenya. • Inadequate and unreliable supply of fish. • No co-management mechanisms that should be in place for the sustainable use of resources. • There are not many efforts to bring illegal fishermen onboard or provide them other forms of livelihoods • Government institutions, both federal and regional, have not brought together knowledge of researchers, experts, extension agents and the experiences of the fishery business operators together, to increase the awareness of stakeholders at all value chains. • All stakeholders and specially institutions do not seem to know, what can be done with fish species that are not commercially important now.

3.13 Needs assessment (assistance most needed) of stakeholders

Based on the survey, the stakeholders in each country require the following assistances which are computed here under:

Stakeholders	Assistances needed according to stakeholders
Fishermen/producers	**Uganda:** • Reduction of taxes on fishing equipments. • Protection against wild aquatic animals like Hippos and Crocodiles. • Sensitisation in Resource Management and creation of alternative sources of incomes. • Improved security against pirates on the lake. **Ethiopia** • Technical assistance in the supply of raw materials to build boats and make nets • Technical assistance in the maintenance of fishing gears • Formation of national fishermen's union or association • Capacity building in fish transportation and storage

	• Training in aquaculture • Access to credit so that fishermen can replace old gear and start new fleets • Bringing illegal fishermen onboard or finding them other livelihoods **Kenya** • There is still a need to disseminate the presence of EFMIS to major stakeholders, to enable them make informed decisions on pricing • Back ward linkages in ice provision should also be developed with fishermen to guarantee that the fish caught is iced at source. • There is a dire need to train the operators in hygiene and handling practices **Somalia** • Improved skills on navigation • Marketing information, particularly on pricing • Credit facility • Ice supplies at reasonable price • Technical assistance on fish handling and processing **Sudan** • Supply of more modern fishing gears and facilities to increase catches. • Provision of efficient and preferably mechanised hygienic handling, transportation and preservation facilities. • Credit facilities at low interest rates. • Advanced training in modern fishing gears and methods. • Develop and disseminate awareness on multimedia packages, on fish handling and business oriented marketing **Djibouti** • Fishing equipments (boats and fishing gears) • Fish preservation in insulated boxes • Fishing company/buyer link
Middlemen/Traders	**In Uganda** • Training in small scale business management. • Training in fish quality maintenance. • Assistance to acquire suitable fish handling equipment **In Ethiopia**

	• All stakeholders called for practical training on the aquatic system; how it works, how fishes breed, what cycles they follow to breed, what they feed and how fishing affects them **Kenya** • There is need to design policy systems, which can enable traders to purchase insulated containers and flake ice making machines, through developed societies • There is a dire need to train the operators in hygiene and handling matters • The critical areas for improvement are the major markets in the urban centers, like the city market and Gikomba market **Sudan** • Improved facilities and infrastructure to support better processing and marketing. • Training in application of proper hygienic conditions and quality assessment. • Assistance in creation of fish traders association. **Djibouti** • Refrigerated truck to transport fish from the fishing port to the market
Processors	**Uganda**: Industrial Processors • Training in market research information analysis. • Training of all stakeholders in hygienic handling of fish. • Supply of reliable and adequate utilities. Traditional Processors • Assistance to secure safe and reliable regional markets. • Help to improve traditional processing practices. • Training on new technologies of fish processing. **Kenya** • Training on fish safety and quality • Training on regulations and guidance on quality and safety • Training on correct use of ice • Training on use of detergents, disinfectants and protective gear • Develop fish grading standards and train fishermen

	• Develop posters on commercially important fishes
Retailers	**Uganda**: • Provision of cheap and appropriate fish containers. **Kenya**: • A need to have pictorial posters on handling and correct sanitation practices to be adopted in fish processing plants and markets, to create consumer awareness on fish safety and consumption **Djibouti** • Hygienic facilities for selling fish • Ensure availability of fish market close to consumers
Institution	**Sudan** • Training on marketing /value chain and quality assurance. • Assistance to speed up the implementation of single window service to simplify export procedures and fiscal incentives for investors (custom, tax exceptions); • Establishment of a single fish quality certification by competent authority and an authorized testing laboratory • Review and improvement of the policy and legal framework in the fisheries sector; **Djibouti** • Stable price and good quality fish • Export market development • Participation in the regional trade fair • Promotion of fish from Djibouti at international market

3.14 Quality Assurance

3.14.1 General Considerations for Assessing Potential for Improvement

As mentioned above, there are significant differences among the IGAD countries with regard to the organisations and agencies responsible for the sanitary control of the fishery products.

In Kenya, the Ministry of Fisheries is responsible for monitoring and regulating the sector, through a technical committee that is able to identify the most urgent needs and prioritise the sector in public health and monitor various stages of production, such as landing,

transport and sale of fishery products. This is due to the fact that in Kenya, there is an official registry of companies in the fisheries sector, which can easily be monitored by the government. In addition to the competent authority for the fisheries sector, Kenya has set up a special division for the monitoring of molluscs. This shows a great step forward in the field of public health, which does not exist in any other IGAD countries.

There is a similar situation in Uganda also where the Ministry of Agriculture is responsible for monitoring the fisheries sector, through the Department of Fishery Resources. At Lake Victoria there are "beach units" which have teams of fish inspectors, who check the landing sites and sample the fish. They also have the responsibility to communicate and explain the standards and laws that apply to fishery products, to the operators in this sector (fishermen, transporters, traders and processors). There is better relationship of collaboration between these "beach units" and the operators in the sector.

In Djibouti the Livestock and Veterinary Service is responsible for monitoring the sector. This is relatively a recent institution, created in 2001, which is conducting activities of quality control and fish sampling since 2009, when the first state laboratory was set up. In this country there is great potential for the fisheries sector, but the operational functions of competent institutions and authorities still have to be fixed. Since these activities are of recent origin in the country, application of the HACCP for fishery products is yet to be implemented.

In Somalia the Fisheries Ministry has established a body of laws and regulations for the fisheries sector. Since there is no efficient mechanism of control in the national territory and no proper system of communication between the government authorities and the operators in the sector, these regulations are hardly ever applied for implementation.

There is fairly similar situation in South Sudan also, where the Fisheries Department and the Ministry of Animal Resources are responsible for the fisheries sector. There is, however, little contact existing between these institutions and the operators in the sector. It is however worth mentioning that the Blue Nile and the White Nile have a wide variety of fish species that are fished by small-scale traditional fishing methods. They do not comply with appropriate hygienic standards and on a national level; there is no real health or sanitary service for monitoring the situation.

Some fishery products from the shores of the Red Sea in Sudan are exported to many countries in the Arabian Peninsula. There is, however, no proper system of control or monitoring with regard to sanitary aspects of fish processing activities in the region. The systematic monitoring of the quality of fishery products requires a capillary health or sanitary service in the national territory, as well as systematic landing-site inspections, combined with a good and updated registry of enterprises and firms in the fishery sector. This includes enterprises dealing with transportation, processing and sales.

Among the IGAD countries, as mentioned above, there is a satisfactory system of quality monitoring only in Kenya and Uganda, but even in these two countries the activity of sampling is almost exclusively concentrated on those products destined for export to the EU, and for the local market observing quality regime and monitoring of the product quality is not in practice.

3.14.2 Assessment of the Relationship between Institutions and Stakeholders (fishermen, traders, processors, fishmongers etc) with regard to Sanitary Control.

As for the fish product export industries in Kenya and Uganda, the relationship between the processing plant and the inspectors is direct and the control is carried out on a regular basis, however in all other countries the relationship between the sanitary control inspectors and the fisheries stakeholders is non-existent. There is an urgent need for imparting training of operators in the sector, and continuing the existing quality control measures to the stakeholders. Some training activities have been implemented through projects. One such project most recently undertaken is the EU funded project, Smart Fish. However most of these activities were piecemeal and the real impact of it is not reaching to the grass root level.

3.14.3 Simple Considerations about Common Standard of Hygienic Conditions for Marketing of Fish Products in the Domestic Market.

In the domestic market for fishery products, the standards between the various IGAD countries are different, and this also applies to the standards within the countries themselves, depending on the different zones (urban or rural) involved. The hygienic condition of the local and domestic markets has, on the whole, not attained acceptable level of hygienic standards, neither for fresh untreated products nor for dried, salted or smoked products. It should be pointed out that many of the deficiencies in the hygienic standards and the possible risks for local consumers are mitigated by the fact that, these products (especially tilapia and *Mukene*) are generally consumed on the same day that they were fished, since most families do not own a fridge or similar home appliances for cooling or freezing products. In addition, the fish products are usually cooked very well in the traditional way, so that most macrobiotic sources of infection are generally been destroyed.

The hygienic standards of salted, smoked and dried products are generally low, due to the fact that these products are generally stored and transported in the same way and by the same vehicle, used for fruit and vegetable products.

3.14.4 Consideration about the Current Possibilities of Training Operators in Hygiene and Handling Practices.

The training of operators on fish handling, hygiene and sanitation is fundamental. This will ensure the growth and improvement of technical knowledge and standards in this sector, both for better food safety and hygiene. In order to ensure an increase in the economic value of fishery products and implementing training courses, it is important to know the consumer habits for fishery products. Since there are communities within the IGAD countries, that deal almost exclusively with fishery products, from the farm to the fork, it is absolutely necessary to raise their level of awareness in order to initiate certain cultural changes that will benefit both their life style and economic situation.

Within the IGAD countries, as the national consultants have explained and illustrated, the possibilities of training operators on hygiene and handling practices are very limited at

present since the relevant authorities are not sufficiently equipped for conducting such training programmes and bringing out information material for the operators in the sector. In some cases, as in Uganda, the fisheries associations, like the Victoria Lake Fisheries Association, have proved themselves to be more active and efficient in this respect, than the official governmental organisations; having conducted training on health and safety issues.

On the whole, however, the situation is very grave. Those working in the fisheries sector are often ignorant of the most basic principles regarding hygiene and food safety. For example, in Kenya, which is one of the most advanced IGAD countries in this respect, the national report clearly points out the shortcomings of those working in the fisheries sector:

"There is a dire need to train the operators in hygiene and handling practices. The urgency is based on the fact that ice is the basic denominator in the fish trade; yet most of the traders barely understood its role, as seen in the questionnaire. Most did not even know the correct ratio of ice to fish, to preserve it. This implies that the few, who use ice, do not use the correct quantity and hence it does not serve the purpose, but is still an overhead."

This probably explains why most of the workers in the sector consider ice as expensive and basically useless, since they do not use it properly at required ratio and do not obtain the extended shelf life required to sell all their products.

3.14.5 Evaluation about the Possibility for Operators to Access Specific Information of Food Safety.

In Kenya and Uganda the respective government ministries, together with associations representing the exporters of fishery products, have set up training programmes for imparting food safety and hygienic aspects for the handling and consumption of fishery products. As already pointed out, the landing sites around the shores of Lake Victoria are efficiently monitored and the local operators are well-informed about the appropriate norms and practices to be observed while handling fishery products. This is mainly because, fish from this area is meant for export to the EU. However, in various other IGAD countries, there is an almost total absence of training programmes and insufficient information, on the post harvest handing and processing sector. There is, therefore, an urgent need to bring out handouts/ manual on fish handling, in order to impart knowledge not only to the operators in the sector, but also the general public, on the correct handling practices, preservation of fishery products and conservation of fishery resources.

This could be done by discussing with various associations and communities of workers in the fishery sector and ensuring the involvement of the local and municipal authorities, so that they can stimulate government training programmes and information campaigns, aiming to increase professional and public awareness.

3.14.6 Availability of Clean Water in the Value Chain with Identification of Critical Control Points and General Considerations.

As already pointed out, there is a substantial difference between the various IGAD countries, but they all have all common problem of supplying clean and fresh potable water to landing sites and fish processing areas. It is worth remembering that in 1997, the export of fishery products from Lake Victoria to the EU was completely banned, due to the detection of microbes, *Vibrio cholera and Salmonella.* This was presumably by the use of unclean water at the landing sites. The EU ban caused immense damage to the rural/local economy. The situation was later resolved in those sites, where the fishery products were being landed and handled for export. However this risk is still prevails in the traditional landing sites in many of the IGAD countries. The supply of clean potable water for washing and processing fish is an essential link in the value chain. It should therefore be a priority of all IGAD countries, to ensure that clean potable water is made available in all landing sites and working areas.

It should be pointed out that clean potable water could easily be supplied to many landing sites and working areas, since potable water supply readily available in areas close to large cities, but the necessary investment required to be made, to have facilities for water supply such as pipelines and pumping stations, is rarely available. If the local authorities were sufficiently informed on necessity of having potable water to fish processing site, it would not be difficult to achieve this objective.

4. Results of the Capacity Needs Assessment

4.1. Results of the Capacity Need Assessment Test for Stakeholders

Capacity Need Assessment (CNA) for all stakeholders was carried out using questionnaires prepared by the international consultants, covering mainly two aspects namely, trade/ marketing and quality assurance. Normally CNA is undertaken just before commencement of training, with the main objective of establishing the level of knowledge of the stakeholder and also to assess the improvement in knowledge and skills of the trainees, once the training is completed. However, this report only tries to analyse the level of knowledge of stakeholders and to identify areas for possible intervention in capacity building for stakeholders. This exercise is also useful to design better training packages and materials, to meet stakeholders' requirements in each country.

The CNA questionnaires were designed as simple as possible, using multiple choices to make easier for stakeholders to answer and to make appropriated analysis. Following are the compilation of CNA test results carried out for stakeholders.

4.1.1 Fish Producer (Fishermen)

The results of CNA test among fishermen/producers show that they generally are knowledgeable about their field, particularly in marketing/trading aspects. In Uganda, about 75% of fishermen and producers participated in the CNA, scored above 50% and even

more, while 16% of them who could answer all the questions correctly. The major areas where most of them scored poorly were about fish auction and whether fatty fish was more suitable for drying etc. Similarly in Ethiopia more than 62% of respondents scored between 50-70%, but there is also higher percentage (37.2%) of respondents who scored below 50%. Fishermen have more problem in answering questions related quality aspects, rather than questions on marketing. This indicate that the awareness on the quality among fishermen in the country is still low, and they do not know any marketing/trade regulations. This is consistent with the result of the test in Kenya, where it shows that only 17% of the respondents understood the role of ice to preserve their catch to fetch better realisation, while only small percentage (5%) said they benefited from cooperative when selling their fish. Many of them do not (26%) realise the need to work together to preserve fish properly and conserve fishery resources, to have sustainable income.

4.1.2 Middlemen, Retailer, Traders

Middlemen including traders and retailers usually have higher social status and have better educational background or have better exposure to the outside world, compared with fishermen. Therefore, it is not surprising to note that middlemen in IGAD countries generally scored better in CNA tests than fishermen. In Uganda around 30% of the middlemen scored above 80%, while in Ethiopia more than 27% scored above 70%. However, those who scored below 50% is also significantly high in Uganda (40%) and 34% in Ethiopia. Surprisingly in Uganda, the respondents mainly failed to answer questions on what is involved in marketing as well as in value addition, while in Ethiopia they failed to answer questions related to quality which is, reflecting their inability to appreciate the importance of cleanliness, sanitation and hygiene. They also did not know causes of spoilage, whether fish fat content is healthy or not, how long fish could be kept in ice, the amount of ice needed to preserve per kg of fish; and how much percentage of water is contained in a fish, etc.

All the middlemen and fish traders tested in Kenya knew about fish trade related regulations, but majority of them (55%) did not know that not all fish could be marketed. This may be the reason for selling undersized fish, which is still rampant in the country. Generally middlemen and traders also failed to answer basic questions on trade and marketing aspects. Only 31% of the respondents understood that fish supply depends on demand, price and season, and only 28% of respondents understood that fish demand depends on the population size, disposable income of the consumers, the season and availability.

4.1.3 Processor, Exporter

This group comprised of industrial fish processors who mainly export fish products to international markets and to the regional markets. While the industrial processors are familiar with the questions related to fisheries, majority of the artisanal processors and regional exporters were ignorant about issues relating to international /regional trade. In Uganda, the questions that were poorly answered are those related to bioterrorism and the meaning of letter of credit, as almost 83% of the respondents, mainly artisanal processors, scored below 50%. No CNA test was conducted for processors/exporters in Ethiopia.

Most of the traders/processors in Sudan, who are mainly traditional processors, are not aware of international seafood trade and its basic terminology. For example only 20%

traders know what the letter of credit means and nobody knows which importing country enforce bioterrorism act. Since their interaction in the international trade is mainly with Middle East market, their knowledge on other markets is also limited.

Small scale processors interviewed in Kenya generally failed to answer questions related to international fish trade. This is understandable as the respondents do not export, since they only deal with informal cross border trade. However, high percentage (47%) said they know about eco-labelling of fish products. Only 20% of the respondents understand what letter of credit is and only 7% respondents know the major import markets for seafood products; but around 27% interviewed have heard about bio-terrorism.

4.1.4 Consumers

In general, consumers are relatively knowledgeable about fish as the CNA results showed. In most countries, high percentage of consumers scored 70% and above. Even in Ethiopia with the lowest fish consumption among IGAD countries, more than 41% respondents could score 100%. It is probably most of the consumers involved in the test were those, who were able to read and understand English which implies that their awareness about fish as food is better than the other stakeholders. However, they do not know how fish is prepared (deep-frying, steaming, etc.), the fat contents of pelagic marine fish, which fish contains more omega or HDL compounds, how fish is preserved just before cooking etc. Some do not even know whether consumption of fish could be useful for brain development.

In Uganda the consumers were evenly distributed in most of the score groups, with 70% scoring 70 marks and above. Urban respondents tend to do better than those from rural areas. The questions that was most difficult for this group includes the one on the contents of marine fish and fatty fish.

In Kenya majority of consumers could also answer the questions correctly. However, only 39% of consumers knew how to select fish by looking at all the parameters for determining its quality. In Sudan 50% of the respondents knew how to select good quality fish and generally know the nutritional value of fish. In quality aspects, they scored lower, as most of them (90%) do not even know what HACCP means.

4.1.5 Institution

The respondents in this group were also evenly distributed in the score, with those in fisheries and trade institutions being the most knowledgeable and those in law enforcement and tax administration being least knowledgeable. In Uganda, for example, the questions that related to international trade agreements were found most difficult for the respondents. Meanwhile in Ethiopia they could not answer questions on marketing, do not know what the Doha Round is or what IUU means. They do not seem to appreciate the work on value addition at each level of the chain. They do not know the global fish marketing trends, and have no knowledge on which fish is the number one in global fish trade. They scored better in quality but they could not answer on how frequently fish should be sampled for quality evaluation. Though they are ignorant on the details of EU regulations for fish import/export and the principles of HACCP, most seem to know that it exists.

4.2. Identification of Capacity (Training Needs) for each Stakeholder

The results of the CNA test suggest that training on marketing and quality assurance related aspects in general, is still required in all IGAD countries. Different emphasise for each country, however, should be given, as the status of fisheries sector varies from country to country, thus their needs also vary. Uganda and Kenya which have relatively developed fishery industry, compared to other IGAD countries, may need more advanced training programmes compared with Ethiopia, Sudan, Djibouti or Somalia, where the industry is basically small and artisanal.

As suggested by the national consultant, training in Ethiopia should emphasise on improving the quality aspects of products as the key, to fetch better prices. In other and simpler terms, the training package must bring out the economic benefit that could be derived by following good handling practice, ensuring good quality product that would fetch much better income than before.

In Uganda, all respondents involved along the value chain expressed interest for getting trained on good fish handling practices, hygiene and fish preservation. They also evinced interest in getting training on business management skills, including record keeping and formation of groups for management of credit and savings. With regard to improving operations /income, the fishermen were shown interest in developing skills on sustainable resource management, to control decline in catches, including management of transboundary resources.

All the respondents are also interested in being assisted to acquire other skills that would lead to an alternative source of income, like setting up of fishery related cottage industry and fish farming. The fish processors and exporters would like to be trained in value addition, packaging and presentation of products. Other areas of interest listed include improved processing methods and techniques as well as market information.

In Kenya all the stakeholders are interested in improvement of marketing skills in order to improve their income. Basic training on marketing skills is core to profitable and sustainable business. It should be carried out for different categories of the actors. Most of the respondents felt that this is one area where they still require help. The proposed modules are based on recommendations by the respondents. Book keeping, financial management, investment skills, marketing skills, price regulation, strengthening of market management, training on cross border trade, training on labour laws are other areas of learning suggested. The need for stakeholders to work together in preserving fish resources and marketing their products via cooperatives is also another area required for intervention.

In Sudan around 90% of stakeholders surveyed agreed on the importance of improving of quality assurance regime of fish and fish products, starting from the initial stages of fish handling at the producer level, through the marketing and trading levels of the wholesaler, retailer, processors and up to consumer. The most immediate need is capacity building towards improvement in hygienic and safety measures of foods in general and particularly for fish products to meet international standards.

South Sudan, being a young nation in this trade, compliance with international ordinance and regulation are of premature concern; the government is overwhelmed with numerous

demands of its citizen and priorities are also numerous. Therefore, quality assurance, handling and safety are lagging in capacity building. It is therefore worth recommending for a wide range of training programmes on all aspects of quality assurance, handling and safety regulations, to enable the country to meet the international standards. Environmental management, hygiene and sanitary standards are rudimentarily developing in the sector; therefore a capacity building initiative in this area is also a prerequisite, for sustainable development and management of the resources.

Somalia requested proper and relevant training for fishermen in order to enhance their skills in fishing, navigation, fish handling and processing. Training in pertinent aspects of marketing of products for stakeholders, including market operators is also assumes importance. In order to have better access in the regional and international markets, imparting training to producers, processors, manufacturers, traders and entrepreneurs to adopt Good Manufacturing Practices (GMP) and Hazard Analysis & Critical Control Points (HACCP) are crucial in order to improve quality of fishery products in the country. This will in turn lead to better market access in the regional and international markets.

Similar to Ethiopia, fishermen in Djibouti also need basic training on fishing related skills, such as the use of more modern fishing gears, navigation etc. Since most of the fish is sold in fresh form, improvement in handling and maintaining cold chain along the supply chain is important for improving quality of the fish. Processing is another area needs further improvement by adding value to fish and encourage wider consumers (not only in coastal areas) to consume processed fish.

Details of recommended topics for capacity building for all stakeholders are given in the following section.

4.3. Recommendations for Capacity Building for Fisheries Stakeholders

Stakeholder	General	Marketing/Trade	Processing/Quality Assurance
Fishermen/ producers	• The role of fishermen in sustainable fisheries resource management. • Alternative sources of income (e.g. cage culture). • Basics of fish breeding and functioning of aquatic systems • Development of network of various stakeholders • Diversification of fishing from the most common species to the less popular ones • The importance of diversification into aquaculture • Training on the Role of cooperatives and marketing associations • Training on navigation skills • Training on new fishing methods (specific for certain types of fish.) • Training on new technology and the use of advanced materials (GPS, radar etc).	• Management and utilization of market information • Business record keeping/book keeping. • Formation and management of credit and savings groups. • Comparative advantages of right to sell products to the best bidder (Auctioning) • Training on marketing skills and giving direct correlation between resources, preservation and high income • Develop posters, banners etc indicating fishes for trade and parameters which do not allow fishes to be traded • How to request for loan and its implementation	• Better fish handling and preservation practices • Reduction of post-harvest losses • Develop audio-visual tools for training on handling and sanitation and the role of ice in post harvest losses and role of salt in preservation • Processing and diversification of products • HACCP and GMP training • Cold chain training

Middlemen/ traders/ retailers		• Management and utilization of market information. • Business/record keeping. • Develop simple brochures, posters on regulations guiding fish trade. • Branding of fish clearly articulating virtues of fish • Basic marketing • Supply chain training	• Good fish handling and preservation practices. • Packaging and presentation of fisheries products. • Training on cold chain infrastructure Determining proximate composition of fishes showing moisture content, histamine levels and fatty fishes for key species.
Processors/ exporters		• Management and utilization of market information. • Business record keeping • Lessons and experiences of entering into the international fishery trade including experience sharing among IGAD countries • Training on marketing skills, (fiscal), providing skills to help determine key markets, market diversification for value added products/ ecolabeling/Catch certificate/ bio-terrorism • Training on product and market diversification	• Good fish handling and preservation practices. • Packaging and presentation of fisheries products. • Development of value added products. • Training on food safety principles • HACCP/GMP training

Resturant			• Fish handling and preservation • Assessment of fish quality • Developing different cooking recipes
Institution	• Co-Management of Fisheries Resource • Fisheries Management Regulations • The role and responsibilities of a resource manager and experience sharing from different IGAD countries • Conducting EDP training for entrepreneurs and training of trainers for the training institutes	• Training on fisheries business	• Assessment of fish quality • Training in contextual Scope in hygienic improvements and their impact on the revenue generated • Training for trainer • Training on international standards and requirements • Traceability in fisheries

5. CONCLUSIONS AND RECOMMENDATIONS

This report has made an extensive analysis of various aspects of fishery trade in IGAD countries, with reference to market, value chains of main species and quality assurance, covering Djibouti, Ethiopia, Kenya, Somalia, Sudan, South Sudan and Uganda. With an estimated population of around 216 million, IGAD countries have huge inland fisheries resources and few of them have access to rich marine fisheries resources. Yet fisheries production in this region is still below 800,000 MT and its main species Nile perch, is under great pressure of over fishing and the contribution from aquaculture is still very limited.

Thus there is an urgent need to increase fish production and supply to meet increasing demand in the region through the development of aquaculture and optimize the utilization of catch, through reduction of post harvest losses. There is also need to improve food security measures. Government of IGAD countries have realised the situation and moved towards this direction. Hence the supply of fish is expected to increase in the near future, particularly from aquaculture sector. In anticipation of the increase in supply, it is important to start developing the markets, whether it is the domestic, regional or international, to ensure that increase in supply will be well absorbed by increasing demand, thus improving the livelihood of stakeholders along the value chain.

5.1. Improvement in Fish Marketing and Trade

5.1.1 Development of Domestic Market

The main issue: Fish consumption is still very low in all IGAD countries except in Uganda. Fish is mainly consumed by people living near the coastal areas and in major cities since marketing network is generally weak due to poor infrastructure facilities.

Recommended actions:

a. National campaign to encourage consumers to consume more fish.

b. Improve availability of fish in the market through improvement of marketing facilities and distribution network.

c. Educate consumers on how to handle and prepare fish at home.

d. Assist fishermen cooperatives to engage them in processing and marketing of their catch.

e. Promote the production and preserve the diversity of traditional fish products by assisting producers to secure stable supply of quality raw materials and to meet food safety requirements.

f. Assist producers to improve product identity, nutritive value and marketing plan.

g. Provide support for the development and introduction of technologies that optimise the utilisation of catches; reduce post-harvest losses, waste and discards in commercial and small-scale fisheries.

h. Provide improved processing facilities and infrastructure development.

i. Impart training on on-board and on-shore fish handling, storage, distribution and marketing of fish and fishery products.

j. Introduce and develop financial incentives and micro credit facilities for small scale fisheries and to assist fishermen and also traditional processors to improve quality of their catches and products.

5.1.2 Development of Regional and International Markets

The Main Issues - The regional trade in fishery products is not yet developed, which is dominated by traditional cross border trade and in many cases it is illegal, involving mainly undersize fish, dried, salted and smoked products. In addition to this, transportation network and infrastructure facilities connecting IGAD member countries are generally poorly developed. Fishery products from IGAD member countries, except products from Kenya and Uganda, are unable to access major developed markets, like the EU, USA and Japan. This is due to non-existence of national regulatory framework and implementation of quality assurance programme, to meet required standards of importing countries. Nile perch, the main export item from the region, has been facing strong competition from other freshwater fish products, particularly *Pangasius* fish from Vietnam.

Recommended Actions:

a. Strengthen cooperation among IGAD member countries to implement international standard requirements with regard to trade on fish and fishery products.

b. Harmonize standards, technical regulations and assessment procedures, as inputs for the establishment of IGAD guideline and standards, for trading fishery products in the region.

c. Improve security and infrastructure along the borders, particularly in strategic entry and exit points, for facilitating smooth movement of products.

d. Harmonise trade policy among the member countries of IGAD to avoid unnecessary red tapism and double tax for products traded among the members

e. Encourage development of air cargo connection among the member countries, to facilitate regional trade for high value fishery products such as fresh/chilled Nile perch and marine fishes.

f. Strengthen cooperation among the members for developing regulatory framework and establishing quality assurance programme in the fisheries sector. Uganda and Kenya should share their experiences and expertise in this field to other countries in the region.

g. Develop a strong processing industry association, not only at national level but also at regional level, so that governments will have a united partner to regulate the fishery industry.

h. Pool resources between private and government sector, for joint promotion of products in international markets.

5.2. Improvement in Quality Assurance

The Main Issues: In IAGD countries, apart from the fish products meant for export, there is no quality assurance system in place. The questionnaire has shown that operators in the sector are aware of quality control measures and it is necessary to improve their approach to fish quality.

Recommended Actions:

a. It is necessary to improve quality standards of fishery products in those countries that are not yet to commence exports.

b. Ensure that the international / intercontinental trading activity of fishery products from IGAD countries are carried out according to traceability system and product labelling, as required by international trade.

c. Quality control measures should be enforced for domestic and intra-regional trade, ensuring that there is no double standard for domestic or exported fishery products.

d. Create a basic system of seafood traceability so that the product can be tracked down from the production line to consumption. These systems should encompass documentation that includes quantity, quality, content (species name, size/grade etc.), date of production and name of producer, etc.

e. It is also important to underline the laws that regulate the quality of fishery products, inscribed into the general laws, ruling foodstuffs' quality assurance.

International funding and access to credit schemes can be an important method for improving infrastructure, even at a small scale. This is because various necessary tools and equipment for the fishery industry like insulated fish boxes and vehicles are sometimes difficult for the fishermen to purchase, as they are hard to find and expensive. This issue should not be underestimated, since post harvest loss due to absence of similar tools and equipment, resulting in reduction of shelf life of products is often quite substantial. In order to resolve this problem, it would be necessary to carry out some market research to check its availability and cost of such equipment in IGAD countries. It is also necessary to find out whether insulated boxes are locally available and what would be its price.

Women play an important role in the marketing of fishery products; however in IGAD countries there exists no important programmes of credit schemes operated exclusively for women. These schemes should be created favouring this particularly needy category. Funding schemes for acquisition of simple equipment would in turn certainly encourage their resale and more wide spread use, thereby instituting appropriate hygienic practices in the trade.

5.3. Capacity Building

5.3.1 Trade and Marketing

Based on the CNA test and capacity building assessments, each country has been identified with specific needs to improve skills and knowledge of stakeholders along the value chain. Training requirement for each stakeholder is given in the previous section 4.3 above. In trade and marketing aspects, all the stakeholders in IGAD countries feel that they need to improve their knowledge and skill in business and marketing, simple book keeping, product development, market information and how to use such information, access to loan and financial assistance. For officials from government institutions, they require training on international trade aspects, imports and quality standard requirements in importing countries, development of marketing information system and training on products and market diversification.

5.3.2 Capacity Building with regard to the Quality of Fishery Products which can be improved in the following Ways:

- to improve knowledge and awareness on hygiene and consumer health issues or producers, processors, traders and all middlemen involved in the value chain, through training programmes.

- Improvement of the organisational aspect of relevant national government and local

authorities.

- Dissemination of information and imparting training programmes, aimed at the employees of relevant national government and local authorities.
- Updating of legislation regarding the fishery sector in the IGAD countries in such a way as to produce a standardised/harmonised legislation for all the countries of the IGAD association.
- Through programmes of assisted funding, aimed at improving infrastructure that can ensure the continuity of the cold-chain.

5.3.2.1 Training Programmes for Workers in the Fishery Industry.

As mentioned above, training programmes and publications for improving knowledge and awareness on hygiene and consumer health issues in the sector are seriously lacking in all IGAD countries. Above all, it is necessary to produce audio-visual materials that can quickly disseminate most essential information to all the workers in the fishery sector, which may preferably carried out through national media, to reach the widest possible audience in shortest time.

The training programmes should be aimed at reducing post-harvest losses, a factor which is not sufficiently addressed at present. This was revealed by the questionnaires distributed by the national consultants. In all the phases of the industry, there is insufficient attention towards the maintenance of product quality, and this problem must be addressed very seriously.

The National Report on Kenya points out the inefficiency of the training programmes conducted by government and non-governmental organizations. It states that: "In spite of all this effort the study revealed that only 25% of fishermen graded fish according to its quality, and over 90% of the respondents had a health certificate from the public health service, without even understanding the role of the certificate. To most of them, this is simply a legal requirement for food handling, just like a fish trading license." The situation is similar or even worse in other IGAD countries, such as in Sudan where, government and non-governmental training programmes are totally absent.

5.3.2.1 Organisation of the Relevant National Government and Local Authorities

The relevant national government and local authorities must initiate a process of official accreditation in their national territories, so that internationally recognised certificates can be issued to the fishery sector. This should also assist the collaboration and standardisation of inter-governmental legislation between various IGAD countries. In the countries on Lake Victoria, where the fishing and exportation of the Nile Perch is the predominant economic activity, there is a capillary presence of well-organised local government authority. However, in those areas where fishing is not aimed for export, the government presence is seriously lacking. This situation must be rectified so that the sector can be regulated as a whole.

5.3.2.1 Employees of Relevant National Government and Local Authorities

The above mentioned problems can of course, be properly addressed to, only if those employed in the relevant national government and local institutions are well educated and must be aware of the importance of consumer health and safety, vis-a-vis the fisheries industry. The first step towards is therefore to elaborate in-depth knowledge, so that the officials responsible for monitoring and visiting the sites and processing plants concerned, can fully understand issues and problems. This would include proper techniques and materials for the construction of infrastructures, the importance of access for clean potable water, and the right methods of transport and sale of food products. This kind of knowledge is at present lacking and thus officials who inspect sites and sample the products often do not have the necessary skills and know-how. As mentioned earlier, the biggest problem in the IGAD countries with regard to fish quality control is represented by the lack of official documentation that attests the quality and identity of the product, at all levels of its handling, transportation, storage and sale. This is due to the fact that the government and local authorities are often unaware of the importance of sampling and identifying the product and therefore unwilling to give relevant documentation to the operators. Proper capacity building in this respect is extremely important.

5.3.2.1 Updating and Standardisation of Legislation in the IGAD Countries

A significant problem which will influence the growth and economic development of the fishery sector is that of creating a standardised and harmonised set of norms and legislation, in all of the countries of IGAD association. The only way to implement a system of traceability of the products in the fishery sector is to establish, a harmonised inter-governmental system of legislation, for all the IGAD countries.

The capacity building process should be commenced at an inter-governmental round table meeting, so that the relevant ministries can create a uniform system of legislation, on proper hygienic practices to be observed in the fishery sector. Fines or sanctions should be introduced for those countries that do not properly implement the legislation and those fail to follow appropriate hygienic practices. This should also stimulate the countries to excel in the efficiency of applying the common legislation, as a matter of national pride.

The legislation for the quality of foodstuffs, destined for both internal commerce and export prevailing in the European Union could be taken as an example for the IGAD countries. Despite the different nature of the products and diversified nature of the national territories involved, following a harmonised hygienic system is appropriate to IGAD countries.

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