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SOCIOECONOMIC STUDY OF THE FISHERIES SECTOR, THE GAMBIA



**SOCIOECONOMIC STUDY OF THE FISHERIES SECTOR,
THE GAMBIA**

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List of Abbreviations

AfDB	African Development Bank
AFDP	Artisanal Fisheries Development Projects
ANR	Agriculture and Natural Resources
BADEA	Arab Bank for Economic Development in Africa
CCLME	Canary Current Large Marine Ecosystem
CCRF	Code of Conduct of Responsible Fisheries
CECAF	Fishery Committee for the Eastern Central Atlantic
CFC	Community Fisheries Centres
COFI	Committee on Fisheries
CRR	Central River Region
DTIS	Diagnostic Trade Integration Study
ECOWAS	Economic Community of West African States
EEZ	Exclusive Economic Zone
EIF	Enhanced Integrated Framework
ESMP	Environment and Social Management Plan
EU	European Union
FAO	Food and Agriculture Organisation
FASDEP	Food and Agriculture Sector Development Project
FCMC	Fisheries Centre Management Committees
FDU	Fisheries Development Unit
FEU	Fishing Economic Units
FRP	Fibre-glass Reinforced Plastic
FTT	Fish Technology, Thairoye
GAFDP	Gambia Artisanal Fisheries Development Project

GBoS	Gambia Bureau of Statistics
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHP	Good Hygiene Practice
GIEPA	Gambia Investment and Export Promotion Agency
GMD	Gambian Dalasi
GNAIP	(The Gambia National Agriculture Investment Policy
GoTG	Government of The Gambia
GRT	Gross Register Tonnage
HACCP	Hazard Analysis and Critical Control Points
IRD	Institute of Research and Development
IUU	Illegal, Unreported and Unregulated
JICA	Japan International Cooperation Agency
MCS	Monitoring, Control and Surveillance
MoA	Ministry of Agriculture
MSME	Micro, Small and Medium Enterprises
MSY	Maximum Sustainable Yield
MTP	Medium Term Programme
NAAFO	National Association of Artisanal Fisheries Operators
NACCUG	National Association of Cooperative Credit Unions of the Gambia
NADS	National Aquaculture Development Strategy
NES	National Export Strategy
NFGW	National Federation of Gambian Women
OBE	Out-Board Engines
OMVG	Organization for the Management of The Gambia River Basin

PAGE	Programme for Accelerated Growth and Employment
PAH	Poly-Aromatic Hydrocarbons
PL	Post Larvae
PRCM	Regional Coastal and Marine Conservation Program
SFLP	Sustainable Fisheries Livelihoods Programme
SPS	Sanitary and Phyto-sanitary Standards
SRFC	Sub Regional Fisheries Commission
TAC	Total Allowable Catch
TCP	Technical Cooperation Program
TOWA	TRY Oyster Women's Association
TTM	Taiwanese Technical Mission
UK	United Kingdom
UNIDO	United Nations Industrial Development Organisation
URR	Upper River Region
USA	United States of America
WAQP	West African Quality Programme
WB	World Bank
WCR	West Coast Region
WTO	World Trade Organization

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EXECUTIVE SUMMARY

The Government of The Gambia places priority on the development of the fisheries and aquaculture by providing the enabling environment for the active involvement of players including the private sector, in its development. However, there are various constraints confronting the development of the sector as a whole and in specific areas including post-harvest fish handling, processing, preservation and marketing and distribution chains and the organisation and strengthening of capacities of operators which, present socio-economic challenges for improved productivity and contribution of fisheries to livelihoods, food security, poverty reduction and to the national economy as a whole. The organization and effective coordination of activities and access to finance for improvement of small and micro-businesses also pose challenges.

This study concludes that fish landing sites need to be upgraded in terms of basic infrastructure and facilities. This is with view to ensure proper hygiene operations and meet food quality and safety standards for domestic consumption and the export market. The snow-ball effect is improved access to markets and competitiveness of products in the international fish trade. Standard sanitation and hygienic operating procedures need to be put in place which should be supported with capacity building for improved management. Since most fish landing sites are without a reliable supply of potable water and appropriate sanitation facilities there is need to have such installations for improved hygienic operations and ensured safety of products. Training and awareness is fundamental in the handling and preservation of fish along the supply chain.

Fish spoilage is a major problem, especially during peak fishing seasons with resultant losses and thus reducing values of fish and fish products. Large quantities of fish are sometimes dumped back to sea or at landing sites due mainly to lack of adequate cold chain facilities such as availability of affordable and reliable sources of supply of ice, cold storage facilities and limited processing capacity.

Fresh fish supply to inland markets is faced with problems relating to short supply of ice and lack of appropriate transport, handling and refrigerated storage facilities both at source and at inland distribution points. These aspects of the fisheries value chain are highly underdeveloped and require improvements by improving handling, storage and transportation facilities. Hence there is need for intervention to provide such facilities, which in turn will ensure availability of quality supply of fish for nutrition and support food security initiatives, enhance small business enterprises and improve the supply chain. This can be achieved through installation of cold storage and ice production facilities at strategic points for the holding of fish supplies along the distribution chain. A national project designed to address these issues is vital. FAO and Government of The Gambia could initiate the process, given FAO's technical and strategic advantage in formulating projects and programmes and in resource mobilisation.

The current state of fish processing facilities, equipment and practices leave much to be desired in terms of processing techniques, process control, hygiene and quality of the end products. Hygiene conditions can be deplorable, operational practices insensible and quality and safety of products a great concern. The combination of these factors raises concern over food safety and product quality, reduced value of products and fish losses of physical, nutritional and financial nature.

New product development and value addition in the fisheries value chain also offer potentials for improvements of benefits and increased market access and competitiveness of fishery products. Therefore research and development for new product development value addition through processing and developing markets for such new innovations can have added advantages for the sector and the economy as a whole.

There are also problems relating to meeting compliance with export standards by fish processing establishments. This is often due to supply chain deficiencies including awareness and technical competence of fish handlers and fish suppliers at the level of the supply chain. At the level of processing establishments this affects factory operatives' supervisors and managers. There is therefore the need for awareness and training of actors along the supply chain including fishermen, fish traders and suppliers and factory operatives on sanitary and phytosanitary systems and issues including fish handling and preservation, basic hygiene, food safety and quality assurance systems and application of HACCP procedures.

Finally, one of the far-reaching revelations of this study is the health and nutritional benefits related to consumption of fishery products. Medical and health facilities close to some of the fishing communities both in-land and along indicate that the physical and mental health of people from these communities is better than those from no-fishing communities. This assertion could not however, be scientifically tested by this study to confirm or prove that this can be generally attributed to fish based diets or other factors. Furthermore, the group discussions reveal that participants along the fish value chain are generally able to meet family health and education expenses from accruals from fishing and related activities.

1. INTRODUCTION AND BACKGROUND

The Gambian fisheries sector has significant potentials to increase its contribution to national socio-economic development. It is a source of relatively cheap, high value animal protein - food for the general population; a source of employment, revenue and foreign exchange earnings. The sector accounts for 3.4, % of GDP in 2010 (Cham and Musselli, 2013) (with potential to be increased. Per capita fish consumption estimates are put at between 25kg and 27kg per year along the coastal riparian areas, dropping to an average of 9kg in the interior of the country.

It is a dynamic sector with various value chain actors operating a variety of small and micro-enterprises or business activities that support their livelihoods. In spite of its importance to the economy, the full potential of the sector is not being fully realized due to various constraints. These constraints are broadly classified as physical, technical, financial, social and institutional (Fisheries Policy of The Gambia 2007). Specifically, they include:

- inadequate infrastructure and support facilities and services,
- limited technical capacity, lack of skills and technical know-how,
- high cost of energy and fuel
- inadequate financing
- lack of adequate protection of the resources from illegal fishing.
- inadequate entrepreneurship and technological skills;
- inadequate equipment and facilities for handling, processing, preservation, marketing and distribution of fish and fishery products
- inadequate social organisation
- limited institutional capacity
- limited awareness of operators on best practices including in the application of good hygiene practices (GHP)
- inadequate supply of ice and cold storage facilities to maintain the cold chain;
- low level of value addition; and
- fish spoilage and high post-harvest losses (up to 15%) that affect fish supplies and reduced value of the fish with negative impact on incomes, livelihoods and food security.

The fisheries sector comprises of two main sub-sectors of artisanal (or small scale) and industrial fisheries. Of the two main sub-sectors, the artisanal fisheries are considered to contribute more meaningfully to livelihoods and the economy. It is the major supplier of animal protein for the population and plays a pivotal role in poverty reduction and food security. It provides employment, income, and is the main source of fish supply for domestic consumption and export through fish processing in exporting establishments that export high value added fishery products (over 3,500 tonnes in 2010, excluding unofficial exports). Hence, the Government places priority on the development of fisheries and aquaculture and seeks to provide the enabling environment for the active involvement of players including the private sector, in its development.

Objectives and Approach of the study

For the purpose of improving benefits from the fisheries sector and for increased contribution of the sector to the national economy, it is vital to expand knowledge and understanding of the sector and its potentials. It is in light of the foregoing that this socio-economic study was commissioned. The objective of the study is to review and analyze the state of the fisheries sector and its socio-economic aspects with a view to identifying the sector's registered gains, key constraints impeding its growth and development, and the impacts that the sector is having on the nutritional and income status of the citizenry and the national economy.

The study approach takes the form of a desk review and analysis of information on the sector buttressed with stakeholder consultations and operators nationwide.

However, the major limitation of the study is the unavailability of updated data on key parameters such total fish catches (industrial and artisanal) and fish export trade data. The latest figures which could be accessed were way back in 2010.

1.1 Fisheries Resources

The country is said to be endowed with abundant fishery resources. Although it has a relatively short coastline of about 80 km, it has a diversity of fish species in its territorial waters which, with judicious management and utilisation can make substantial socio-economic impact on national development and growth.

There are over 500 different pelagic and demersal marine fish species in the marine waters of The Gambia, broadly classed as demersals (bottom dwelling) and pelagics (free swimming in water column). The demersals include shrimps, groupers, sea breams, grunts, croakers, snappers, etc., and small pelagics group consists of the two sardinellas (*Sardinella aurita* and *Sardinella maderensis*), the bonga/shad (*Ethmalosa fimbriata*), horse mackerels (*Trachurus trecae*, *Trachurus trachurus* and *Caranx rhonchus*) and mackerel (*Scomber japonicas*).

However, recent estimates of the fisheries biomass are not available. The latest available figures for demersal species are from 1995 surveys put at 22,000 metric tons and for pelagic species from a 2003 pelagic survey estimated to be 285,000 metric tons (Mendy, 2009). Table 1 shows results of biomass survey from 1986 to 2006 with wavering figures of the pelagic biomass and no survey of demersal stocks since 1995. The latest reported maximum sustainable yield (MSY) estimates for the entire resource base is quoted to be 75,000 metric tons from 1986, a figure that has not been updated over the years. Estimates of potential sustainable yields from the 1986 surveys for groups of species are 50,000 to 60,000 tons for small pelagics (excluding about 10,000 tons of *Ethmalosa fimbriate*), and 8,000 to 9,000 tons of demersal species. Given the reported total catch and landings data values of about 50,000 metric tons in 2010, the quoted total MSY figure still far exceeds the total catch and landing figure. This situation signifies a data and information gap on the state of the fisheries resources and uncertainties around the state of health of the respective demersal and pelagic stocks, At the same time there is general belief of overexploitation of the demersal resources without reliable data and information on the state of the stocks, In the face of the open access nature of fisheries resources on one hand and the presence of indiscriminate targeting of species on the other hand by both artisanal and industrial fisheries, there are possibilities for over and under-exploitation affecting both the demersal and pelagic stocks. This makes fisheries management a problem with existing imbalances on

individual species. With the reported catch and landing figures excluding illegal and unreported landings from IUU fishing in the presence of a weak surveillance system, the real state of the resources is in question and fisheries management and sustainability also a problem of the sector. Hence there is a real need for refocusing on understanding the state of the resources and the actual level of its exploitation for sustainable harvest and utilisation.

Table1: Fisheries Resources Survey Data 1986 - 2006

Year	Biomass MT	
	Demersal	Pelagics
1986	43,645	*
1992	30,000	160,000
1995	22,000	156,000
1996	*	122,000
1997	*	113,000
1998	*	173,000
1999	*	510,000
2000	*	213,000
2001Jun	*	217,000
2001Nov	*	165,000
2002Jun	*	470,000
2002Nov	*	242,000
2003Jun	*	62,000
2003Nov	*	285,000
2004Nov	*	212,000
2005Nov	*	284,000
2006Nov	*	153,000

Source: Mendy 2009

Estimates of fish populations in the River Gambia in 2004 by the French Institute for Research and Development (IRD) in collaboration with the Fisheries Department indicate that there are about 70 fish species within the river system and several of them, particularly those belonging to Carangidae, Drepaneidae, Clupeidae, Haemulidae, Polynemidae, Cichlidae, Sciaenidae, Cynoglossidae, etc, are of important commercial value. There is a strong believe and justification that the fishery resources of the River Gambia (excluding estuarine shrimps) are under exploited and improvements in fishing technology and techniques will allow for increased fish landings from the river in the inland artisanal fishery. Shrimp resources on the other hand show signs of depletion (Mendy, 2009).

1.1.1 Fisheries Resources Management and Development

For management and conservation purposes, the marine waters of the Gambia are delineated such that only artisanal fishing vessels (canoes) can operate within the now 9 nautical mile zone (increased from 7 nautical miles in 2008, following a review). This delineation is aimed at protecting the sea bottom of the continental shelf and feeding and nursery grounds for developing juveniles of important fish and other stocks. Fishing vessels up to 250 GRT operate the 9 and 12

nautical miles boundary while vessels of over 250 GRT operate outside the 12 nautical miles boundary. Other conservation measures applied to the resources include mesh size regulation and gear restriction, fish size limitation, restricted and protected areas among others. Conscious of the state of the resources, management policy and approaches call for implementation of legal provisions and policy towards development of fishery management plans and co-management; and ecosystem based management approaches with participation of all resource users.

Like in many other countries, the management and development of fisheries resources in The Gambia are the responsibilities of the Government. The powers to execute these responsibilities are entrenched in the law (Fisheries Act 2007). The Act empowers the Minister responsible for fisheries to make regulations for the proper management, development, conservation and protection of fisheries resources or a particular fishery or aquatic species. The Department of Fisheries is the technical department responsible for fisheries and ensures the provision and enforcement of fisheries legislations. It prepares policy guidelines for management and development of fisheries resources. Fisheries agents in collaboration with other government institutions enforce provisions of the Fisheries Act and Regulations to protect and preserve fish resources and promote their rational exploitation and use.

The Director of Fisheries is mandated to prepare and keep under continuous review, plans for the management, development and promotion of both inland and marine fisheries resources. Such fisheries management and development plans should apart from stating the objectives of management and development of the fisheries, also among others: specify management areas; limitations to be applied to local fishing operations; total allowable catch (TAC) limits on species (possible only where the state of the stocks are known) and any other relevant management and development measures to be applied based on formulated policies.

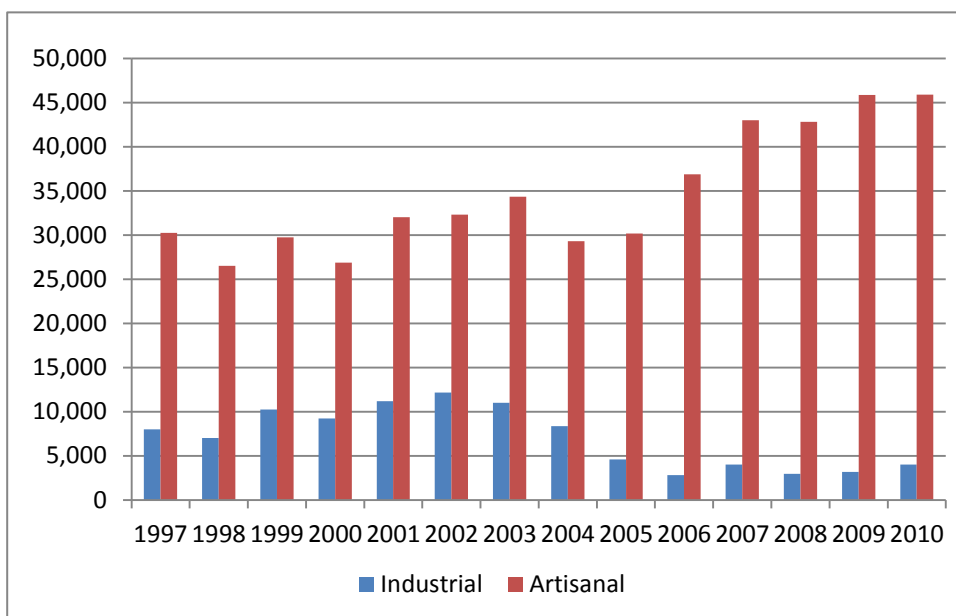
In its fisheries development strategies, the Government of the Gambia has successfully implemented artisanal fisheries development projects in which participatory and integrated approaches have been applied that incorporate community based participatory management of land- based fisheries infrastructure and facilities in community fisheries centres (CFCs) of both coastal and inland fishing villages. In this system, centre management committees comprising elected representatives of fishers and other user groups and village heads collaborate with government to manage the affairs of the fishing centre facilities. Government efforts to implement this CFC type of community based participatory management system have been successful in some key fishing communities that provide lessons for improvement in future development and management.

1.2 Fish Production

Annual fish production including landings from both artisanal and industrial fisheries sub-sectors (excluding quantities landed in the country on transit to export markets) was estimated at about 50,000 tonnes in 2010 (Fisheries Department). Out of this, the artisanal fishery contributed approximately 46,000 tonnes (92 percent), and the remaining 4,000 tonnes (8 percent) from the industrial fisheries. As can be seen in Figure 1, the overall nominal output of the industrial fisheries sector has by and large remained low over the years whilst catches from the artisanal fisheries have been on the increase. In 2002 industrial production was 12,000 tonnes, but declined

to 4,000 tonnes in 2007, whilst landings of the artisanal sector increased from 32,000 tonnes in 2002 to about 46,000 tonnes in 2010. It should be noted however, that these figures do not capture the proportion of industrial catches caught in Gambian waters, but not landed in The Gambia but in foreign ports. It is important that such landings are monitored and recorded in the national records to provide the needed statistical data for fisheries management information.

FIGURE 1: INDUSTRIAL AND ARTISANAL FISH CAPTURED (MT) (1997-2010)



Source: Data provided by the Department of Fisheries, GOTG, 2011

1.3 Export of Fish and Fishery Products

Export figures for fish and fishery products are shown in Table 2. Exports totalled 932 metric tonnes in 2002 and 3,563 tonnes in 2010, which mostly reflects increases in production by the artisanal sub-sector. This has been mainly due to the fact that the fisheries sector, especially the industrial subsector, lacked inflows and investments to allow for its optimal operation. The value of fish exports from The Gambia is believed to be severely underestimated, as huge quantities of fish caught in Gambian waters is landed in foreign countries, and hence not accounted for in the Gambian trade statistics. In any case Government derives significant revenue from exportation of fishery products as customs processing fees are charged on export consignments at about 1.5% of FOB (free on-board) values.

Table 2: Exports of Fish and Fishery Products (1997 - 2010)

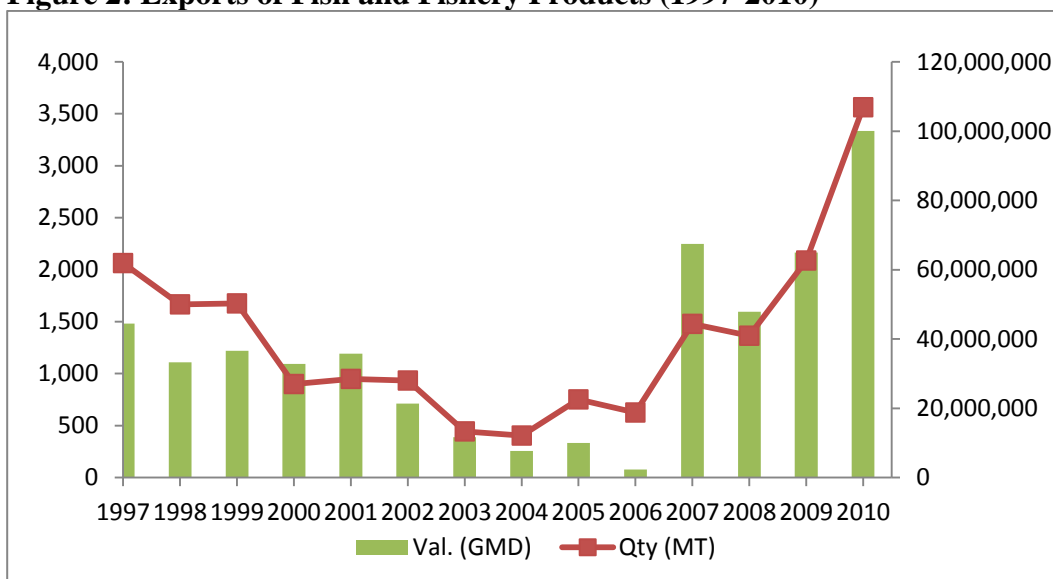
Year	Quantity (MT)	Value (GMD)
1997	2,063	44,427,355
1998	1,666	33,293,225
1999	1,677	36,563,649
2000	901	32,779,477
2001	949	35,726,199
2002	932	21,334,062

2003	445	11,629,895
2004	405	7,694,241
2005	751	9,956,837
2006	625	2,287,733
2007	1,480	67,432,811
2008	1,363	47,847,297
2009	2,087	64,919,036
2010	3,563	100,041,068

Source: Department of Fisheries, GOTG. 1US \$=GMD30, 2011

Figure 2 gives a schematic presentation of export trend of fish and fishery product in relation to quantities and value for the period 1997-2010.

Figure 2: Exports of Fish and Fishery Products (1997-2010)



Source: Department of Fisheries, GOTG, 2011

The EU is the main export destination for fishery products from The Gambia, to which all exports are made directly through approved fish processing establishments. Trade requirements for this market are stringent and production systems and products must comply with equivalent regulations on hygiene, food safety, consumer protection and official control requirements. It is noted that exports to the EU were suspended for four months (October 2010 to February 2011) following detected deficiencies in the system of official control of fishery products, but have since resumed with five companies approved to export to the EU being fully operational and continue to export a variety of fresh, frozen and smoked products.

Exports of fresh and frozen fish are also made to Senegal either for the domestic market, or for processing in Senegalese establishments for further export to Europe and other destinations. Exports of frozen fish are also made to other African countries such as sole fish products to South Africa, or whole fish of the “African mix” category to Ivory Coast.

Reasonable quantities of traditionally processed products are also exported to African countries. However, much of these are exported informally and often illegally (without passing through official export channels) without official documentation. These exports do not appear in the Government's export data because they are undocumented. They could be by sea or land through neighbouring countries where the fish are gathered from around the region. For example, smoked *Bonga (Ethmalosa fimbriata)* and smoked sharks to Guinea are notable for these export routes according to informal sources. Dried sharks to Ghana also used to be exported officially by sea from The Gambia, with some quantities obtained from neighbouring countries and thereafter shipped as Gambian products. In recent years however, the trend is reversed. Fisheries products from The Gambia are taken unofficially over to Senegal for shipment to Ghana. Hence there are lots of criss-crossing of fishery products in the sub-regional and African trade unaccounted for in official export figures. There are also exports of dried freshwater catfish (*Clarias anguillaris*) from inland fisheries to Senegal, Mali and even reportedly to France via Senegal (Njie and Jallow, 2001; Njie and Mikkola 2002). It is however, vital that there should be control to enable the formal accounting of these exports.

Table 3: Official Export of Smoked Fish Products by Destination (2004-2010)

Year	Total Qty (kg)	Value (GMD)	Destination					
			EU		USA/Canada		Africa	
			Qty (kg)	Value (GMD)	Qty (kg)	Value (GMD)	Qty (kg)	Value (GMD)
2004	18,194.2	131,234	4,685	35,284	13,509	95,950	N/A	N/A
2005	143,994	521,742	21,911	202,622	14,122	102,687	107,961	216,433
2006	114,946	1,483,317	61,098	1,029,964	19,595	252,546	34,253	200,807
2007	159,464	4,554,959	140,564	4,266,234	1,000	25,000	17,900	263,725
2008	188,391	2,325,934	175,351	1,671,141	11,573	612,627	1,467	42,167
2009	187,850	6,052,783	156,167	5,022,862	29,200	1,026,641	2,487	3,280.4
2010	123,349	3,777,171	79,029	2,353,325	14,564	541,514	29,756	882,332

Source: Department of Fisheries, 2011 US\$1 = GMD30

Table 3 depicts the official export data for smoked fish products (quantity and value) for the three main export destinations of EU, USA and Africa.

2.0 SOCIO-ECONOMIC IMPORTANCE OF THE FISHERIES SECTOR IN THE NATIONAL ECONOMY

The Gambia Government continues to give high priority to the development of the fisheries sector because it is not only a source of revenue and foreign exchange earnings for the country but also a repository for increasing employment opportunities, particularly for youth and women who are mainly involved in fish processing and marketing. The sector is also contributing in improving nutritional dietary in-take of the citizenry, poverty alleviation and food security.

It is difficult to gauge the sector's contribution to GDP, given the informal and unrecorded nature of artisanal fishing and processing activities in The Gambia. According to earlier data in the above text, the sector contributed about 3.4 percent of GDP in 2010.

Though small in absolute terms, fish exports are significant for the economy through foreign exchange earnings. Exports are mainly to various destinations (America, Africa and USA). The bulk (about 80 percent) of the exports is to the EU (as fresh, frozen and smoked fish).

The fisheries sector's contribution to Government revenues is relatively small but significant, fishing licenses and registration fees account for as low as 0.1 percent of total government revenue according to the 2012 budget estimates. However, there are also other revenue sources from the exportation of products through customs processing fees and through taxation on service providers such as clearing and forwarding businesses and fish processing and export enterprises/companies and income tax of workers. Additionally, small businesses and employees in various stages of the fisheries value chain also contribute to Government revenues. Consequently, great importance is attached to fisheries development because of its current contribution and potential to make more significant contribution to national socio-economic development.

In particular, the sector is the third largest food production sector, after food crops and livestock, and plays a significant role from a nutritional viewpoint, being the main supplier of animal protein in the diets of most Gambians. As earlier indicated, the estimated per caput fish consumption is 25kg along the coast with the average scaling down to 9kg further inland.

In terms of employment, it is estimated that some 200,000 people are directly or indirectly dependent on fisheries and its related activities for their livelihoods (Fisheries Department, 2006): fishing, fish processing and fish marketing. The artisanal sub-sector provides direct employment to over 6,000 fishers (1,410 head fishermen and 4,694 assistant fishermen) that catch and land fish. Artisanal fisheries provide direct and indirect employment to over 30,000 people, with about 3,000 people more employed in the industrial fisheries sub-sector and related operations. Thousands of post-harvest operators, most of them women are engaged in fish landing, processing (smoking and drying), marketing and distribution including transportation. Other actors include ancillary workers in other areas such as boat building and fishing gear construction, repairs and maintenance of boats, outboard engine mechanical works, fishing input supplies including ice production and sale, among others (Cham and Musseli, 2013)

3.0 THE POLICY AND LEGAL ENVIRONMENT FOR FISHERIES

Following the identification of a number of constraints (institutional, technical, economic, social, and physical) impeding the sustainable management and development of the fisheries sector, the Gambia Government adopted a new Fisheries Policy in 2007 (currently under review process) which, aims to address the constraints in order to contribute to the realization of the country's goals as outlined in the main national blue print "*Vision 2020*". The review process incorporated the principles of the Code of Conduct for Responsible Fisheries (CCRF) as well as other emerging trends in fisheries management including ecosystem based management. The policy framework recognises that responsible fisheries management is essential for the sustained development of the fisheries sector for the economic benefits and welfare of fisheries and related operators. Current fisheries development policy objectives as outlined by the Fisheries Policy 2007 are to:

1. effect a rational and long-term utilization of the marine and inland fisheries resources;
2. use fish as a means of improving nutritional standards of the population;
3. increase employment opportunities in the sector;
4. increase the net foreign exchange earnings;
5. increase participation of Gambians in fisheries, especially women and youth;
6. develop aquaculture;
7. improve institutional linkages with other relevant sectors;
8. improve the institutional capacity and legal framework for management of fisheries;
9. strengthen regional and international collaboration in the sustainable exploitation, management and conservation of shared stocks and shared water bodies, and
10. promote bio-diversity maintenance and enhancement and prevent environmental degradation.

To implement these policy objectives the Government developed the Fisheries Strategic Action Plan (2012–2015 which is currently under review) Implementation of the plan has been progressing albeit with constraints due to, among other reasons:

- inadequate skilled manpower;
- inadequate scientific information and data for informed decision making;
- poor infrastructure;
- limited control over the resources;
- inadequate resources for fishery products quality management;
- low level of aquaculture development;
- low level of regional trade in fish and fishery products; and
- low level of investment in the sector by the private sector.

It is to be noted that the Fisheries Policy was implemented within the context of the overall framework of the Agriculture and Natural Resources (ANR) Policy which encompasses the water and other natural resource sectors (forestry, livestock, parks and wildlife, and the environment), each of which is implementing its own sector policy. Implementation of the Fisheries Policy presents major challenges for collaboration to address the numerous problems (often trans-boundary and global in nature) on conservation and protection of the aquatic environment. In this

regard, the Government has placed strong emphasis on international cooperation within the context of the various multilateral and bilateral agreements and processes to which The Gambia is a party to such as the Sub Regional Fisheries Commission (SRFC), the Organization for the Management of The Gambia River Basin (OMVG - French acronym), the Regional Coastal and Marine Conservation Program (PRCM in French), the FAO Fishery Committee for the Eastern Central Atlantic (CECAF), the Canary Current Large Marine Ecosystem (CCLME), and the World Bank/GEF funded West Africa Regional Fisheries Project. Others include the FAO Committee on Fisheries (COFI), the Economic Community of West African States (ECOWAS), and the World Trade Organization (WTO). At the bilateral level, regular monitoring and implementation of the national obligations occur between The Gambia and neighbouring countries. In addition to the ANR sector policies, a number of other relevant national policies and strategies support and complement the Fisheries Policy i.e. GNAIP, PAGE Vision 2016 etc.

The Microfinance Strategy Framework, currently under review by the Ministry of Agriculture (MOA), aims to institutionalize a beneficiary-managed sustainable rural finance system to provide smallholders credit access at reasonable conditions.

The National Export Strategy (NES), providing the national framework for export development and promotion. The Strategy is intended to promote public-private partnerships, export competitiveness, and multiband bilateral protocols, notably including ECOWAS member countries.

The Government's Vision 2016 considers fish a basic and affordable animal protein in the diets of greater percentage of the population and envisages aquaculture development as one way of increasing fish supply, and making fish available at affordable prices. It is the policy of Government to pursue investments in the development of aquaculture for creation of gainful employment, supplement the incomes of rural people; provide additional fish protein to supplement diets; and to reduce the pressure on the capture fisheries, a rational path to fisheries management. In summary, aquaculture development is considered to have potential to contributing significantly to achieving the objectives of the Vision 2016.

The Gambia National Investment Policy (GNAIP) recognised the important role of the fisheries sector in the economy and advocates for ensuring sustainable management of fisheries resources. It called for investments in development of aquaculture as a source of food, employment and income. Despite challenges in the sector, the policy ascribes fisheries to having great potential for contributing to national socio-economic development, and identifies the sector as a priority area for increased investment. It therefore developed a fisheries component with the objective of sustainable management of fisheries resources in order to contribute to food security and foreign exchange revenues and to build resilience to climate change through adoption of adaptive and mitigation measures. It identifies five sub-components as: (i) management of capture fisheries and particularly avoiding endangered mammalian species and by-catches using appropriate fishing methods; (ii) fisheries infrastructure development; (iii) aquaculture development; (iv) capacity building; and (v) enhancing youth and women participation.

The GNAIP's expected outcomes for the sector component include: enhanced sustainable fish production capacity; reduced post-harvest losses; increased market access and information on fishery products; increased aquaculture production including commercial aquaculture farms to

complement national fish production; increased number of Gambian youths participating in the fisheries sector among others.

A National Trade Policy Framework aims at improving the business environment to attract private investments in the productive sectors for an export-led growth. The National Trade Policy focuses on regulating standards regarding imports of animals, marine life, plants, their products, and processed foods of plant or animal origin. The Policy recommends the formulation of a Quality Policy to ensure that Gambian products meet international standards for increased market access. The “West African Quality Programme (WAQP)”, a European Union funded initiative supported The Gambia to foster its agricultural sector’s compliance with international trade rules and regulations such as WTO agreements and SPS issues through the strengthening of quality infrastructure including development of the national quality and food safety policy whose continued implementation in the establishment of the Food Safety and Quality Authority based on the Food Safety and Quality Act 2011 that is enforced to implement the policy and manage food safety and quality.

The Gambia’s Enhanced Integrated framework (EIF) Medium Term Programme (MTP) was designed to be a comprehensive framework for implementing the National Trade Policy and the Action Matrix of the Diagnostic Trade Integration Study (DTIS). The DTIS makes references that are in line with specific needs in the fisheries sector including: fish processing which suffers from the unreliable provision and high prices for electricity, and the high cost of finance. The DTIS Action Matrix highlights the need to improve sanitary standards and hence strengthen sanitary inspections, provide regular demonstrations of improved fish handling and to strengthen operations as well as develop a plan to introduce basic services and infrastructure at fish landing sites.

The Government created the Gambia Investment and Export Promotion Agency (GIEPA) in 2010 to give impetus to promotion of investments and exports in the Gambia. The GIEPA Act provides attractive incentives for investment and enterprise development particularly the micro, small and medium sized enterprises, guided by the MSME Policy and Strategy.

To sustain the stability of the macroeconomic environment, Government formulated a Medium Term Macroeconomic Framework that aims to promote private sector activity and poverty alleviation and continues to strengthen partnership with the private sector to take advantage of the opportunities in the trade, tourism, manufacturing, agricultural and fishery sectors among others.

The National Policy for Advancement of Gambian Women: the Gender and Women Empowerment Policy (2011-2020), concerns mainstreaming of women into the national development process across all sectors and setting goals and strategies for enabling women to have equal access to opportunities in order to bridge gaps of traditional gender based inequalities and deprivation and to achieve an equitable gender balance in rural economic activities. It also promotes economic opportunities for women (e.g. employment creation) especially as women constitute more than 50 percent of the population. Government developed the Gender and Women Empowerment Policy and the Women’s Act geared towards the empowerment of women and gender mainstreaming into development processes and policy and for equity,

advocating that men and women participate as equal partners and beneficiaries in the economic development process for sustainable livelihoods development.

The gender and women empowerment policy's specific objective under the fisheries sector is to enhance the participation of indigenes, men, women and youths in fish farming, processing, marketing and post harvesting techniques. The identified strategies for realisation of this objective include to: encourage women to venture into fishing activities by owning fishing boats, and acquire appropriate technologies for fishing and oyster harvesting, processing and storage. Promote the training of more Gambian men, women and youths in fishing and oyster harvesting techniques, processing, marketing and business management.

The National Youth Policy (2009-2018), focuses on the mainstreaming of youth into the productive economic sectors (e.g. ANR) for greater achievement of food, nutrition and income security and youth employment and self-reliance. The Government of The Gambia and FAO Country Programme Framework 2014-2017 advocates that the promotion of economic opportunities for youths (e.g. employment creation) is vital to national growth given that youth represent 45 percent of the population;

The Fisheries Act (2007) and its attendant Fisheries Regulations (2008) serve as the legal basis for the management of the fisheries sector. The Act, whose provisions cover the artisanal, industrial and aquaculture sub-sectors, was first promulgated in the 1970s, and several amendments were made since then. These two pieces of legislation are under the purview of the Ministry of Fisheries and technical implementation is the responsibility of the Director of Fisheries. The other important stakeholders and partners involved in its implementation include the Gambia Navy, responsible for enforcement of licencing conditions. A Fishery Advisory Committee and the Community Fisheries Centres (CFCs) are also part of the institutional structure for inclusive oversight of the sector and decentralized fisheries co-management. Together, these different stakeholders interact to address the issue(s) at hand. The most common infringements committed in the industrial sector are: operating without an authorization to fish; incursion into prohibited areas; use of destructive fishing methods, and use of banned gear and mesh sizes. Thus, the industrial fisheries, and now artisanal fisheries from 2015, are being regulated through licensing, mesh size restrictions, delineation of fishing zones, and surveillance activities. Table 4 indicates regulatory and management measures applied for the industrial sector. However, there are still no stated limits to the number of licensed vessels for both industrial and artisanal fisheries. Close seasons and areas are also not introduced, neither are there restrictions on individual species or groups of species as management measures.

Although improvements have been made in some areas of fisheries surveillance, a major constraint is the policing of the country's EEZ by the Navy. Operational constraints included insufficient fuel to conduct surveillance exercises, and relatively short range and endurance to stay out at sea for long periods. The continual presence of the patrol vessels at sea alone, will deter incursions into wrong fishing zones by licensed vessels, and poaching by unlicensed vessels. Often the source of conflicts between the industrial and artisanal sectors is the incursion of trawlers into wrong fishing zones resulting in destruction of fishing gear and equipment of artisanal fishermen, and even death some times. Clearly, this could lead to great economic and financial losses to the artisanal fishermen. Where an offending licensed vessel escapes from the scene of conflict but its registration identified, the local agent of the vessel is called in to effect

reparation. On the other hand, if the vessel is not licensed in The Gambia and not in the records, the case is usually more difficult to follow up for possible reparations.

With the advent of the GAFDP and training of fisheries and Navy MCS staff, illegal fishing appears to have been significantly curbed. From 2000 to 2008 a steady decline in the number of vessels arrested was recorded - from about 12 per year to 1 or 2 per year, attributed to effective surveillance. Since then there has been a downward trend in the number of infractions committed and arrests made due to increased presence of the navy in the marine fisheries waters. These include joint patrols with sub-regional countries under the Sub-regional Fisheries Commission (SRFC). Hence, the number of recorded infringements and arrests has substantially reduced and often do not involve unlicensed or poaching vessels. Infringements are mainly related to wrong mesh size nets and other minor offences. In 2013 for example, only one arrest was made and involved wrong mesh size and fishing without a fisheries observer on-board. Further training, adequate equipment, better allocation of resources and observatory mechanisms on the fisheries waters, as well as the intensification of surveillance patrols, can have a profound impact on management of the fisheries resources with improved sustainable benefits (Njie, 2013).

Reference to the artisanal fisheries, there are restrictions on gear, mesh size and minimum fish size, but not restricted to the 9 nautical mile limit zone where industrial trawlers are restricted. In addition there are no closed areas or seasons. The provision in the older regulations to impose fees on the canoe fishery was not implemented because it was seen as too cumbersome and more costly than the revenue it would generate. The same provision is in the new Fisheries Regulations, imposing a license fee on artisanal fisheries, depending on the size of boat and gear/technology used. The more a boat can catch and the higher the value of the fish, the greater is the fee. The artisanal fishery also self-regulates itself, including rule-making, arbitration and conflict resolution. Conflicts are rare among artisanal fishermen and when they arise they are usually resolved among themselves, or arbitrated with the help of village authorities, elderly fishermen or a combination.

Table 4: Regulatory Management measures applied in Fisheries

Industrial Fishery Regulatory Management Measure	Description
Mesh size regulations on trawlers (stretched mesh)	<ol style="list-style-type: none"> 1. demersal fish species – 70 mm 2. pelagic fish species: 40 mm 3. shrimp: 50 mm 4. tuna seine nets: 40 mm 5. tuna gill nets: 60 mm
Licensing	The bilateral Agreement with neighbouring countries has a limit on the total tonnage of fish catch capacity. When the maximum allowable catch capacity for each fishery category is reached, (with data collected and reported by observers on-board) no other vessel can be registered.
Surveillance and Monitoring	Fish production/ catch data is recorded by the Fisheries Observer Program (each vessel carries an observer) and industrial fishing vessels are monitored by the Gambia Navy.

Near shore fishing restriction	For the purpose of resources management and to reduce conflict between the industrial and artisanal fishing fleets, the legal nearshore fishing limit for industrial vessels with capacity smaller than 250 gross tons in the waters of the Gambia is observed. These are prohibited from fishing below the 9 nautical miles zone from the shoreline. The regulations also prohibit vessels of gross tonnage over 250 tons from operating below the 12 nautical mile zone from the shoreline.
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Courtesy of: Tobey et al, 2009, in Cham and Musselli, 2013

4.0 STRUCTURE OF THE FISHERIES SECTOR

As indicated earlier, the Gambia's fisheries sector consists of two subsectors: the artisanal and the industrial fisheries.

4.1 The Artisanal or Small-scale Fisheries value Chain

The artisanal fisheries consist of relatively extensive, relatively low-capital traditional fishing craft, gears and fishing techniques. It refers to those fishermen (both national and foreigners) operating in units of 2-8 or more fishermen, depending on size of vessel, or on individual basis employing a fishing unit comprising a motorized or un-motorized boat (canoe) and fishing gears (nets, hooks or traps) and other accessories. It also includes the women oyster and cockle harvesters who generally operate within the estuarine areas. Essentially, the craft employed in this subsector are planked and dug-out canoes. The sub-sector is highly diversified, covering marine (coastal), brackish (through the estuary waters of the river Gambia) and freshwater (upstream along the river) fishing operations.

In spite of the small-scale nature of its operations, the artisanal sector provides 90 percent of the total national fish consumption; it produces the bulk of fish catches and is the main source of raw material for the industrial sector. Artisanal fisheries also supply about 80 percent of throughput in the industrial fisheries processing plants. The *bonga*, round and flat *sardinella*, and other small *pelagics* are the main species landed by the artisanal fishermen. These species are mainly consumed locally in fresh or traditionally processed (smoked or dried), or exported to the West African sub region. The high value commercial species that the sector produces (tiger shrimps, sole fish, sea breams, lobsters and cephalopods and other white fish species) are mostly supplied to fish processing factories for export, mainly to the EU, America, Asia and Africa.

4.1.1 Steps in the Artisanal Fisheries Value Chain

The steps in the value chain of the artisanal fisheries in The Gambia extend from fishing to fish marketing and distribution at the domestic level and exports. Steps in the value chain of artisanal fisheries include fishing and fishing input supplies, fish landing and offloading, fish trading (marketing through whole sale and retail), fish processing, transportation and marketing and distribution of fresh fish and processed products including exportation of fresh and processed products.

4.1.2 Artisanal fisheries Value Chain Steps with Actors and Operators in the chain

The value chain actors comprise of operators along the fish supply chain as depicted in figure 3. These actors range from fishers to fish traders who are engaged in a range of activities from fishing to fish marketing, distribution and export on a vertical successional activities with horizontal players in the provision of supporting accessories and services. It is important to note that ice manufacturers and suppliers are critical along almost all stages of the value chain except for fish drying and smoking. This is with view to preserve freshness and consumer satisfaction.

Figure 3: Generalised value chain steps actors and functions along the value chain

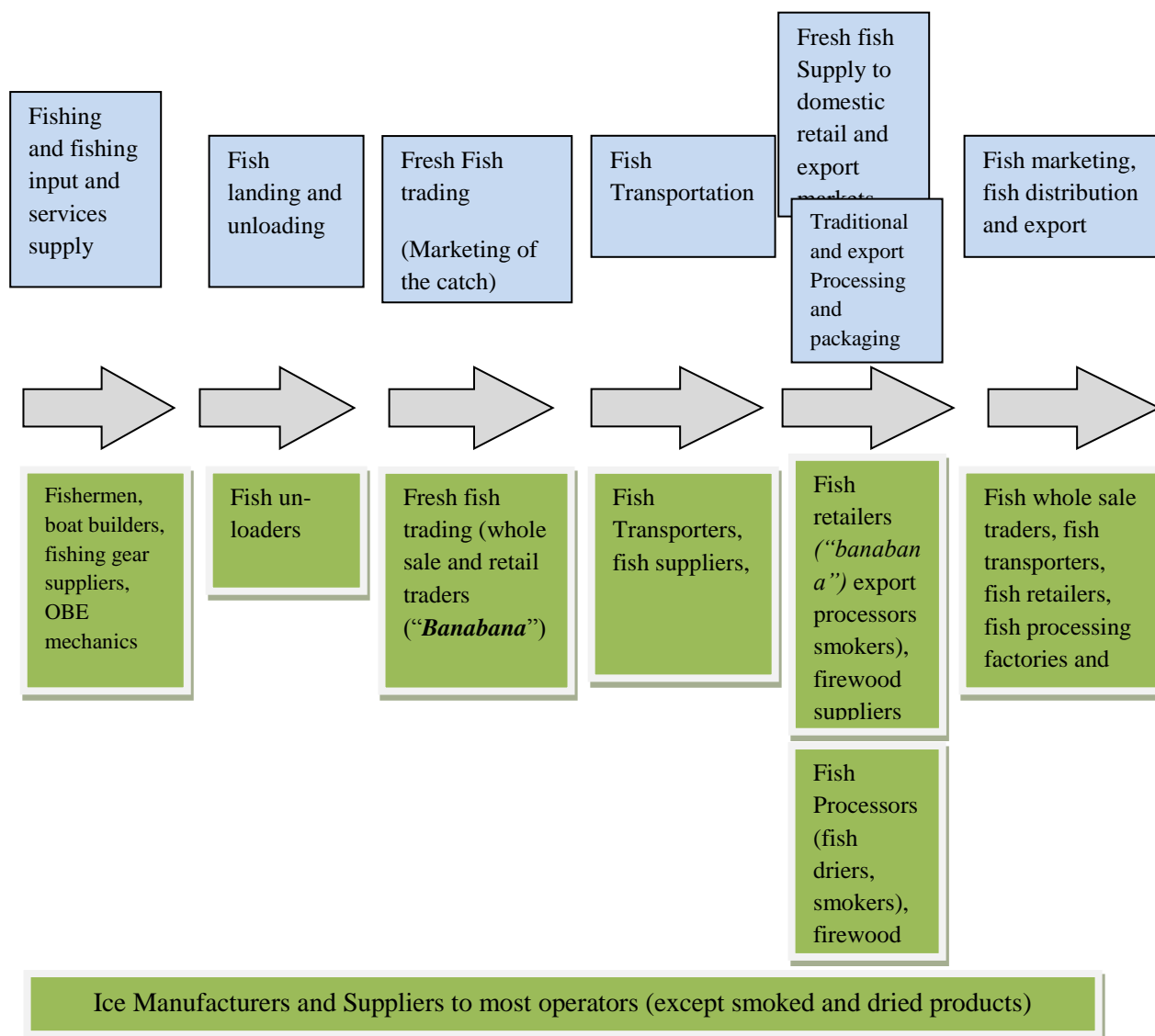


Table 5 gives a detail overview of the various functions of the value chain actors and operators. It further shows the different stages, actors connected, functions executed and location in the value chain.

Table 5: Functions of Value Chain Actors and Operators

Step	Actors connected	Functions	Location
Fishing	Fishermen, fishing input suppliers (boat builders, fishing gear and accessories suppliers, net menders, engine suppliers, mechanics, spare parts dealers)	Fishing operations Fishing input sale and supply	At sea and in river estuary

Fish catch landing	Fish unloaders and carriers,	Discharge fish from canoes and carry them to landing platforms, market places, transport and fish processing plants	On the beach in marine coastal and Inland (river) fish landing sites
Fish trading	Fish traders (“ <i>Banabana</i> ”)	Buy the catch and sell by whole sale to distributors, fish factory suppliers, retailers and processors, financing of fishing operations	On the beach and fish landing site facilities, at fish factories
Fish transportation and distribution	Fish transporters, distributors and suppliers to processing factories	Load and transport fish to markets (urban and inland markets) and fish processing factories	From landing sites to major urban and inland markets and satellite villages
Fish processing	Fish processors (fish smokers and fish driers), fish processing factories, firewood sellers, salt sellers	Traditional fish smoking and salting and drying, fish processing at factory level, freezing and cold storage	At landing sites and in homes and at fish processing factories
Fish marketing	Fresh fish wholesale traders, fish retail traders, processed fish traders, fish suppliers to processing factories	Fresh fish and processed fish whole sale and retail marketing and export	On the beach, in urban and inland markets, along major road sides, at hotels, restaurants and catering places and food vendors
Fishery products export	Fishery products exporters, fish processing companies (fish factory or fish business operators), shipping agencies and freight handlers	Processing, packaging, freezing and export of fishery products, shipping agents	Fish processing factories, seaport and airport and by road/boat transport to Senegal and other regional markets

Source: Discussions with stakeholders and value chain actors

4.1.3 Artisanal Fishing and Economic Operations

Fishers are the actors engaged in fishing activities and with the exception of harvesters of wild oysters who are predominantly women; all fishers are men. A fishing craft comprises mainly of wooden canoe locally constructed by artisan boat builders. Canoe types are mainly the planked or planked dug-out canoes of various sizes and capacities, predominantly operated in the coastal marine fisheries areas. There are also the dug-out canoe types of various sizes in the river estuary and in the inland river fisheries. Dug-out canoes are un-motorized, operated with paddle power as means of propulsion.

Planked canoes are generally propelled with outboard motors while smaller canoes which do not go far out to sea are propelled with paddling or occasionally with sails or masts. A small

proportion of fishing crafts is of the fibre glass type commonly referred to as FRP (fibre-glass reinforced plastic) boats that are also in use in some fish landing sites around the country in the coastal and river or inland fisheries. These FRP boats were introduced in the fishing industry in the early 1990s through bilateral fisheries cooperation projects between The Gambia and the Japan International Cooperation Agency (JICA). They are fast diminishing in numbers due to lack of continuation in supply and poor repair and maintenance. However, limited numbers of fibre-glass boats are now being built locally.

Canoe sizes range between 3 or 4 metres to 25 meters. Number of crews per fishing canoe also varies depending on the size of canoe and type of fishing operation. Canoe sizes of 3 to 5 meters length carry between 3 and 6 crew members and larger canoes of 17 to 25 meters length carry between 10 and 15 crew members. The crew size also depends on the type of fishing operation.

Various fishing gear and techniques are employed by fishermen with the most important including gillnets (set, bottom and suspended nets), drift nets, surrounding or entangling nets, cast nets, hook and lines, purse seines and stow nets targeting different fish species.

Fish catches may be landed iced or without ice depending on type of fishing, duration of fishing trip or type of target species, financial capabilities and choices of fishermen. However, the bulk of fish landed is fresh usually within few hours of catching (small pelagics) or well iced and preserved on-board (in the case of high value demersals and white fish). However, depending on availability of ice, affordability, choice of fishermen or fishing techniques employed some fish may be landed already spoiled, especially by fishers operating set gill nets and those staying for longer hours at sea. Such spoiled fish is also marketable but downgraded and sold at lower prices, used for processing into a traditional fermented, salted dried product (locally called “*guedge*” or “*nye jarro*”). The product is an important traditional condiment used for flavouring in local dishes and is widely marketed in urban and rural markets and export to sub-regional countries.

The size of the fish catches vary depending on the type of fishing operations and target species. Pelagic fishing canoe operations targeting *Bonga and Sardinella*, and other small pelagic species land comparatively large quantities (2-5 tons) of fish, normally placed in the bottom of the canoe. White fish and demersal fishing operations on the other hand catch may land between 100kg and 500kgs which are stored at the bottom of the canoe or in insulated fish boxes. While most fishing trips last between a few hours to a day, some fishers go on longer fishing trips lasting between two and five days. This category of fishers carry ice and insulated boxes in which they preserve the catch.

Fishing enterprises provide employment and income for many coastal families. However, fishing inputs and financing of fishing operations are associated with constraints ranging from unavailability of formal sources of financing, absence of appropriate and organised credit and financing systems, high interest rates on borrowing and lack of co-laterals and hence reluctance of banks and other financial institutions to lend to fishers whose operations are also considered high risk. However, profitability of fishing as a key socio-economic activity is also affected by fish losses due to lack of reliable means to preserve the freshness of fish.

Fishermen and Fishing Economic Units

The sub-sector has witnessed an increased expansion in the number of fishing economic units (FEU) operating in the coast and along the river banks and estuaries: from 1,299 canoes in 1983 to 1,969 canoes in 1997. The 2006 frame survey indicated a fleet of 1,785 canoes operating in both the marine and along the river, indicating a decline to the 1997 figures. However, it is not unusual to find variations in the numbers of actors recorded at different times of the year due to internal and external migration of fishermen within the country. Interestingly, a further sharp decline is registered in the latest frame survey conducted this year in April (2016) with a recorded total of 1,231 canoes. No reasons are presented for this sharp decline but it is also noticeable that the total number of fishermen have greatly decreased by over 30% in 2016, particularly foreign fishermen (by 36%) according to the draft frame survey 2016 report (Fisheries Department 2016). Some contributing factors could preliminarily be ascribed to migration and timing of the conduct of the frame survey. Other unconfirmed reasons may relate to the recently introduced payment of registration/licence fees on artisanal fishing vessels, causing some foreign fishers to emigrate. Before this, access to the fisheries resources has been free. However, circumstances have changed with tendency for free access to be classed as IUU fishing, but in reality, it is important, for resource users to pay levies and contribute to resource management costs, and other costs relating to service provision for sustainability.

As shown in Table , the sub-sector provided direct employment to 6,104 fishermen (1,410 head fishermen and 4,694 assistant fishermen) according to the 2006 frame survey. Out of the 1,410 head fishermen, 805 (57 percent) were Gambians and 605 (43 percent) foreigners. Foreign fishermen (mainly Senegalese) form the majority along the Atlantic coast, which is the most productive area. This trend of decline in the fisher population seems to be continuing with the 2016 frame survey recording a total fishermen population of only 4,234 (1,230 head fishermen and 3,004 assistant fishermen). The reasons for this may be related to the earlier forwarded explanations. It is estimated that the artisanal fisheries sub-sector provides direct and indirect employment to 25-30,000 people. Broadly, the livelihoods of an estimated 200,000 people may be dependent on fisheries and related activities (Mendy, 2003). Table 6 also shows the various types of canoes (motorized and un-motorized) and main types of fishing gears used in artisanal fisheries.

Table 6: Comparison of the 1997 and 2006 and 2016 Fishery Frame Surveys

	1997	2006	2016	Percentage Change 1997 to 2006	Percentage Change 2006 to 2016
Head Fishermen	1,969	1,410	1230	-28.4	-12.8
<i>Gambian</i>	1,238	805	833	-35.0	3.5
<i>Non Gambian</i>	731	605	397	-17.2	-34.4
Assistants Fishermen	4,067	4,694	3004	15.4	-36.0
<i>Gambian</i>	1,985	2,291		15.4	

<i>Non Gambian</i>	2,082	2,403		15.4	
Total Fishermen	6,036	6,104	4234	1.1	-30.6
<i>Gambian</i>	3,223	3,096		-3.9	
<i>Non Gambian</i>	2,813	3,008		6.9	
Type of Canoes					
Un-motorized canoes	1,243	1,082	637	-13.0	-41.1
<i>Gambian</i>	888	700		-21.1	
<i>Non Gambian</i>	357	382		7.0	
Motorized Canoes	542	625	582	15.3	-6.9
<i>Gambian</i>	306	325		6.2	
<i>Non Gambian</i>	236	300		27.1	
Fishing Gears Used					
Encircling Net	279	295	149	5.7	-49.5
Gill Net	1,050	1,066	417	1.5	-60.9
Long Line	158	177	119	12.0	-32.8
Hand Line	138	169	6	22.5	-96.4
Drift Net	165	344	298	108.5	-13.4

Source: Fisheries Department, 2006 and 2016 (Draft) Fishery Frame Survey Reports

4.1.4 Development of Artisanal Fisheries and the Advent of Community Fisheries Centres

The strategic approach to artisanal fisheries development has been through participatory planning and implementation of development projects from the late 1970s. This involved the use of integrated and participatory approaches with fishing communities and partnerships with development partners who provided support and funding which resulted in a number of supportive and enabling interventions that changed the artisanal fisheries landscape (Njie, 2013).

Much has been achieved in this endeavour typified by planning and implementation of Artisanal Fisheries Development Projects (AFDP). These initiatives led to the successful institution of 15 community fisheries centres (CFC) around the country (8 in the marine coastal areas and 7 in the brackish water regime along the banks of the river or inland fisheries). These CFCs are a complex of fisheries infrastructure, facilities and services to support activities in artisanal fisheries.

Specifically, CFCs have provided fishing equipment and materials, fish landing and handling facilities including processing facilities (fish smoking houses and sun drying racks, individual product storage facilities for fish processors, insulated containers among others. CFC projects also contributed seed money and supported the setting up of credit and savings schemes through fisherfolk associations that were set up and strengthened, and a fisheries revolving loan scheme, centrally managed by the Fisheries Department (Njie, 2013).

At different times and complementing each other, fisheries development projects provided ice plants and cold storage rooms and insulated or refrigerated transport vehicles at some major fish landing sites for preservation, marketing and distribution of fish. However, increased entry into the sector and participation by actors have placed strain on, and rendered the facilities limited and with age proved to be expensive to run and maintain due to high costs of electricity (commercial rate), unavailability of spare parts and management related challenges, that make some of the facilities rather unprofitable to run.

Artisanal fisherfolk also received organisational development support and training in various disciplines to enhance organisation into trade group associations and business activities. Implementation of such projects contributed to increased fish production, reduced post-harvest losses and enhanced malnutrition in children, pregnant and lactating mothers, increased employment in various income generating activities and capacities for both men and women in the sector. Elected members of these trade group associations constitute the local community fisheries centre management committees that participate in the co-management of CFCs infrastructure and facilities at landing sites (Njie and Mikkola, 2002). However, valuable lessons have been learned from these experiences.

More recent project interventions to complement and consolidate achievements involve construction of two retail fish markets in the major central urban town of Brikama in the West Coast Region (WCR) and in Bakoteh, in the Kanifing Municipal Council. The Brikama fish market constructed with Japanese grant aid is equipped with fish retail tables, ice plants, refrigerated stores, insulated vehicles and cooler boxes for improved fish preservation, marketing and distribution of fish. The Gambia Artisanal Fisheries Development Project (GAFDP), funded by the African Development Bank Project, Arab Bank for Economic Development in Africa (BADEA) and Gambia Government commenced in 2002/2003 with objectives “to contribute to improved food security, increased employment and foreign exchange earnings and to achieve sustainable exploitation of fish resources”. The project provided training and capacity building for fisheries staff and fisherfolks in various disciplines, supported MCS activities to curb illegal fishing in the territorial waters and rehabilitated three inland fish landing sites. It built the fish landing jetty with pontoons around the port of Banjul to address the lack of a fishing port for fishing trawlers and artisanal fishing canoes. The project constructed the Bakoteh central fish market for the wholesale and retail of fish, equipped with fish retail stalls for fish retailers, a fish auction or whole sale hall, a total capacity of 15 ton ice plant and 10 tons chill rooms with a standby generator, fish handling facilities and piped water supply with sanitary facilities. It trained market users in food hygiene, fish handling and preservation, business and environment management and put in place a line of credit to finance fisherfolk operations (Njie, 2013). These interventions by the GAFDP significantly complemented fisheries development and management actions and addressed constraints in the sector.

Other complementing interventions in artisanal fisheries came from, among others, regional projects and programs which made remarkable contributions to development and management of fisheries in The Gambia. The trickle-down effect was strengthening of hygienic conditions of fishery products to improve fish quality and safety control and access to international markets. Consequently, artisanal fisheries development witnessed increasing growth and absorptive capacity for employment and entry into the sector. Today there are about 155 artisanal fish landing sites or bases of operation dispersed along the marine coast and along the banks of the river (Njie, and Drammeh 2011).

4.1.5 Oyster and Cockle Fisheries

The shell fish fishery includes the oyster and cockle harvesting fishery which is an important source of livelihood for many women in coastal and brackish waters of the river more particularly in the Tanbi National Park, the Allahein “Bolong” in Kartong, and Bintang in West Coast Region, the north bank villages of Tambana and Bakang, and Kemoto in the Lower River Region. Harvesters, the majority of whom are women, mainly belong to the Jola, Balanto and Manjago ethnic groups. The harvesting season in the Tanbi wetland area is restricted by a community based management consensus from March to June for oysters, and from July to November for cockles. The development of this fishery activity became a stated priority for Government since the 1980’s, but little has been done to manage the oyster and cockle fisheries or to provide technical support to develop the activity until recently. Information on the subsector is limited. Data on oyster and other shellfish production is unavailable because it has not been part of the countrywide frame survey design and data collection effort of the Fisheries Department. However, limited surveys have been conducted on the oyster fisheries in the Tanbi National Park, and it was estimated that there are about 500 oyster harvesters, predominantly women, and that hundreds more could be involved in related activities including production of white lime from oyster shells (Njie and Drammeh, 2011).

The oyster harvesters use un-motorized simple dug-out canoes (3-4 meters in length) capable of carrying 1 or 2 women who paddle to the harvesting sites. There are times when they do not use canoes (because they cannot afford them) and walk on foot or wade into knee-deep waters to access the harvesting sites. Harvesting is only possible during the six hours of diurnal low tide when the oysters, attached to the prop roots of the mangroves are exposed, and the women can reach them, using either a cutlass or a small axe. The axe selects the oyster one by one, removing the mature ones and leaving the small ones to grow, whilst the cutlass peels the oyster from the roots of the mangrove scraping the bark of the roots and usually leaving a scar on the roots. The oysters are gathered in the canoes or carried on head either in bags or baskets back to the bases before the high tide sets in (Njie and Drammeh, 2011). Hacking or chopping off the oysters from the roots can be destructive because when the roots are chopped off, and the available settling space for the next generation of baby oysters is reduced, which could in turn lead to fewer oysters and thus a reduced oyster population and potentially reduced harvests for the women.

Cockles are also harvested by the same women during low tide either using canoes to the harvesting sites or walk on foot, but unlike oyster harvesting by canoe, in cockle harvesting the women anchor the boat and disembark to scrape the sand with their fingers or with spoons to access the cockles - although there is the superstitious belief that the cockles will disappear from high yield beds due to the use of spoons.

Processing is performed by the same women who harvest the produce from the wild by steaming or boiling because it is effective and consumes lesser resources (firewood, water and time). The process begins with removal of foreign matter from the harvested oyster; then steamed in pans/drums for 30 minutes to one hour, during which the shells will open, and the meat softens up to ease shucking and extraction of the meat.

Another technique is to roast the oyster over fire on metal grills - a practice which is now rare, because it is time consuming and uses huge quantities of fuel wood. After roasting the oysters, the meat is extracted with knives and collected in woven baskets, and marketed often after washed clean or even reheated. In some other places in the country, the meat is preserved by salting and sun drying to very low moisture content, before marketed.

Meanwhile the oyster shells are gathered in heaps and sold for the production of white lime, for brick making, the preparation of chicken feed or as soil conditioner and fertilizer in the horticulture industry.

Cockles are also processed by boiling/steaming to open the shell and to loosen up the meat from the shell. After steaming, the meat is sieved with perforated trays or shaken and separated by gravity when the meat falls to the bottom and the shells gently scooped out from the top. The meat is then placed in baskets and washed in sea water. Water is allowed to drain and the product re-boiled before marketing. In some instances the product is salted and sun dried to reduce the moisture content before storage and subsequent marketing, similar to oysters.

Marketing of cockles and oysters is conducted by the same women who harvest and process them. However, it is not uncommon to find younger women (daughters and relatives of harvesters) selling cockles and oysters. The products are marketed in diverse places including the processing sites, urban market places and along roadsides, while some producers carry the products on their head and sell from house to house in the neighbourhoods. Dried oysters and cockles are sold at the weekly market days ("loumo") in rural communities which rotate from village to village on a daily basis. Selling is by a measure of an empty milk tin that contains about 150 grams of oyster or cockle meat at D30. However the large, handpicked grade of processed oysters fetches D40. The price of fresh cockles is D10.00 and dried cockles are D20.00 for a container of 150 grams.

Buyers of these products include individual consumers who buy for home consumption, street food vendors, restaurant operators and exporters. Currently, limited quantities of oysters enter the international trade. Small quantities of oyster are shipped overseas as gifts to relatives or informally sold to niche markets of mainly the Gambian Diaspora in the EU and USA. The product may also be taken for special ceremonial occasions of Gambians living abroad. Hence exports are classed as traditional ethnic foods of value.

However, if the formal export markets are to be targeted for the export of raw or fresh shell fish products, stringent sanitary requirements must be met, particularly to the European and American markets. This requires significant improvements in the organisation of the sector and its production systems.

4.2 The Industrial Fisheries Sub-sector

Unlike the artisanal sector, industrial fisheries and fish-processing activities involve use of high-cost fish-production systems (fishing trawlers), as well as high-cost processing systems (fish factories).

As at mid-2012, there were 20 locally registered fishing companies operating in The Gambia, but only 10 companies had managed to invest in on-shore facilities (fish factories). Five of these (Bara Fishing, Kendaka, Rosamond Trade, International Pelican, and the Atlantic Seafood Company) had met the required standards and been certified to process and export fresh and frozen fish products to the EU, Africa and Asia. Only one factory (Rosamond Trade) is currently certified to export cured (smoked) fish products to the EU. The remaining fishing companies are yet to have processing establishments or meet the EU regulations on fishery products processing establishments for smoked/cured fish.

Exports to the EU essentially consist of fresh and frozen fish, particularly of high-value commercial species (crustacean, cephalopods, sole fish, etc.). Specialized smoked fish products (all traded through the only certified establishment) essentially serve the Gambian diaspora market in the EU (UK, Netherlands, Spain, and Belgium) and the USA. The development of industrial fisheries has been relatively limited in The Gambia. Over 90 percent of the fishing vessels legally operating in Gambian waters are foreign owned and land their catches at foreign ports. They usually make contractual arrangements with Gambian fishing companies and individuals as agents in order to satisfy national licensing conditions, or operate by virtue of fishing access agreements with the Gambia. Foreign licensed trawlers are required to land 10 percent of their catches in the Gambia (a licensing requirement), or pay the equivalent in monetary value to the Gambia Government. Constraints such as a virtual lack of locally registered industrial fishing vessels and lack of adequate cold storage facilities, financial constraints and high cost of energy, among others have considerable negative impact on the development of industrial fisheries for the benefit of the economy in general.

The major contribution of the sub-sector lies in its foreign exchange earning potentials, and its employment generating capacity. The licensing conditions stipulate that, 20 percent of the crew of a fishing vessel licensed to operate in Gambian waters must be Gambian, and this is aimed at building the capacity of Gambian youths in fishing operations and create employment. It is estimated that about 2,000 people are employed in the industrial sub-sector, women accounting for an estimated 70 percent of employees. The female share is significantly higher in the packaging/processing nodes, where virtually all workers except filleters are women (Fisheries Department, 2010).

4.3 Aquaculture Development

Based on the policy objective to develop aquaculture which has been a neglected area, the Government is now giving attention to its development. This is in light of reducing the pressure on capture fishery resources and as a means to support food security and poverty reduction in rural areas.

4.3.1 Fin Fish Culture

To exploit the potentials of the river with the view to support aquaculture development, the Fisheries Department, in collaboration with the FAO and the then Taiwanese mission in the country conducted fin fish culture trials of the Nile tilapia (*Oreochromis niloticus*) and fresh water catfish (*Clarias anguillaris*). The project established twenty earthen ponds of 286 square meters average size. It also conducted the poly-culture of tilapia and the freshwater catfish (*C. anguillaris*), and both systems have shown promising results.

The introduction of fresh water finfish aquaculture in The Gambia took place from the 1970s and 1980s with the introduction of small-scale tilapia farming. This was with however little success but reasonable experience was gain by fisheries officials who were taught by their Peace Corps counterparts who initiated the system.

Subsequent activities with finfish culture followed later from 1994/1995. Thereafter, Government reflected on development of a rural based aquaculture with a view to enhancing rural nutrition, provide employment among others. The Department of Fisheries developed project proposals for soliciting funds from potential donors. A National Aquaculture Development Strategy (NADS) was also developed by the Department for sustainable aquaculture in the country. Apart from tilapia species, other fresh water fish species are locally available for culture, including the African catfish *Clarias gariepinus*, the African arowana, *Heteroticus niloticus* and the Africanknife fish *Gymnarcus niloticus*.

Around 2008, the Taiwanese Technical Mission (TTM) responded to a request for technical assistance from The Government of The Gambia towards the revival of aquaculture development in the country. This was with the view to improve availability of fish for improved nutrition and food security in rural areas. The Taiwanese technical assistance team collaborated with the Departments of Fisheries and Agriculture to address challenges in the aquaculture sector. They established a mini hatchery for production of Tilapia fingerlings in Sapu (a major agricultural research, extension and demonstration centre), and also established the Jahaly fish farm. The hatchery produced tilapia fingerlings for stocking in fish ponds in the farm and later transported thousands of fingerlings to the already existing Kanilai fish farm (since 2004) belonging to the President of the Republic of The Gambia as part of his enthusiastic agricultural development initiatives, where they were grown in ponds and supplied locally to consumers (Rice, M. A. et al 2014). The mission also set up a low capacity fish feed plant based on locally available ingredients (rice bran, fish meal, groundnut cake etc.). The feed plant produced pellet and ground fish feed.

In 2009, FAO through a Technical Cooperation Program Grant provided funds for aquaculture development in the rural areas. This project, “**Sustainable Aquaculture Systems**” was implemented in the Jahaly layout near the TTM fish farm. The project developed 20 tilapia ponds and additional ponds for catfish culture. The project and the TTM interventions involved organization of beneficiaries into an association of fish farmers, comprising men and women farmers who received training in fish farming and allied activities. Small quantities of locally cultivated fish were harvested for sale and consumption in the surrounding communities. The farm and proceeds of sale are managed by the beneficiary 150 - member Fish Farmers Association (Darboe, 2014).

These experiences in finfish aquaculture, led the Gambia Government to introduce an Aquaculture expansion program under the Programme for Accelerated Growth and Employment (PAGE). Hence, the Government allocated D3.5 million for aquaculture Development during 2012 – 2013 targeting new sites in Koina, Basse and Sandu Kuraw in the URR, and Bansang and Kuntaur in the CRR. To support these initiatives, the FASDEP project which started in 2013-2014 earmarked the development of 200 extra fish ponds country-wide for communities and schools to support the school feeding program.

4.3.2 Oyster Culture

The Department of Fisheries conducted studies in the 1980s on the West African mangrove oyster (*Crassostrea gasar/tulipa*) which indicated great commercial potential. The competitive advantage enjoyed by this species in the Gambian estuary is the fast rate of growth (relative to other commercial species harvested elsewhere) and a relatively unpolluted environment. Oysters thrive in the marine and brackish waters of the river and its estuarine areas, which, are relatively clean compared to other estuarine areas elsewhere. However, market outlets/niches need to be adequately identified and a shellfish sanitation plan put in place for access of the products to export markets.

Any commercial expansion and/or upgrading of the industry will involve some shift towards oyster culture (as distinct from harvesting from the wild), for a number of reasons: conservation purposes, as fish stock potentials for certain species are threatened by full exploitation /over-exploitation; environmental reasons to avoid more extensive damage to the fragile mangroves ecosystem; commercial reasons, oysters harvested from the wild tend to be smaller and less homogeneous than oysters potentially cultured in trays, and on racks.

Development of oyster culture is likely to generate significant employment particularly for poor women engaged in the harvesting of wild oysters. With focus on export, strategies may be explored, with a view to identifying means for value addition and providing hygiene and quality infrastructure and facilities.

4.3.3 Commercial Aquaculture

Though still in an embryonic stage, aquaculture is deemed to have huge growth potential in The Gambia. The development of subsistence, small-scale and commercial aquaculture is a stated Government policy, given the nutritional and economic potential of this sub-sector. Indeed, aquaculture represents an additional source of animal protein, contributing to food security while reducing pressure on wild stocks, particularly the shrimp and oyster stocks. It can also create jobs and generate foreign exchange earnings. The country is particularly well positioned for shell fish farming, and shrimp exports which command a high price in Europe. Pilot aquaculture activities were carried out by the Department of Fisheries in co-operation with the Department of Agriculture through a FAO Technical Cooperation Program (TCP) and also the then Taiwanese Technical Assistance program for development of aquaculture in the country. Currently, the Departments of Fisheries and Agriculture through a few projects are supporting the expansion of aquaculture activities in some parts of the country to exploit the potentials of the sector. However, there are a number of challenges including the proper organisation of farmers, access to finance, availability of fry and fingerlings: currently obtained by collecting from the wild (and needing a hatchery system), availability of appropriate feed among others.

Commercial Shrimp Farming

Only one company (West Africa Aquaculture) has been engaged in aquaculture on a commercial scale in The Gambia. It was established in 1988 as Scan-Gambia Shrimps Ltd, but collapsed in 1992 due to financial problems. It was restarted and renamed West Africa Aquaculture, it is a hatchery, farm and processing establishment engaged primarily in the farming of the black tiger prawn (*Penaeus. monodon*) for export, mainly to the EU. In 2006, using 50 hectares out of its original 200 hectares the farm produced 50 tonnes of shrimp. Of the available 550 hectares only 40 hectares (10 ponds) were used for production as at June 2012, with the hatchery producing 2.5 million post larvae (PL). The production cycle is 6 months (April-November). This means that there is still potential for more area to be put under cultivation, and to even serve as a base for modelling production methods adapted to the local context in the West African region.

The point was made that costs of production were too high for the business to be profitable. More specifically, the cost of energy was identified as a major constraint for commercial aquaculture development in The Gambia. Indeed, the industry is particularly energy intensive, given the energy requirements of the processing establishment (cold-chain infrastructure) and the ponds (pumping water from the estuary). While the price of fuel for power generation had increased by 900 percent over 10 years (from as low as D5 or about US\$0.022 at current exchange rate of \$1 = GMD44.46 in August 2016) per litre in the early 2000s to D45/50 or about US\$1 at current exchange rate, in recent years), the export price for shrimps had increased by only 60 percent over the same period (Cham, and Musselli; 2013).

Aquaculture ventures are inherently risky financial endeavours. Uncertainties associated with production yields, escalating prices of production inputs and market price volatility, or failure to meet stringent standards on safety and quality make commercial shrimp farming in the Gambia extremely risky.

Notwithstanding these obstacles, the commercial potential for the sector remains significant. In particular, commercial shrimp farmers in The Gambia would have some strategic advantage over their competitors, including those in Asia. There are two main sources of comparative advantage.

- First, given the lack of significant industrial activity within the estuarine areas, and upstream along the River Gambia, shrimps could thrive in relatively clean waters with no use of antibiotics.
- Second, shrimps grow faster and bigger than elsewhere, given climatic/locational conditions, which enhances the quality of the product in terms of texture and shape. Specifically, there is significant potential for a product differentiation strategy (antibiotics-free shrimps with unique characteristics in terms of texture and size) with a focus on high-value niche markets in Europe.

Commercial shrimp farming appears to have significant potential for employment generation and poverty alleviation in rural communities, particularly for women. At harvesting local women form the bulk of the workforce in processing and packaging for export, with important spill over effects for the local village economy. For example, shrimp processors at West Africa Aquaculture

(86 percent of the workforce) were reported to be all women, while the remaining (14 percent of the workforce) were men. It should be stressed that the female shrimp processors were employed during harvest period on a temporary basis; men (the daily management staff and shrimp harvesters) were employed on a permanent basis. Workers earned salaries between D75 (processors) and D100 (harvesters) per day (relatively good salaries for local standards). The workforce was entirely drawn from the surrounding local villages, with significant impact on the local community in relation to wealth distribution.

However, these socio-economic impacts need to be carefully weighed against environmental impacts and related social costs. Industrial shrimp farming projects tend to involve large-scale destruction of coastal environments, especially ecologically important mangrove forests that supports a high diversity of marine and terrestrial life. Other vitally important wetland habitats and economic activities - particularly women's vegetable garden and other subsistence farming areas - may also be adversely affected due to salt water leakage and seepage and consequent dryness. The development of commercial aquaculture should therefore be carefully planned, due attention taken for possible negative spill over effects and trade-offs. Strict adherence to environmental laws and regulations, especially the development of participatory Environment and Social Management Plans (ESMPs) will be crucial if the Gambian process is to avoid the pitfalls and environmental catastrophe of other countries where the industry became the victim of its own success (Cham and Musselli 2013).

In view of the above, foreign capital and expertise are needed to stimulate commercial shrimp farming in the Gambia. There are a few potential commercial shrimp aquaculture sites, free from conflicting uses in the country, but their viability (including environmental) must be reviewed before any investment is made towards their development. Unfortunately though, the only commercial shrimp farm, the West Africa Aquaculture, has been facing difficulties and is currently dysfunctional thus affecting all those that were employed and earned their livelihoods from operations of the establishment.

5.0 POSTHARVEST FISHERIES

5.1 Fishery Products Supply, Processing, Marketing and Distribution Chains

The supply chain for fish and fishery products is rather complex in The Gambia because of:

- i) The range of different markets served (urban, inland, sub-regional, international - EU and USA);
- ii) The assortment of species (small pelagics and high-value demersal species) and products offered (fresh and frozen fish, cured products, by-products), each serving different market outlets;
- iii) The large number of different operators (fishermen, fish traders/dealers, artisanal processors, industrial processors, specialized exporters, etc.) and modes (small-scale and large-scale trade).

At the coastal landing sites the fish is typically bought from artisanal fishermen by relatively large-scale fresh fish dealers, who tend to be predominantly men. The dealers (“*banabana*”) then sell on to smaller intermediaries for distribution in urban or inland markets or to processing establishments. In certain cases the fisherman is related to the “*banabana*”, or if not related, has invested in the boat, or often provides some form of assistance to the fisherman, which creates a business linkage between the two. At some landing sites, women may be the intermediary between fisher folks and traders/processors, particularly as regard certain fish species processed and traded by women (e.g. cat fish and spoiled white fish for production of salted dried products). These women are sometimes the fishermen’s wives and take over marketing of the catches of their husbands and sell to other fish traders and processors.

About 40 percent of fish landed in The Gambia is marketed in the fresh state within the coastal areas and in some of the major growth centres in the rural districts (white fish is mainly supplied to urban markets, hotels, restaurants and other catering houses; and *bonga* is mainly sold in urban and rural markets). However, this aspect of the fisheries supply chain requires improvements in the handling, transportation, and storage.

An estimated 30 percent of landed fish is traditionally processed (sun dried and/or smoked) and marketed within the country (especially in the inland markets); part is exported to neighbouring West African countries, sometimes by nationals of these countries who settle and operate in The Gambia, e.g. Ghanaians, who have their own processing-export lines of operation. However, the processing techniques and facilities need to be modernised to meet quality and food safety standards. The state of hygiene in fish landing sites and around fish processing areas leaves much to be desired with fish handling and sanitary conditions resulting in poor quality of products and food safety concerns. This affects access to markets and competitiveness of products in the international fish trade. Most fish landing sites are without clean water supply and appropriate sanitation facilities which are essential in post-harvest fish landing, handling and processing operations to the ensure safety of products Njie, 2013).

5.1.1 Fish Landing and offloading

When fishing canoes land, the catch is immediately discharged, this is an important step in the value chain to a segment of actors referred to as fish off-loaders or carriers locally referred to “*dunula*”. Depending on size of the catch, fish species, canoe type, or fish landing site, the catch is offloaded either by the crew themselves or more commonly in the case of small pelagics and fish caught in purse seine operations, by these regular “*dunula*” who are comprised predominantly of women but also men.

Catches of white fish and demersals are more often offloaded by the crew themselves because the size of the catch is usually small or comprise individual big fish. The fish is then carried to the local open market on the beach for direct sales, waiting transport vehicles, landing platforms or filled into wheelbarrows (particularly for small pelagic fish) and sold on the beach. In some landing sites, fish may also be placed into holding containers (troughs) for icing, or delivered directly to fish smoke houses for immediate processing and preservation. These “*dunula*” use pans, basins and fish trays to carry the fish and are paid in kind by retention of a small quantity of fish from each container delivered. This provides employment, income and food for them.

These operators are self-employed, gain income from this operation, by making reasonable earnings by either selling the in-kind payment on the beach to individuals and fish retailers or, at local markets. Some of the fish is taken home for food and some may be processed into smoked or dried products, especially when the fish cannot be sold fresh. There are times though; when fish spoilage are experienced due to long term exposure to high temperatures and lack of or high cost of ice. In general, many operators make a decent living out of this operation, earning between D100 and D250 per day depending on landings.

5.1.2 Fish Marketing and Distribution

Both men and women are actors in the fish marketing and distribution stages of the value chain and constitute the link between fishers and consumers.

Marketing of Landed Catches

Artisanal fish catches are generally sold to middlemen fish dealers or traders in the local fish landing site for onward marketing and distribution or to local processors (smoker and driers). Marketing of the catch takes different forms. Middlemen operators (locally called “*banabana*”) who may be organised marketing units or act as individual operators buy and trade the fish onsite. Others (fish mongers) supply fish to other dealers and retailers along the fish supply chain. The middlemen have special relationships with the fishermen and often have sole rights to takeover and market the catch, either because they financed the fishing operations/trip, or are ordinarily marketing agents with the first priority to trade the catch.

Pricing of the landed catches

In general, middlemen are the determiners of the price of landed fish. Pricing is usually a collective transaction of middlemen on the landing site, particularly for the predominant small pelagic fish. Fishermen are usually price takers as they often have limited bargaining power.

Pricing is based on supply which is dependent on the season and prevailing weather conditions which in turn determines the number of fishing canoes that venture out fishing and hence the amount of fish landed. The price of fish can change by the day with early landings attracting higher prices than late landings. Once the price is determined and agreed with the fishermen, the catch is discharged and sold out whole sale to the middleman.

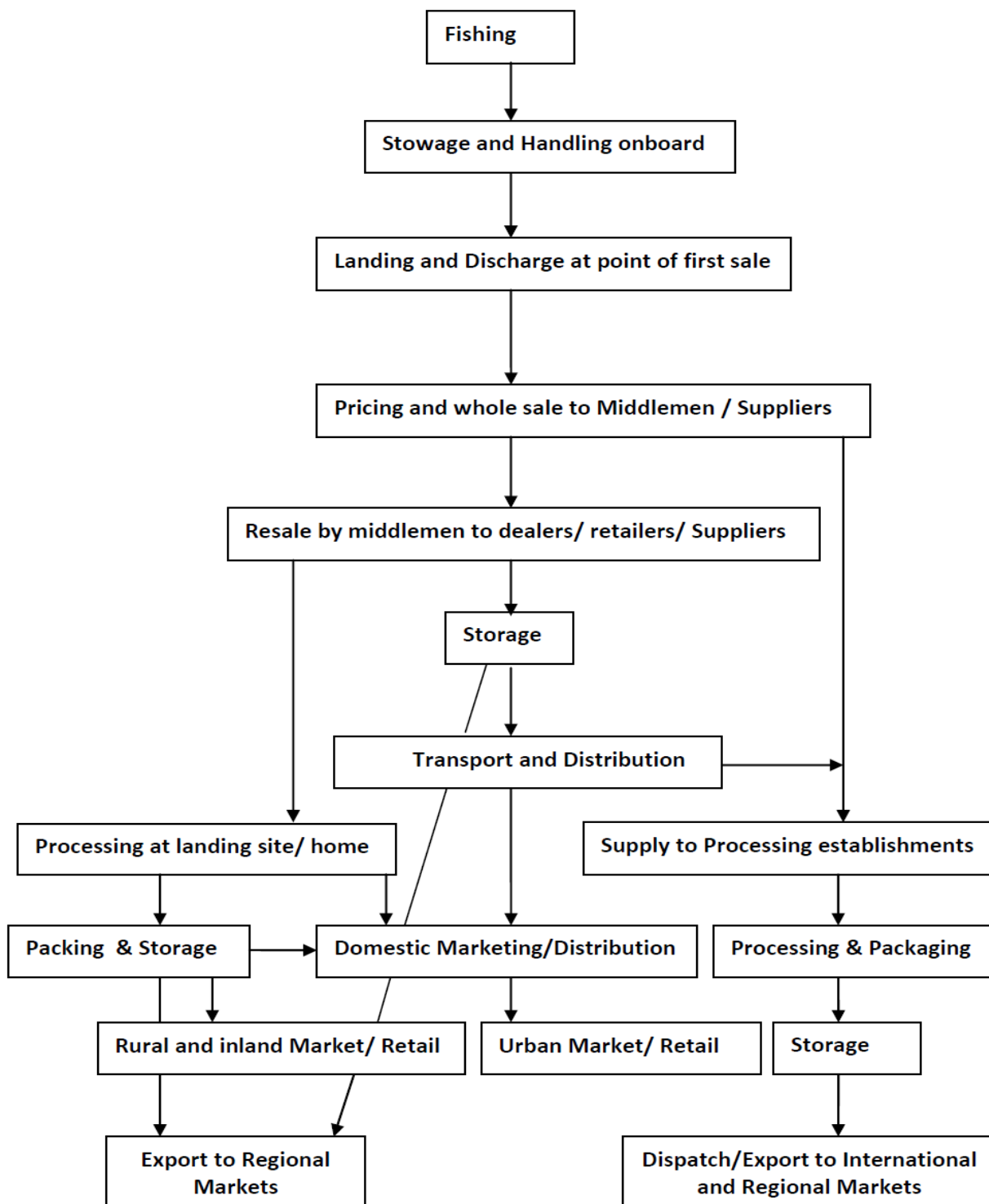
Fresh fish marketing and distribution

In the fresh fish trade women tend to be small scale dealers. They mainly buy from large-scale mongers a few trays of fresh fish and transport it to various urban markets for retail. They sometimes collectively hire a commercial vehicle to transport the fish, or use commercial taxis.

Large-scale dealers are mainly men who often buy large quantities (e.g. one or more canoes of fish). Some large-scale specialised fish dealers export fish to Senegal, Ghana, Guinea Conakry, Nigeria, etc. in smoked or dried forms. Processing factories also procure supplies from these large-scale fish suppliers. Local hotels and restaurants are also mainly supplied by this category of dealers. However, and within this group of suppliers a few women are quite often very active as they enter into contracts with hotels and restaurants during the tourist season (October –April). This category of trade offers substantial returns compared to selling produce to daily markets on retail. The women traders usually require an extended form of operating capital and reliable cash flows because the hotels and restaurants usually do not pay on receipt of produce; payments are fortnightly, or monthly. Thus a credit line extended to this category of women traders will help expand their businesses and thus increase levels of income. In addition these women require capacity building in the various aspects of the fish value chain, and small business management.

Figure 4 provides a comprehensive account of all steps, linkages and synergies in the fish supply chain.

Figure 4: Steps in the Fish Supply Chain



Source: Njie, M. 2013

5.1.3 Fishery Products Processing and Marketing Functions and Gender roles

Due to prevailing high temperatures that accelerate deterioration of fish, unavailability and, unreliability in the supply of high cost of ice, and lack of cold storage facilities, lead to excess fresh fish to be traditionally processed. Increases in these activities have contributed to reduction of previously high levels of fish losses and waste and ensured supply of processed fish and fishery products for domestic consumption and export. Artisanal processing techniques use traditional methods of smoking and sun drying. Fish fermentation is core to the production of salted and sun dried fish.

The actors in the artisanal fish processing stage are individual male and female fish processors, firewood suppliers in the case of fish smoking and suppliers of salt in the case of fish drying. Processing also takes place at export fish processing companies where fish processors are employed in the processing lines.

In the artisanal fisheries, men and women tend to produce rather different processed products; they operate on different scales and serve rather distinctive markets. Hence, there is also a gender-based approach to fish processing and trade patterns in the fisheries value chain. Artisanal fish processing is often constituted of small individual or family units. They use rudimentary and often highly inefficient techniques of processing with often inefficient equipment, facilities and processes. Processing units are usually located close to the fish landing sites where all associated activities take place.

Cured fish processing and marketing

Cured fish products are mainly sundried and/or salted and smoked. Fish dryers are mainly women who cure salted sun dried fish for urban and inland markets or for regional export dealers. The same women who process the fish often market it as (small-scale traders).

Smokers are both men and women. Women smokers are mainly involved in the domestic marketing of smoked products. They generally produce smoked fish (mainly *bonga* and catfish), of relatively short shelf life (about 3 days) meant for urban and inland markets. Their operations are often labour intensive and characterized by small-scale direct marketing (daily basis) and low profit margins.

The women lay the split fish on raised platforms made from sticks and poles where the fish is sundried 5-7 days. Often, products are contaminated with dust, and infested by flies and maggots leading to quality deterioration. Thus, the product's storage life is shortened. Transportation to market centres is usually by commercial vehicles, and at this stage too a good part of the product could be lost due to spoilage, and which results in financial loss to the processor.

Fish are usually smoked over open fires in pans covered with jute bags. Due to the high cost of fuel wood, the women use cartons, coconut husks, groundnut shells, or any material to smoke the fish. Smoking lasts for two to four hours after which the fish is laid out to cool before packing in woven baskets ready for the market. Unlike the smoked product by the men, this product soon

deteriorates if not cooled, because the moisture content is still high, which could result to losses, if the product does not sell fast.

Male fish smokers tend to operate in the long-distance trade of smoked-dry products with longer shelf life (low moisture content). Their operations are more capital intensive and their products are marketed to the inland and sub-regional markets where the profit margins are higher.

Fish curing processes are tedious, time consuming, and done under often unhygienic conditions with guts and other fish waste thrown around which attract flies and other pests. The preparatory activities are often carried out on the floor in often improperly cleaned containers with possibilities for contamination from various contact surfaces (containers, the ground, tools and other equipment). Despite the introduction of the improved Chorkor fish smoking oven, which is mainly installed in fish smoke houses, some models are used in the open air with minimum control of the processing environment, with high possibilities for contamination. Because of the inefficient smoking process the products are prone to spoilage and losses, particularly during prolonged transportation and storage.

6.0 FISHERIES GRASSROOTS ORGANISATIONS/STRUCTURES

6.1 Fishing Community Trade Group Associations

Traditionally, communities in The Gambia have local organisational structures. Examples of such structures are the Kafos (or local associations) such as the trade group associations (people with the same trade and united by their common interest and use of CFC facilities) and the Village Development Committee (Njie, 1993).

The organisation of fisherfolks into user group associations follows the existing informal professional groupings of the community. During implementation of earlier CFC fisheries development projects, fisherfolks were sensitised and encouraged to organise into user-group associations. Professional fisherfolks operating at the fish landing sites, as direct project beneficiaries and users of the CFC facilities were organised group associations. The main trade group associations at fish landing sites trail the following trend which is exemplified by the Tanji community fisheries centre and is generally the structure of grass roots associations at virtually all typical artisanal fishing communities in the country.

- Trade Group Associations (the example of the Tanji CFC)
- Fisherfolk Association
- Fishermen Association
- Men Smokers Association
- Women Smokers Association
- Natangeh Credit Union Association
- Fish Dryers Association
- Fish Traders Association
- Vegetable Gardeners Association

At community fisheries centres, training programmes were run for fisherfolk association members in various disciplines: business and financial management, literacy and numeracy, simple bookkeeping, credit and savings, theoretical and practical fish handling, preservation and processing, etc.

The associations hold regular monthly meetings to discuss issues affecting them. Informal credit and savings schemes were encouraged and many associations operate their own credit and savings schemes through specific weekly or monthly cash subscriptions by members. From the accumulated funds, credit is given to members in a rotating manner to meet operating costs of members etc. Some of these schemes have been very successful, especially the women's schemes and the male fish smokers schemes. Although varied from one association to another, the associations operate on the basis of mutually agreed rules and regulations.

6.2 Fisheries Centre Management Committees (FCMC)

Fisheries centre management committees (FCMCs) were instituted in 1988 to gradually take over management responsibility of the CFCs at the end of a project. Formation of the FCMC was a gradual process which involved intensive sensitisation of user groups by the Fisheries Development Unit (FDU) and regular meetings of the groups at which election of representatives

was done. At first, each user group association at the CFC elected two representatives to the FCMC. The composition of the FCMC is shown in Table 7. The FCMCs worked closely with the FDU during project implementation and became the local organised institutional organ for management of the CFC and facilities. At first, the committees were voluntary and members did not receive any form of remuneration. Over time however, and as some of the CFCs became more independent and generated income, members of the management sub-committee who were on full-time engagement in some coastal CFCs received allowances and were eventually placed on the CFC pay role. It must be noted that some selected FCMC agents also represented the community on the project steering committee during project planning and implementation.

Table 7: Composition of the CFC Management Committee (The example of Tanji CFC)

Status/Post	Origin	Gender		Main responsibilities
		Male	Female	
President/Chairman	Fish smokers association	1	0	Coordinate activities at the CFC Secretary, Chair FCMC Meetings. Represent males smokers interest
Vice President	Male Smokers association	1	0	Deputize for the President and represent men smokers interest
Secretary	Employee of the FCMC	1	0	Rent collection, Accounting Record keeping etc...
Alkalo	Village head	1		Represent Village and give advice
Member Trustee	Fisherman	1	0	Trustee and represent fishermen
Member Trustee	Fisherman	1	0	Trustee and represent fishermen n
Member Trustee	Male fish smoker	1	0	Trustee (represent fish smokers)
Village Elder	Village	1	0	Represent village and gives advice
Village Elder	Village	1	0	Represent village and gives advice
Fisherfolk Members	Male Fish Traders	3	0	Represent male Fish Traders
Fisherfolk Members	Male Fish Smokers	2	0	Represent Male Fish smokers
Fisherfolk Member	Women smokers' Association	0	1	Represent women smokers association and consult with them
Fisherfolk Member	Women Fish Dryers' Association	0	1	Represent women smokers and consult with them
Total	FCMC	14	2	Manage the CFC

Source: Cham and Musselli, 2013

Committee members were entrusted with responsibilities to oversee facilities used in their respective domains while members of the FDU sat on the committee to facilitate and advice. Following devolution of management responsibility to management committees the FDU only provided advice and act as liaison between the community and the Fisheries Administration (Njie, 2001). Women are equally represented by one member from each of the two women associations. However, women participation in the decision process is limited by social and religious factors. Men therefore partly dominate management and the decision processes, but women do have influence in what affects them directly.

In preparing the FCMC for autonomous management of the CFC and its facilities, committee members received interactive training in organisation and management related disciplines: business and financial management, literacy and numeracy, bookkeeping, credit and savings etc.... Following termination of project assistance, training activities continued in autonomous management and related disciplines.

6.2.1 Operations of the FCMCs

FCMCs now autonomously manage the CFC in each village/landing site. In 1988 when the FCMCs were created, management of the CFCs was a joint effort of the FCMC and Fisheries Department. By 1992, the FCMCs became autonomous with Fisheries Department playing more of an advisory role.

The Management Committees operate within the remit of set rules and regulations to manage the affairs of the CFCs. The CFC facilities are rented to users and services provided for the fishing communities. Rental fees and service charges are collected and managed on behalf of the community. Periodic (usually monthly) meetings are held when matters concerning revenue from rental collections, expenditures, budgets and future development of the CFC are discussed. For the proper up-keep and care of the facilities, the committees assign responsibilities to various committee members to oversee the facilities, report damages, collect rental fees for onward payment to the CFC secretary/treasurer who is in-charge of these responsibilities.

Before committee meetings, representatives consult with members of their groups to seek for inputs regarding issues of concern and suggestions. These inputs are passed on to the committee for discussions during committee meetings. Any decisions reached are then communicated back to the associations, thus following a two way communication channel.

In the course of time, the FCMC employed people from the community on casual and permanent basis to carry out various tasks and responsibilities. Management responsibilities of the committee were extended to cover wider circles of the fish landing site and the fishing community. Repairs and maintenance, and expansion of facilities CFC facilities are carried out from accrued funds.

There are various other potential revenue inlets from which the FCMC can derive income to increase the revenue base of the CFC and effect further development of the landing site. With improved organisation of fisherfolk operators, further enlightenment, strengthening and empowerment, a more unified and participatory management approach can be applied to manage and develop the landing sites and local fisheries and related resources.

Table 8: Fishing operations and related activities in coastal fish landing sites

Fishing and related activities/operation	People engaged in activity/operation
Fishing	Fishermen
Fish smoking	Men and women processors and traders
Fish drying	Women fish dryers
Fish marketing	Men/women processors/traders (trucks, bicycles)
Smoked bonga peeling	Women casual workers on labour basis
Vegetable gardening	Women gardeners
Fish off-loading	Women and children
Boat building, repair and maintenance	Men carpenters
Net construction, repair and maintenance	Older men, boat owners and fishing crew
OBE repair and maintenance	Trained male mechanics
Boat mooring	Young men and fishing crew
Shop-keeping	Male shop keepers
Petty trading	Male and female of age 12 upwards
Market vending	All age groups and gender
Fruit and vegetable selling	Women
Fuelwood supply and marketing	Men wood cutters and wood sellers
Selling of prepared foods	Women
Restaurant keeping	Men and women operators
Land and sea transportation and distribution	Cargo/transport canoe operators (Guineans)
Petrol vending	Businessmen

Source: Discussions with Stakeholders

When management meetings are held, committee representatives report back to the groups on the major decisions and actions taken on maintenance, operations and financial aspects of the centres etc... User groups submit for approval by the FCMC, proposals on expenditures for repairs and maintenance. In general, the main associations: fish traders; men and women fish smokers' and fish dryers' associations are relatively well organized and cohesive in many of the CFCs.

In most CFCs, records are now kept by the FCMC Secretaries with assistance of Fisheries Field Assistants. The Tanji CFC for example, adopted and maintains systematic filing procedures with clear monthly statement of accounts.

The CFCs have had a pulling effect to fishing and related activities and have become bustling poles of attraction for a number of increasing spin-off activities. Apart from the fishing and related activities, there have been growing private entrepreneur activities: restaurants, canteens, mechanical workshops, petty trading, selling of primary and basic household supplies and increased transportation services and fuel stations etc. Reference to user group activities on Table 8, the facilities and services at the centres have increasingly become sources of local revenue for improved development of the fishing community.

The FCMCs maintained the development initiatives of the CFCs at first with some of the FCMCs enhancing existing facilities (e.g. rented stalls, drying racks and smoke houses) and even invested in fuel vending. They operated bank accounts in which revenue is deposited and withdrawn only by elected trustees (usually three members of the committee). Expenditures on maintenance and expansion of the facilities were prioritized. Most of the CFCs operated profitably and that momentum could have been sustained. However, this required considerable discipline. Unfortunately, that was not the case for most CFCs which eventually ran into financial liabilities due to mismanagement on one part and unsustainable generosity by giving out charity to local institutions and organisation such as churches, mosques, village development committees and local youth groups at the expense of savings and investments in CFC development. Hence, when there was a breakdown of the ice machines and the need to replace parts and other obligations to continue to provide services, these could not be afforded. Part of the problem could be ascribed to a lack of appropriate monitoring and supervision.

A main lesson which can be drawn from the above shortcomings of the CFC management system is that well-functioning user group associations are essential to the operation of strong management committees. They ensure representation of different shades of opinion in the community and permit free flow of information between management and users (Njie, 1993). Another lesson to be drawn however and a more important one for that matter is that: community based management success should not be judged too early to warrant giving total independence. Management monitoring, audit and supervision are essential and should be a continuous process in order to sustain any success registered.

6.3 TRY Oyster Women's Association

Established in 2007, the TRY Oyster Women's Association (TOWA), a community-based non-profit organization, brought together the women cockle and oyster harvesters within the Tanbi National Park and periphery communities. Its objective is to raise the standard of living of low-income women, often from marginalized communities. The TOWA comprises members from 15

communities. It is allocated the exclusive rights to harvest cockles and oysters from the Tanbi National Park and is responsible for the co-management of the fishery in partnership with other stakeholders including governmental and non-governmental organizations and local authorities.

In view of the over exploitation of the oyster populations within the Park, TRY-affiliated women are adopting sustainable harvesting practices to ensure that the Park remains a healthy mangrove ecosystem. Harvesting grounds are closed, enforcing closed seasons, and introducing new harvesting methods different from their previous methods of chopping and hacking oysters from mangrove roots and branches, in an attempt to increase their productivity and income. The Association has created diversified sources of income and micro credit facilities to engage in other activities such as tie and dye and soap making, etc. This is with a view to encouraging them to divert their effort from oyster harvesting to some other income generating activities to control the fishing effort on the oyster stocks.

In collaboration with the relevant government agencies TRY-affiliated women harvesters also help to police the mangrove environment and report any illegal harvesting of the mangroves. They are also experimenting with oyster culture (knowledge gained from neighbouring Senegal) to help relieve pressure on wild stocks and limit the destruction of mangroves.

6.4 Natangeh Cooperative Credit Union

The Natangeh Cooperative Credit Union was formed in 1997 as a small savings and credit association. Since its inception, the credit union has been expanding and now registers more than 300 members comprising individual and associations of fishermen, processors and fish traders (mongers) affiliated to the union.

Natangeh Cooperative Credit union benefited from the FAO executed regional Sustainable Fisheries Livelihoods Programme (SFLP) in West Africa in 2001 which funded a small project to strengthen the association. The association was supported and linked to the National Association of Cooperative Credit Unions of the Gambia (NACCUG), which train and build capacities of members in credit union principles and practices and guided them to establish a savings and credit scheme with NACCUG. Members effect savings and disburse credit to its members. Currently the credit union has members across the entire community of fisherfolks and even beyond with members in other domains away from fisheries and from satellite fishing communities. Members are benefitting by saving their earnings and taking loans to finance their business operations.

6.5 National Association of Artisanal Fisheries Operators (NAAFO)

NAAFO is an amalgamation of fisheries organisations. It was constituted in 2004 and has individual and affiliates of fisheries professional organisations. There are over 100 different associations affiliated to it. It represents the interest of fisherfolks and often has wide consultations with members to plan and gather inputs in national fora and regional actions. It plans, seeks funding and implements small projects for the benefit of fisherfolks. Its activities are both national and regional and are an important entry points for wider consultations on fisheries matters and general development issues.

6.6 Association of Women Fish and Vegetables Exporters

The Association of Women Fish and Vegetables Exporters were formed by a group of women seeking to be involved in the processing and exportation of fish and vegetables. The Association was registered and incorporated under The Gambia Company Act of 1955 in 2003 and has since been involved in the export of fish and fishery products and fresh frozen vegetable products mainly to the EU, chiefly United Kingdom and the United States of America.

The association has as a vision of becoming the leading fish and vegetable marketing company in the Gambia and to progressively cater for both the domestic, EU and USA markets as a growth opportunity. Members make individual investments but operations are carried out collectively. They individually process between 500 and 5000kg of produce and invest between D50, 000 and D300, 000. On rare occasions individuals may invest up to D1 Million with associate financing from partners in the Diaspora. Each individual buys raw materials which are delivered to the Rosamond Trade Fish Processing Company as the approved factory for processing and packaging for smoked and cured products.

Consignments range between 5 and 24 tons of products and may also include frozen fishery products and could be shipped with vegetables (normally ground frozen potato and cassava leaves and other green vegetables) used as ingredients in cooking traditional dishes. The trade has been very lucrative and some women have become very successful. However, the women and the fish processing establishment need support to meet the required compliance for the continued exportation of the products, particularly in respect of complying with allowed levels of polycyclic aromatic hydrocarbons in smoked fishery products. The introduction of improved fish processing technology is vital for this purpose and to improve quality and safety of products in general. It was in this regard that some intervention was made through UNIDO supported demonstrations in 2013 to introduce a model of the FAO Fish Technology Thiaroye (FTT) to improve product standards. This contributed to improvements in product standards but operators need wider application of the technology and training for uptake and improved use of the technology. This fish smoking and drying technology has potential to make a difference in the postharvest sector with prospects to contribute to improved product standards and access to markets. As FAO is promoting the technology in West Africa, it is vital that Gambia makes a request to benefit from FAO's intervention in this regard.

6.7 The National Federation of Gambian Women

The National Federation of Gambian Women (NFGW) has been constituted with a wide affiliation of women groups both across the country and from the Diaspora to encourage productivity and effective participation in national development and advocacy. The Federation draws membership from various women actors throughout the country including women operators in the fisheries sector.

7.0 CONCLUSION AND RECOMMENDATIONS

The Government of The Gambia places priority on the development of the fisheries and aquaculture by providing the enabling environment for the active involvement of players including the private sector, in its development. However, there are various constraints confronting the development of the sector as a whole and in specific areas including post-harvest fish handling, processing, preservation and marketing and distribution chains and the organisation and strengthening of capacities of operators which, present socio-economic challenges for improved productivity and contribution of fisheries to livelihoods, food security, poverty reduction and to the national economy as a whole. The organization and effective coordination of activities and access to finance for improvement of small and micro-businesses also pose challenges.

Fishing and related activities are important micro-enterprises yielding profound social and economic benefits and steering the micro-economy in the sector. These business operations are profitable and ensure fish supply, employment and income to value chain actors. However fish handling on-board fishing vessels and at landing sites result in spoilages and losses that affect fish supplies or reduce the value of the fish with impact on businesses. The state of hygiene on fish landing sites and around fish processing areas leaves much to be desired with fish handling and sanitary conditions resulting in poor quality of products and food safety concerns. Improvements are required and training and capacity building needs are obvious. Fish handlers and operators of fish businesses ranging from fishers to fish processors and traders must be trained to create awareness on food hygiene, environmental sanitation in fish handling and preservation to improve the situation (Njie, 2013).

Fish landing sites will require to be upgraded in terms of basic infrastructure and facilities. This is with view to ensure proper hygiene operations and meet food quality and safety standards for domestic consumption and the export market. The snow-ball effect is improved access to markets and competitiveness of products in the international fish trade. Standard sanitation and hygienic operating procedures need to be put in place which should be supported with capacity building for improved management. Since most fish landing sites are without a reliable supply of potable water and appropriate sanitation facilities there is need to have such installations for improved hygienic operations and ensured safety of products. Training and awareness is required in the handling and preservation of fish along the supply chain, but use of appropriate handling and storage facilities should be encouraged.

Fish spoilage is a major problem, especially during peak fishing seasons with resultant losses and thus reducing values of fish and fish products. Large quantities of fish catches may be dumped back to sea or at landing sites due mainly to lack of adequate cold chain facilities such as availability of affordable and reliable sources of supply of ice, cold storage facilities and limited processing capacity.

Since fish is the predominant source of protein in The Gambia, fish marketing and distribution in the country contributes enormously to food and nutrition security, distribution of fish from riparian coastal areas to inland communities is very important. However, fresh fish supply to inland markets is faced with problems relating to short supply of ice and lack of appropriate transport, handling and refrigerated storage facilities both at source and at inland distribution

points. These aspects of the fisheries value chain are highly underdeveloped and require improvements by improving handling, storage and transportation facilities. Hence there is need for intervention to provide such facilities, which in turn will ensure availability of quality supply of fish for nutrition and support food security initiatives, enhance small business enterprises and improve the supply chain. This can be achieved through installation of cold storage and ice production facilities at strategic points for the holding of fish supplies along the distribution chain. A national project designed to address these issues is vital. Such a project must have an inbuilt cost recovery system to ensure sustainability. The project must also have a sound management system with appropriate transparency and accountability. Joint public and private sector involvement should be encouraged. FAO and Government of The Gambia could initiate the process, given FAO's technical and strategic advantage in formulating projects and programmes and in resource mobilisation.

Fish distribution and retail business enterprises are a main source of employment and livelihood for many people, especially women who normally operate small business enterprises. Transport and working capital and access to financing are some of the major constraints of fish traders and processors. Lack of appropriate fish handling, smoking and drying facilities, access to markets, high cost of transport, are also part of the constraints. One major problem of fish retailing at landing sites and within main local markets is the indiscriminate use of old and unhygienic often rusty refrigerators to store fish during marketing. Various other unsuitable and unhygienic materials such as old clothing, dirty jute bags etc... can be found placed with fish as additional insulators. Possible options include setting standards for fish retailing and transport and putting in place a scheme through which retailers and transporters can obtain the required fish handling and retail facilities such as insulated boxes and display units of appropriate standard materials supported through a credit or private investment scheme.

Due to limitations in quality and food safety standards and control, there is restricted access of the traditionally processed products at landing sites penetrating export markets, especially western markets which adhere to strict food safety requirements. Interventions are vital towards upgrading of fish processing techniques, quality and hygiene standards. Interventions in product development and value addition will have important impact on improved fish utilization, nutrition standards, product diversification, employment creation, improved quality and safety of products and, access to markets, thus contributing to realization of fisheries development objectives.

The current state of fish processing facilities, equipment and practices leave much to be desired in terms of processing techniques, process control, hygiene and quality of the end products. Hygiene conditions can be deplorable, operational practices insensible and quality and safety of products a great concern. The combination of these factors raises concern over food safety and product quality, reduced value of products and fish losses of physical, nutritional and financial nature (Njie, 2013).

Existing fish smoking techniques and equipment are not fuel efficient and consume large quantities of firewood. Hence operators cannot maximize profit. The "*Gambian banda*" fish smoking oven is widely used by operators in artisanal fish smoking operations. Although modified to reduce the amount of firewood used, in general it consumes large quantities of firewood from forest resources thus adding to the high rates of deforestation in coastal areas

(Njie, 2013). The overall impact of the use of such large quantities of firewood in highly inefficient processes is depletion of forest resources and deforestation resulting in damage to and degradation of the environment. The combustion of the large quantities of firewood contributes to the emission of greenhouse gases (CO₂), climate change and global warming.

Because of the increasingly scarce supplies and high cost of firewood, women fish smokers may be found indiscriminately using other fuels as carton materials and others include plastic materials in fish smoking operations. These practices may introduce toxic substances on the fish in defiance to food safety requirements with medium to long term health consequences. Existing crude processing units and operations in fish smoking expose operators to smoke with the tendency for respiratory problems and possible health related complications from long term exposure to smoke and toxic fumes.

Options for intervention include the introduction of improved fish processing units (for fish smoking and drying fish) with appropriate technology transfer or adaptations to improve quality and food safety, and health standards. Such processing units must be fuel efficient and environmental friendly with direct effect on conservation of the environment and mitigations on climate change. In addition, the processing and export of smoked fishery products is very important business enterprise contributing to social and economic improvement of the citizenry and the national economy. However, the residual high levels of poly-aromatic hydrocarbons (PAH) in products has been causing rejections of consignments and issuance of rapid alerts from the EU, a major concern and challenge in the production and export of smoked fishery products to the EU as the main market for export products. Hence it is vital that support is provided to this end through introduction of improved smoking facilities and techniques to produce products that comply with international standards. To this end the collaboration of FAO and other donor partners must be sought to remedy the situation. It may be vital to explore introduction of the FAO developed FTT (Fish Technology, Thiaroye) fish smoking and drying technology which offers opportunity for FAO intervention and collaboration in the postharvest sector. FAO intervention in this domain is highly desired.

New product development and value addition in the fisheries value chain also offer potentials for improvements of benefits and increased market access and competitiveness of fishery products. Therefore research and development for new product development value addition through processing and developing markets for such new innovations can have added advantages for the sector and the economy as a whole.

There are also problems relating to meeting compliance with export standards by fish processing establishments. This is often due to supply chain deficiencies including awareness and technical competence of fish handlers and fish suppliers at the level of the supply chain. At the level of processing establishments this affects factory operatives' supervisors and managers. There is therefore the need for awareness and training of actors along the supply chain including fishermen, fish traders and suppliers and factory operatives on sanitary and phytosanitary systems and issues including fish handling and preservation, basic hygiene, food safety and quality assurance systems and application of HACCP procedures.

Although aquaculture development holds great potentials to contribute to availability of fishery products, enhanced income, food security, poverty reduction and improvement of livelihoods,

there are a number of challenges which need urgent attention. These include improved organisation and training of farmers, access to finance, availability of fry and fingerlings (currently obtained mainly from collection from the wild), and availability of feed among others. Once these challenges are overcome, the potentials of aquaculture development can be realised.

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ANNEXES

Terms of Reference of the study

- Support the review of the documents prepared by the national consultants particularly in relation to the socio-economic aspects;
- Analyse the socio-economic context of fisheries and aquaculture production in the country, including the investment initiatives developed by the public sector, the private sector and the civil society;
- Describe the role of gender in the marketing of fisheries products;
- Take stock and analyse the types of organizations/structures that bring together grassroots players and the fisheries sector private entrepreneurship;
- Take stock of the different types of fisheries and aquaculture products and their use by the population, and evaluate the traditional or modern technologies used for their processing, with a view to boosting food security and household incomes;
- Provide fish marketing analysis for aquaculture and capture fisheries products;
- Provide economics of fish farming using different aquaculture systems as appropriate;
- Analyse the potential for adding value to the fish and fishery products;
- Identify the main international mechanisms available for financing the fisheries sector at national and sub-regional level in West Africa, including all of those directly or indirectly linked to climate change; and
- Prepare a report highlighting the major findings, conclusions and recommendations

List of Persons Met

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