

# ASSESSMENT OF THE STATUS OF THE ARTISANAL FISHERIES IN PUNTLAND THROUGH VALUE CHAIN ANALYSIS



Prepared for VSF Suisse and UNDP Somalia

by

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### List of abbreviations and Acronyms used in the report

|         |   |  |
|---------|---|--|
| EU      | = | European Union                                 |
| FAO     | = | Food and Agriculture organization              |
| GDP     | = | Gross Domestic Product                         |
| GRP     | = | Glass Reinforced Plastics                      |
| HACCP   | = | Hazard Analysis Critical Control Point         |
| ISO     | = | International Standards Organization           |
| IDPs    | = | Internally Displaced Persons                   |
| IUCN    | = | International Union for Conservation of Nature |
| IUU     | = | Illegal, Unreported and Unregulated            |
| Kg      | = | Kilogramme                                     |
| LME     | = | Large Marine Ecosystem                         |
| LOA     | = | Length Overall                                 |
| MD      | = | Mesh Deep                                      |
| m       | = | Meter  |
| mm      | = | Millimetre                                     |
| NECFISH | = | North East Coast Fisheries                     |
| PA      | = | Polyamide                                      |
| PP      | = | Polypropylene                                  |
| PPP     | = | Public Private Partnership                     |
| TOR     | = | Terms of Reference                             |
| UAE     | = | United Arab Emirates                           |
| UNDP    | = | United Nations Development Programme           |
| US\$    | = | United States Dollars                          |
| USFDA   | = | United States Food and Drug Agency             |
| VSF     | = | Vétérinaires sans Frontières                   |

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## **Executive summary**

This report presents the findings of a study conducted along the Puntland coastline in February 2010 as part of VSF Suisse's intervention in the fisheries sector. The overall objective of the study, which was funded by UNDP Somalia, was to undertake an assessment of the Puntland fisheries sector through value chain analysis and assessment of the current production and its impacts on the marine environment.

The methodology of the study comprised both desktop review of past survey reports and primary research that gathered first hand information. Various data collection techniques such as semi-structured questionnaires, personal interviews, group discussions and direct observations were employed during the primary research.

The study has described the current status of the Puntland fisheries sector exclusively focusing on the artisanal fisheries subsector since there are no industrial and recreational fisheries. Within the artisanal fisheries subsector, three major fisheries have been identified (i.e. lobster, shark and finfish) of which the finfish fishery is the most important in terms of production, employment opportunities, and revenue generation. The finfish fishery targets both large pelagics and demersals but largely focuses on kingfish which is sought after by the Yemeni boats and to a lesser extent on tuna fishes which are canned by local fish canneries. An estimated 120 Yemeni boats shuttle between Yemen and Somalia during the fishing season exporting a total of 3,600 tons of fresh fish/month which translate into 28,800 tons per year. The lobster fishery which at one time become the main stay of the economy before having been eclipsed by the finfish fishery still plays a significant role as it contributes between US\$5 and US\$7.5 million/year to the economy from the export of lobster tails estimated to be 200 – 300 tons/year.

The study has also taken an inventory of the exiting artisanal fishing fleet in Puntland. A total of 3136 fishing boats are currently used for artisanal fishing of which 2974 (94.8%) are GRP motorized boats and the remaining 162 (5.2%) are wooden boats of *Huori* type. Of the GRP boats, *Leyla Alawi* and *Afdheer* types are the most preferred boats together accounting for 81% of the total GRP boats in use. They are followed by the Runner (5.4%) and Volvo (4.9%) boats. The *Huori*, Sri Lankan and SAAB boats make up the rest of the artisanal fishing fleet. In total, 639 GRP boats (21.5% of all GRP boats) are currently not working for lack of engine spare parts.

Similarly, an attempt has been made to estimate the number of active fishermen who can be classified as either permanent fishermen or seasonal fishermen on the basis of their skills and mode of operation. Permanent fishermen are those who engage in fishing as an occupation while seasonal fishermen are those who come to the coast purely for the lobster fishing season and then depart. A total of 12, 730 permanent fishermen has been estimated for the Puntland coastline based on the number of embarked crew of the existing fishing boats. However, it was not possible to put an estimate for the seasonal fishermen owing to their transient nature.

An inventory of post harvest fisheries facilities in Puntland has as well been taken. Eleven such facilities (i.e. 3 ice plants, 7 cold storages and 3 fish canneries) has been found to exist along the coastline with a combined installed capacity of 50 tons, 175 tons and 820 tons respectively in ice production, chill room and cold storage spaces. Similarly, the three fish canneries can together process 80 tons of fish/day. All the facilities are operational save for the NECFISH cold storage in Bosaso which has been idle over the last ten years mainly due

to mechanical problems. However, only 40% of the installed potential capacity of these facilities is being utilized because of lack of internal and external markets.

The research has examined the fishing gear and methods currently employed in Puntland and identified some of them as destructive negatively impacting on the environment. They either destroy sensitive habitats or generate a huge amount of by-catch and discards. The environmental impacts resulting from the use of the identified destructive fishing gear and methods are described in detail.

While it could not be possible to undertake a typical value chain analysis of the fisheries owing to the rudimentary nature of fish marketing in Puntland, the study has described the existing fish marketing channels, internal and external fish supply chains, and the key players involved in these chains. The research has found out that marketing of locally produced canned fish is relatively well developed in comparison with fresh and frozen fish with a sizeable number of intermediaries operating between the canneries and consumers. An attempt has therefore been made to analyse the value added to the product along the supply chain in terms of costs and margins for the different actors based on a carton of Las Qorey canned tuna fish sold in Bosaso.

Lastly, the study identifies the main challenges facing the fisheries sector in terms of production, marketing and long term conservation of the exploited resources. Similarly the research makes recommendations to mitigate the observed challenges.

## **1. 0 Introduction**

VSF Suisse has been working in the fisheries sector since the Tsunami hit the Indian Ocean coastline of Puntland in December 2004. VSF Suisse through funds from Swiss donors has initiated a recovery programme in the fisheries sector through the implementation of post harvest fishery infrastructure in the form of ice plants and chill room facilities at the four coastal sites of Hafun, Barmadobe, Bender Bayla and Durdura in the Karkar region. Moreover, VSF Suisse has embarked on a project with assistance from UNDP Somalia to look into issues related to fish utilization and promotion of fish in the local diet. One such activity was to undertake an assessment of the fisheries sector through value chain analysis and assessment of the current production and its impacts on the marine environment. As a result, VSF Suisse had engaged a consultant to carry out the assessment as per the Terms of References (TOR) provided in Annex 1. This report therefore presents the findings of the said assessment in accordance with the TOR objectives.

### **1.1 An overview of the Somali fisheries sector**

With a coastline of over 3,898km<sup>ii</sup> long, Somalia has one of the largest maritime zones in the western Indian Ocean that embrace a very important large marine ecosystem (LME) known as the Somali Current Marine Ecosystem. A prominent feature of this ecosystem is a seasonal upwelling which gives rise to high levels of biological productivity which in turn sustains rich fishing grounds, most notably in the area between Ras Aseyr and Ras Mabber off the Puntland coastline. Because of its location of the convergence zone of three seas, Somalia is regarded as a major ecotone between the fauna and flora of the Indian Ocean, the Red Sea and the Arabian Sea. Obviously, the Somali coastal and marine environments are of national and regional significance both in terms of biodiversity and fisheries resources. Other distinctive features of the Somali coast include fringing reefs and patches of coral reefs along the Gulf of Aden coast as well as in the south coast between Adale and the Kenyan border. Conservative estimates have put the country's yearly sustainable marine finfish production in the range of 300,000 tons, with the major commercial fisheries being small and large pelagics, demersal fishes, sharks and rays, as well as shallow-water and deep-sea lobsters and shrimps.

In an effort to tap the fisheries resources, successive Somali Governments had implemented, with technical and financial support from bilateral and multilateral donors, various fisheries projects along the coastline including fish processing plants, icemakers, boatyards and acquisition of modern fishing vessels. The Government also established and operated a modern fishing fleet under the Ministry of Fisheries in order to exploit the abundant offshore resources. In the early 1970s, fishermen were organized into district cooperatives and drought-affected nomads were as well resettled in the coastal villages and encouraged to take up fishing. The nascent cooperatives were provided with assistance from various international aid agencies in the form of training and various fishing inputs such as motorized fishing boats, fishing gear and other related shore facilities. However, the cooperatives never become economically viable and eventually collapsed due to mismanagement, corruption and fishermen's dissatisfaction with collectivisation programme in the first place.

In spite of the huge resources and the Government's efforts, Somalia has failed to transform itself into a fishing nation owing to various factors and as a result its fish production has never exceeded more than 20,000 tons even when the catch of the licensed foreign fishing vessels is included. The sector provided only 2% of the country's GDP in the 1980s.

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<sup>ii</sup> Source: [www.unep.org/bh/Publications/Somalia/TSUNAMI\\_SOMALIA\\_LAYOUT.pdf](http://www.unep.org/bh/Publications/Somalia/TSUNAMI_SOMALIA_LAYOUT.pdf). Accessed on 9th April 2010.



Livestock and agricultural sectors have always been the main stay of the economy. More than 60% of the population is still nomadic pastoralists who depend on raising camels, cattle and goats for their livelihoods. Eating fish is therefore unusual in the Somali tradition and even fishermen themselves prefer red meat to fish, resulting in the country to have one of the lowest per capita fish consumption in the world – a mere 1.6 kg/per person/per year<sup>iii</sup>. For comparison, average global and African fish consumptions are respectively 15 and 7 Kg/person/year.

The fisheries sector has been hit hard by the civil war and the cost of its revival may require millions if not billions of dollars given the fact that the entire fisheries infrastructure and facilities put in place by the previous governments were either looted or destroyed beyond repair or left to degrade in the course of the civil strife. Other problems affecting the sector include Illegal, Unregulated and Unreported (IUU) fishing activity, irrational inshore resources exploitation and lack of markets as well as the absence of effective fisheries governance in the country. If developed and managed in a sustainable manner, however, the fisheries sector has without any doubt great potential to contribute significantly to national development and economy at large through food security, foreign exchange earnings and creation of employment opportunities.

## **1.2 Fishery in Puntland – history and importance**

Established in 1998 in the north-eastern part of Somalia, Puntland is self-governing State with a coastline of approximately 1400 km in length that abuts the Gulf of Aden in the north and the Indian Ocean in the east. With the upwelling system occurring off its Indian Ocean coastline and having near pristine coral reefs in the Gulf of Aden, Puntland has abundant and varied fisheries resources compared to the other regions of Somalia. However, like the rest of the Somali people, Puntlanders do not have a long fishing tradition save for small coastal communities who have been engaged in fishing since time immemorial for their mere subsistence and for occasional exchange of dry-salted product for imported commodities from the Arabian Peninsula.

The first serious investment in the sector was initiated in 1940s when Italian businessmen established two fish canneries in Kandla and Habo on the Gulf of Aden coast east of Bosaso. A similar but bigger factory was also implemented in Las Qorey in 1960s with Soviet assistance. The three canneries together employed several thousand Somalis during their heydays. These initiatives were followed by the implementation of NECFISH project in Bari Region in the 1980s that resulted in the construction of a cold storage in Bosaso and several fish collection points in Kandala and Alula districts. With the exception of the Bosaso cold storage, all the factories and facilities have been looted after the collapse of the Government. The Bosaso cold storage may not fair better though as it lies idle thanks to a tussle between the Puntland Government and a group of Businessmen over its ownership.

It was only after the collapse of the Government in 1991 that local Puntland businessmen had realized the potential of the sector and made modest investments in the form of reefer trucks, mobile cold stores, boats and other fishing inputs, mainly to exploit lobster resources. The venture paid off and the lobster fishery had at one time become the main stay of the economy replacing the livestock as the number one foreign exchange earner through the export of frozen lobster tails to UAE. The ban of the Somali livestock export to the Gulf countries also drew more investors to the fishery further intensifying the pressure on the lobster populations.

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<sup>iii</sup> Source: [ftp://ftp.fao.org/FI/DOCUMENT/fcp/en/FI\\_CP\\_SO.pdf](ftp://ftp.fao.org/FI/DOCUMENT/fcp/en/FI_CP_SO.pdf). Accessed on 9th April 2010

Unfortunately the bonanza did not last long and the lobster catches started to decline due to heavy fishing pressure exerted on the stocks. Output has over the years reduced from 2,000 tons/year in the 1990's to the current 200-300 tons/year.

Due to the dwindling lobster catches, the majority of the businessmen started to venture into fish trade by either bringing in Yemeni boats with insulated fish holds to export fresh fish to Yemen or by establishing fish canning factories in three towns (i.e. Las Qorey, Kandala and Habo) that had in the past hosted such industries. The businessmen, who first got the boats through direct hire and/or profit sharing agreements with the owners, have in recent years managed to buy their own boats. Anecdotal information suggests that the Puntlanders now have a fleet of about 60 such boats. On average, 120 boats dock at various villages along the coastline during the fishing season, each making three fish collection trips per month. Despite being accused of price fixing, unfair competition practices and reluctance to accept all landed fish, these Yemeni boats nevertheless provide the only market for many coastal communities along the Puntland coastline.

The December 2004 Tsunami, though seriously affected the sector, was in a way a blessing in disguise because it drew a renewed attention from the Government and donor agencies to the sector. As a result, donor agencies started implementing several emergency projects with a view to rehabilitating the sector. Two such agencies (i.e. VSF Suisse and FAO) provided post-harvest fisheries facilities in the form of ice plants and chill rooms in 7 sites along the Indian Ocean coastline. These facilities have been handed over to local businessmen under Public Private Partnership agreement and are now operational providing valuable services to beneficiary communities.

Fishing activity is seasonal and lasts for 8 months (October – May) each year due to fierce monsoon winds which make sea conditions unsuitable for artisanal fishing operations in the other months. During the offseason, most fishermen migrate to their summer villages, further inland where they tend livestock to supplement their income. However, they troop back to the coast at the start of the fishing season in early October. The sector provides livelihoods to coastal communities as well as IDPs and increasing number of pastoralist who join the industry either as temporary fishermen or as casual labourers during the fishing season. Both the revival of fish canning factories and the implantation of post harvest fisheries facilities in recent years have offered important local market opportunities for artisanal fishermen at various locations along the entire coastline.

## **2.0 Overall objective of the study**

The overall objective of the study was to undertake an assessment of the Puntland fisheries sector through value chain analysis and assessment of the current production and its impacts on the marine environment.

### **2.1 Specific objectives of the study**

The specific objectives of the study were to:

- a) Assess the current status of the sector in terms of employment, production, local consumption and export
- b) Examine the current fishing methods and their impact on the marine environment
- c) Describe the existing domestic and international market channels
- d) Identify key market chain actors and analyze the cost, margins and profits of different stakeholders in the marketing chain

- e) Identify production and marketing constraints and recommend possible interventions to mitigate the observed constraints

### **3.0 Area and methodology of the study**

The study was conducted in the Puntland State of Somalia during the month of February 2010 covering the whole coastline from Gara'ad in the south to Las Qorey in the northwest respectively on the Indian Ocean and on the Gulf of Aden. As part of the data collection, seven out of the ten major coastal towns were visited representing 70% of the target area for the study to obtain first hand information from the key stakeholders on the issues and concerns of the fisheries sector. Data for the three major coastal towns (i.e. Alula, Kandala and Las Qorey) that were not visited due to logistical and time constraints were collected through in-depth interviews with officials from the respective District Fishing Association, fish traders, fishermen and other members of the wider community from those towns.

The study has used a combination of participatory, qualitative and quantitative methods to collect the necessary data. Moreover, a desktop review of the previous survey reports was undertaken to extract the necessary information relevant to this assessment (see reference section for the literature consulted). The qualitative information and quantitative data were gathered through: i) a questionnaire administered to various stakeholders, ii) group discussions with different key market chain actors, and, iii) direct observations made during the interviews and/or at various locations in the course of this study. The data and information collected were crosschecked with different stakeholders for consistency and accuracy.

### **4.0 Limitations of the study**

The following are the limitations of the study:

- a. Paucity of previous survey reports which could have served as reference points for the study.
- b. Lack of historical and current fishery data collection for the whole coastline which made it very difficult to get precise information on many aspects of the fisheries.
- c. Unwillingness of some traders to provide honest answer on questions regarding market information such as costs, profits, etc which they see it as personal secrets.
- d. Refusal by some actors to be interviewed for the study.
- e. Logistical and time constraints

## **5.0 Major findings**

### **5.1 Description of the artisanal fisheries**

The Puntland fisheries sector has not yet developed the necessary technical and logistical capabilities that can exploit a wide range of the abundant inshore and offshore resources. As a result, there are no industrial or recreational fisheries and the sector is exclusively based on artisanal capture that accounts for 100% of the total fish production. The artisanal fisheries can be classified into three components on the basis of the target stocks i.e. shark fishery, finfish fishery and lobster fishery. The shark and finfish fisheries are carried out along both the north (Gulf of Aden) and the east (Indian Ocean) coasts but the lobster fishery is restricted to the Indian Ocean coast owing to the occurrence of the target lobster species in that area (detailed descriptions of these fisheries are given in the following subsections). Other fisheries that are occasionally targeted include sea cucumber, clams, cattle fish and oysters.

Fishing operations are controlled by the prevailing monsoon winds and sea conditions. The main fishing season in the Puntland coastal waters more or less coincides with the northeast monsoon period extending from October to May. During the southeast monsoon period (May – October) there are strong winds which make fishing by artisanal fishermen rather difficult. However, small fishing operations could still take place during the latter months of the southeast monsoon period depending on the general conditions of the sea especially in the Gulf of Aden which is generally calmer in comparison with the Indian Ocean. Fishing activity is therefore longer on the north coast than on the east coast. Similarly, the fishing season for the shark and finfish fishery is longer than that of the lobster fishery due to the northeast monsoon winds that intermittently interrupt fishing for lobster during the months of December, January and February. The approximate harvesting seasons for different fish species caught off the Puntland coastline are presented Table 1.

**Table 1** *Approximate harvesting season for different species caught off the Puntland coastline*

| Stocks         | Harvesting season                             |   |
|----------------|---|---|
|                | Indian Ocean                                  | Gulf of Aden                                |
| Large pelagics | September – May<br>(peak: October – December) | October – May<br>(peak: October – December) |
| Small pelagics | September – May<br>(Peak: November -January)  | October – May<br>(Peak: November - January) |
| Demersals      | All year<br>(peak: September, March – May)    | All Year<br>(peak: September, March – May)  |
| Sharks         | May – September<br>(peak: June)               | May – September<br>(peak: June)             |
| Lobsters       | October – April<br>(peak: November, March)    | –   |

Fishing activities are taken up at 90 settlements, villages and towns along the coastline. However, some of the settlements are only populated when the fishermen descend on the coast for the lobster fishing season. The fishing fleet consists of motorized GRP boats of various sizes and makes, three of which are manufactured in Bosaso by a local boatyard. The traditional wooden boats are no longer used except for the versatile Huori which is still deployed in some traditional villages for subsistence fishing. Various types of fishing gear are used in the artisanal fisheries. Both passive and active gear is commonly employed with nets making about 80 % of the all fishing gear used (Table 2). Hand lines, long lines, gillnets (used as drifts or bottom-set nets) are used for the shark and finfish fisheries while snorkels, diving bottles, goggles, wire traps and tangle nets are employed in the lobster fishery. The drift nets introduced from Yemen are more efficient than the traditional fixed gill nets and because of this most fishermen targeting large pelagics now exclusively use the former nets in their fishing operations.

Puntland State does not have industrial fishing fleet of its own to tap offshore resources but from time to time issues fishing licenses to foreign ships. Three licensed trawlers are currently operating in Puntland waters providing a total of US\$270,000/year in license fees to the Government.

### **5.1.1 Lobster fishery**

The lobster fishery is based on a single subspecies of the scalloped spiny lobster *Panulirus homarus* (i.e. *P.h. megasculptus*) which occur on the east coast. The fishery is export oriented and all the catches are processed as frozen tails that are air freighted to UAE. Although it was at one time the most important fishery in Puntland in terms of generation of hard currency

and creation of employment opportunities, its significance has in recent years decreased due to declining catches occasioned by high fishing pressure exerted on the stocks since commercialization of the fishery in the 1980s. Despite the decline in production, however, the fishery is still important as it brings in between US\$5 and US\$7.5 million/year to the economy from the export of the lobster tails based on the current price of US\$25. The current annual production is estimated to be between 200 and 300 tons which is a fraction of the average 2000 tons produced in the 1990s.

**Table 2 Artisanal fishing gear used in the Puntland waters\***

| Fishing gear | Technical specification  | Operating depth | Operated by                          | Fishery type                        |
|--------------|--|-----------------|--------------------------------------|-------------------------------------|
| Gill net     | PA monofilament transparent gauge 16; 50 m long x 50 MD mesh size 3.5"                 | Bottom          | Foot fishermen                       | Lobster                             |
| Gill net     | PA multifilament dark green 210D/18; 60 m long x 50 MD mesh size 3 to 4.5"             | Bottom          | Foot fishermen<br>Embarked fishermen | Lobster<br>Fish (demersal)          |
| Gill net     | PA multifilament dark green 210D/24; 55m long x 50 MD mesh size 5"                     | Bottom          | Foot fishermen<br>Embarked fishermen | Lobster<br>Fish (demersal)          |
| Gill net     | PA multifilament dark green 210D/36; 55m long x 50 MD mesh size 6"                     | Bottom          | Embarked fishermen                   | Fish (demersal)<br>Shark            |
| Drift net    | PA Multifilament dark green 210D/54 -72; 55m long x 50 MD mesh size 6.5" -9"           | Surface         | Embarked fishermen                   | Fish (pelagic)<br>Shark             |
| Traps        | Wire mesh semicircular ( <i>Gorgoor</i> ) 60 cm x60 cm; mesh size 2mm,                 | Bottom          | Foot fishermen<br>Embarked fishermen | Lobster                             |
| Hook & Line  | Line: PA monofilament diameter 1.5 mm; Hook n.6 round ringed MUSTAD                    | Bottom          | Embarked fishermen                   | Fish (demersal)                     |
| Long line    | Main rope PP diameter 4 mm; Auxiliary ropes diameter 3 mm; Hooks Japan wired tuna type | Surface         | Embarked fishermen                   | Fish (pelagic mostly tuna)<br>Shark |

\*Source: G. Tello *et al.* (2005). Second tsunami assessment mission – Mission Report.

The fishery is open access with no restrictions at all on catches and on fishing effort which means that the entire stocks are accessible to the fishermen who employ small versatile boats and a variety of fishing gear and methods. The fishing season spans from October to April with the best months for lobster fishing being November and March. The best lobster fishing grounds are found off the stretch of the coastline between Gara'ad in the south and Foar in the north where thousands of seasonal fishermen mainly pastoralist but also IDPs from south Somalia congregate at the start of the lobster season. These seasonal fishermen operate on foot to set wire traps and mono/multifilament nets in the surf zone to catch lobsters. In contrast, embarked fishermen catch lobsters either by scuba diving or by setting multifilament nets at depths  $\leq 10$ m. Lobster fishing is carried out during the day time between

early morning and 2 O'clock. Nets and wire traps set in the morning and left to soak overnight are checked in the following morning for entrapped lobsters.

All the catches are processed into tails at the beach mostly by the fishermen themselves and then sold to local traders. The traders use reefer trucks to freeze and store the tails which they later transport by road to Garowe or Galkayo. From there the product is air freighted to Dubai, UAE. Occasionally, small traders use domestic chest freezers to keep the tails when the bigger reefer trucks are not available. Because of limited freezing space, traders freeze the catches of the day in the same reefer trucks that have already contained frozen products from previous fishing operations. This makes the frozen tails to eventually develop black spots as a result of temperature fluctuations occasioned by mixing of frozen and unfrozen tails. By adopting better processing methods and by investing in deep freezers, the traders can indeed improve the quality of their products which can be accepted on the international markets fetching good prices. In the UAE, the tails are reprocessed, packed and re-exported to Asia and Europe as product of Oman.

Because of lack of seasonal closures and established minimum legal size limits, fishermen land and sell berried females and small lobsters, oblivious to the negative effect their action will have on the populations. This practice would interfere with the recruitment process of the lobster populations and could in fact hamper their ability to replace themselves in the face of mounting fishing pressure. While no comprehensive research has been done and therefore the status of the fishery is not exactly known, the stocks appear to have been heavily exploited as suggested by the declining catches over the last 10 years. Anecdotal information gathered during an FAO assessment mission suggested that the abundance of lobsters in Puntland waters may have gone down by 80% since 1995 (Tello *et al*, 2005). The alarm bells were in fact rung as early as in 1995 (Lovetelli 1995) and again in 1999 (Fielding and Mann, 1999) warning that the exploitation of lobster resources was not sustainable in the long term and that urgent conservation measures and sound management policies were needed to protect this valuable resource. Fielding and Mann (1999) estimated the current egg production at about 10% of the original pre-harvest levels. A reduction in the egg production per recruit to this level is internationally regarded to constitute to overfishing. The low egg production could result in very few larval and juvenile lobsters surviving long enough to become part of the fishable stock leading to recruitment failure. In most lobster fisheries, the ideal target levels for egg production per recruit are 30% of the unexploited levels (Fielding & Mann 1999). Considering the above findings, it is safe to assume that the fishery is on the verge of an imminent collapse.

### **5.1.2 Shark fishery**

The shark fishery is a traditional fishing activity that has been undertaken along the Somali coastline over the centuries. Fishing methods have changed little over time and stationary gill nets and long lines are still the main fish gear used in this fishery. Various species of sharks and rays are targeted and both fins and meat are now being utilized thanks to the reopening of the high way linking Puntland and Kismayo in 2006 which has made possible for the transportation of dried shark meat by road to Kismayo from where it is exported to Mombasa which is the main market for dried shark meat in East Africa. Before then, fishermen used to throw the carcasses back to the water after cutting the fins for lack of market for the meat. In contrast, fins have always had a ready market because of the high demand in the Far East Asia countries where they are regarded as delicacy.

Once set, gill nets and long lines are checked every morning for sharks. Landed sharks are finned, beheaded and degutted and the meat is then incised, washed with sea water, salted and dried on the ground under unhygienic conditions. In some cases, fishermen with bigger boats remain at sea for up to several days catching and processing the sharks they caught onboard but drying is always done on land. Drying time depends on the prevailing weather conditions but can take several days at the minimum while the meat is exposed to pests, birds and even domestic animals. Because of improper handling, processing and storing, dried shark meat produced in Puntland is of poor quality with attendant post harvest losses estimated to be as high as 40%. Proper drying of shark meat entails using drying racks which are raised structures one meter or so above ground. The four sites of Hafun, Barmadobe, Bender Bayla and Durdura are the only places in the entire coastline that have such structures and according to businessmen interviewed in the course of this study, shark products from these sites are of better quality than those from other places that do not have such drying racks.

Village level traders buy both fins and dried shark meat from the fishermen and then sell to businessmen in Bosaso who then export the products (meat by road/fins by air) to the respective markets. In the areas where the Yemeni boats operate, fishermen who catch sharks as by-catch when fishing for large pelagic fish sell them whole complete with fins to the Yemeni boats for convenience. In the absence of fishery data, it is not possible to reliably estimate the total production of this fishery and the amount of revenue it generates. In 2005, fishermen interviewed by an FAO team for a tsunami assessment mission estimated the shark production to represent 28% of the fish production in Puntland.

A number of the once abundant shark species (e.g. saw shark, hammerhead shark, white shark and macho shark) have totally disappeared in some areas while the average sizes of some other shark species landed have decreased over the last 5 years. This may be an indication of overfishing but without a comprehensive research it is very difficult to pinpoint a particular factor(s) as the likely cause of the observed disappearance. Local fishermen blame the IUU vessels of being responsible for this problem.

### **5.1.3 Finfish fishery**

The finfish fishery is multi species fishery that targets both large pelagics and demersals. It focuses primarily on the highly valued king fish sought after by the Yemeni boats and to a lesser extent on the tuna fishes which are canned by local fish canneries. The significance of this fishery has been on the rise since the arrival of the Yemeni boats a decade ago which at first accepted only king fish but have since added tuna fishes, groupers, snappers and emperors on the list of fishes they buy from the local fishermen. Having eclipsed the lobster fishery, it is now the most important fishery in Puntland in terms of production, employment created and revenue generated thanks to the high demand from the Yemeni market. It is indeed the life line for many fishing communities on the north coast who are not endowed with lobster resources like the communities further south (between Foar and Gara'ad). Prior to the arrival of these boats, finfish had been caught only for local consumption and occasional smoking especially after the collapse of the Las Qorey Tuna factory in 1991.

A total of 120 boats carrying ice dock at various villages along the coastline during the fishing season. The boats can carry between 10 and 18 tons of fish on ice depending on the capacity of their individual fish holds and on average make 3 fish collection cycles per month shuttling between Yemen and Puntland. In the beginning when their number was small, the boats used to collect fish from villages and towns abutting the Horn (Ras Aseyr) but have since extended their operating range as far towns as Las Qorey and Eyl respectively on the

north and east coasts. Based on an average cargo of 10 tons of fish/boat/trip, the Yemeni boats buy and export a total of 3,600 tons of fresh fish/month which translate into 28,800 tons/year (i.e. 360 boat trips x 10 tons x 8 months). However, the total finfish production from the Puntland waters may be as high as 50,000 tons when discarded fish, local consumption and the intake of the local fish canneries are included.

Drift netting, trolling, land hand lines are the main methods employed in this fishery. Drift nets and trolling are used to catch large pelagic species while hand lines are used for the demersal fishing. Fishermen using drift nets set off in the afternoon, fish the whole night and come back the following morning. These nets were introduced into the country by Las Qorey Tuna Factory in the 1970s but their use was not widespread until around 2000 when the fishermen in Kandala, Alula and Bargal districts resorted to employing them in order to satisfy the growing demand for king fish resulting from Yemeni boats. It is important to note here that in many countries the use of drift nets has been banned due to high turtle and dolphin mortalities associated with this fishing method. Trolling and hand lines baited to lure fishes are used during day time or at nights with enough moonlight. Catches are sorted out at sea and only target (accepted) species are taken to the boats for sale while the rest are thrown away especially in areas where there are no local buyers.

Apart from the discards, high post harvest losses are also associated with this fishery resulting from the lack of proper fish handling techniques on the part of the local fishermen including reluctance to carry ice on board. Indeed, post harvest losses from finfish and shark fisheries are estimated to be between 61% and 70% of the total production. It must be stressed here that the discarded fish are by no means of low quality since there are many species among the discards that can fetch good prices on the international seafood markets. It is also unfortunate that these fishes are negligently discarded at a time when half of the Somali population needs food aid to survive due to recurring droughts, insecurity and high inflation that have pushed many families down below the poverty line. The majority of these families who are IDPs and other urban poor do not get the recommended daily protein intake as they cannot afford to buy the basic traditional source of protein such as meat and milk. The discarded fish can indeed be a good source of protein for these families if properly preserved and marketed in urban areas. Alternatively, the fish can be collected and converted into fish meal which can then be used as a better alternative feed for livestock especially for the animals kept at the Berbera and Bosaso quarantine centres for export to the Arabian Gulf countries. The availability of good quality fish meal will not only herald in commercial poultry farming in the country but will also help release many small farms that are currently used to grow low quality hey for the production of vegetables and fruits.

#### **5.1.4 Fish Prices**

Fish prices are determined by various factors such as quality, type and weight of fish, season, location, and the prevailing demand and supply market forces. In the domestic market (i.e. Bosaso landing beach), prices follow a seasonal pattern increasing during the offseason and decreasing in the October – November period when the supply overwhelms the demand due to the bumper harvest of large pelagics. In contrast, the fish prices offered by the Yemeni boats for the few species they accept from the fishermen are similar in their entire operating range save for slight variations. There is indeed a feeling among the fishermen that the operators of the Yemeni boats deliberately fix and keep fish prices very low to their advantage. In fact, the current fish prices compare well with those reported in the 2005 OTP report showing that the prices have remained stagnant over the last five years. This is understandable since the supply chain is buyer dominated and the producers (fishermen) have



little or no say (bargaining power) at all over price setting. Prices of the lobsters and shark products are determined by the demand on the international seafood markets. The average producer and export prices for various species of fish prevailing at the time of data collection are presented in Table 3.

**Table 3 Average producer and export prices of fishery products in Puntland**

| Species                | Producer price (US\$/kg) | Export price (US\$/kg)* |
|------------------------|--------------------------|-------------------------|
| King fish              | 1.8                      | 3.0                     |
| Yellow fin tuna        | 0.8                      | 1.8                     |
| Skip jack              | 0.5                      | 1.0                     |
| Kwa Kawa               | 0.4                      | -                       |
| Bonito                 | 0.4                      | -                       |
| Bill fish              | 0.4                      | 1.0                     |
| Grouper                | 1.0                      | 3.0                     |
| Sardine                | 0.2                      | -                       |
| Snapper                | 0.7                      | 1.5                     |
| Emperor                | 0.5                      | 1.0                     |
| Shark fin (large size) | 100.0                    | 120.0                   |
| Dry shark meat         | 1.0                      | 2.0                     |
| Lobster (tail)         | 13.0                     | 25.0                    |

\*Export prices represent the prices given to the exporters at the final destination of the goods.

### 5.1.5 Fishing fleet

The artisanal fishing fleet of Puntland totally consists of GRP motorized boats of various makes and sizes (Table 4) save for a small number of wooden boats which are still used for near-shore subsistence fishing by some traditional communities. A total of 3136 fishing boats are currently used in Puntland for artisanal fishing of which 2974 (94.8%) are GRP motorized boats and the remaining 162 (5.2%) are wooden boats of *Huori* type. Of the GRP boats, *Leyla Alawi* and *Afdheer* types are the most preferred boats together accounting for 81% of the total GRP boats in use. They are followed by the Runner (5.4%) and Volvo (4.9%) boats. The *Huori*, Sri Lankan<sup>iv</sup> and SAAB boats make up the rest of the artisanal fishing fleet. The latter two boats are remnants of old models provided through various aid projects in the 70s/80s and therefore most of them are nonoperational due to problems with their obsolete engines. In total, Six hundred and thirty nine GRP boats (21.5% of all GRP boats) are currently not working for lack of engine spare parts.

The *Leyla Alawi* (LOA: 6m), *Afdheer* (LOA: 9m) and Volvo (LOA: 8.5m) boats are manufactured in Bosaso by a local boatyard but the engines are imported from abroad. The former two boats use Yamaha Enduro outboard engines ranging from 15 hp to 40 hp depending on the size of the boat and gear used. The Volvo which is the biggest and the only multiday fishing boat among the Puntland artisanal fishing fleet is driven by inboard diesel engines imported from China. The *Afdheer* boat is exclusively used in shark and finfish fisheries and therefore predominantly found in Las Qorey, Bosaso, Kandala, Alula, Bargal and Hafun which are the main centres for shark and finfish fishing. In contrast, the *Leyla Alawi* is more suitable for lobster fishing though it can as well be used for single-day-finish fishing like the *Afdheer*. It is therefore largely found in lobster producing areas between Foar

<sup>iv</sup> Somalis peculiarly name imported boats after country of origin or installed inboard engines

and Gara'ad on the east coast. The Volvo boat has been traditionally used for shark fishing but is also now deployed in the finfish fishery and occasionally as a cargo boat to ferry goods from Bosaos to the towns of Kandala and Alula as well as villages and settlements near these two towns.

Compared with the smaller ones, the bigger boat has many advantages including lower running costs, longer life span, higher fish carrying capacity, longer fishing expeditions and better handling at rough seas. Moreover, it has inbuilt insulated fish holds for carrying ice onboard. In spite of these advantages, fishermen still prefer the smaller boats because of their versatility and easy beaching. Boats are occasionally beached for various reasons including concerns for their safety during windy seasons. Whereas two or three crew members can beach the small boats, ten or more people are required to take the Volvo out of the water owing to its size and weight. Because of this difficulty and the lack of many natural shelters and/or manmade jetties to moor the boats during the strong monsoon winds, most fishermen prefer the *Afdheer* and *Leyla Alawi* to the Volvo. Another factor that also discourages many fishermen to buy the bigger boat is its cost which is very high in comparison with that of the smaller boats as shown in Table 5.

**Table 4 Distribution of artisanal fishing boats by district along the Puntland coastline\***

| District\Boat |                 | Leyla Alawi | Afdheer | Runner | SAAB | Ceylon | Volvo | Huori | Total |
|---------------|-----------------|-------------|---------|--------|------|--------|-------|-------|-------|
| Las Qorey     | Operational     | 14          | 136     | -      | -    | 23     | 16    | -     | 189   |
|               | Non-operational | 3           | 11      | -      | -    | 18     | -     | -     | 32    |
| Bosaso        | Operational     | 22          | 127     | -      | 2    | -      | 34    | 10    | 195   |
|               | Non-operational | 8           | 63      | -      | 22   | 11     | 2     | 16    | 122   |
| Kandala       | Operational     | 30          | 100     | -      | -    | 6      | 10    | 30    | 176   |
|               | Non-operational | 7           | 20      | -      | -    | 3      | 3     | 8     | 41    |
| Alula         | Operational     | 127         | 369     | -      | -    | 4      | 10    | 0     | 510   |
|               | Non-operational | 25          | 33      | -      | -    | 4      | 4     | 90    | 156   |
| Bargal        | Operational     | 30          | 340     | -      | -    | -      | 15    | -     | 385   |
|               | Non-operational | 10          | 80      | -      | -    | -      | 7     | -     | 97    |
| Hafun         | Operational     | 44          | 191     | -      | -    | 2      | 2     | 8     | 247   |
|               | Non-operational | -           | -       | -      | 2    | 11     | 1     | -     | 14    |
| Bender Bayla  | Operational     | 155         | 26      | 8      | -    | -      | 22    | -     | 211   |
|               | Non-operational | 89          | 4       | 9      | -    | -      | 7     | -     | 109   |
| Eyl           | Operational     | 194         | 1       | 31     | -    | -      | 4     | -     | 230   |
|               | Non-operational | 60          | -       | 27     | -    | -      | 6     | -     | 93    |
| Dan Goroyo    | Operational     | 30          | -       | 11     | -    | -      | -     | -     | 41    |
|               | Non-operational | 12          | -       | 5      | -    | -      | -     | -     | 17    |
| Gara'ad       | Operational     | 133         | 5       | 46     | 6    | -      | 9     | -     | 199   |
|               | Non-operational | 32          | 1       | 31     | 6    | -      | 2     | -     | 72    |
| Total         |                 | 1025        | 1507    | 168    | 38   | 82     | 154   | 162   | 3136  |
| % Total       |                 | 32.7        | 48.0    | 5.4    | 1.2  | 2.6    | 4.9   | 5.2   | 100   |
| No. of crew   |                 | 4           | 4       | 4      | 5    | 6      | 6     | 2     |       |

\*Source: Ministry of Fisheries and respective District Fishing Associations.

### 5.1.6 Fisher population

The emergency of the fisheries sector as an important economic activity over the last 20 years has brought about an unprecedented increase in the number of fishermen operating in the Puntland waters. However the exact number of these fishermen is unknown since neither the Ministry of Fisheries nor the respective District Fishing Associations register Somalis willing

**Table 5 Comparisons of the costs involved in purchasing and equipping the three locally produced fishing boats\***

| Item                     | Leyla Alawi | Afdheer | Volvo (8.5)* |
|--------------------------|-------------|---------|--------------|
| Hull                     | 2,000       | 2,500   | 10,000       |
| Engine                   | 2,500       | 3,000   | 5,500        |
| Nets (mounted)           | 1,500       | 2,000   | 4,500        |
| Ropes, hooks and anchors | 530         | 530     | 1140         |
| Accessories              | 80          | 80      | 160          |
| Total (US\$)             | 6,610       | 8,110   | 21,300       |

\*Source: Hiddig Boat factory, Bosaso. \* Boats with cabins cost US\$1000 more

to fish in the Puntland waters. In the absence of a register, the only other way to get precise information on the fisher population is to carry out a tedious village by village census during the fishing season which was beyond the scope of this study. Generally, the fisher population is made up of traditional fishermen, pastoralists and IDPs who can be classified further as either permanent fishermen or seasonal fishermen on the basis of their skills and mode of operation. Permanent fishermen are those who engage in fishing as an occupation and in most cases operate from boats within the inshore waters and with some exception up to 50 miles offshore. In contrast, seasonal fishermen are those who come to the coast purely for the lobster fishing season and then depart. The latter group whose members also include pastoralists and IDPs work individually on foot setting nets and traps in the shallow waters.

By using the data on Table 4, a rough estimate of 12, 730 permanent fishermen can be made for the Puntland coastline based on the respective crew of the existing boats. However, it is pretty much harder to put a figure for the seasonal fishermen because of their transient nature. Surveys carried out in the past reported contradictory figures for the local fisher population. For example a study undertaken by OTP with UNDP assistance in 2005 reports that there were 4058 full time and 1699 part time fishermen on the entire Puntland coastline excluding Hafun for which there were no data at the time. In contrast, another assessment carried out by an FAO team in May/June 2005 gives a much higher estimate of 22,260 permanent and 27,425 seasonal fishermen for only 28 villages along the Indian Ocean coastline affected by the December 2004 tsunami. It was possible that the villagers had deliberately inflated the number of fishermen who were active in their villages in order to be eligible for more tsunami aid. Due to the civil war in the south central, many fishermen from the traditional fishing areas of Kismayo, Merka and Mogadishu have relocated to Puntland as IDPs where they now make up 50% of the fisher population. According to the secretary of Bosaso Fishing Association, IDPs also represent 80% of the fishermen operating out of Bosaso.

Fishermen in Puntland are not presently organized and do not even register with the existing District Fishing Associations which are recognised by the Ministry of Fisheries as legal entities representing the local fishermen. The majority of these associations were formed in 2005 as part of the Tsunami intervention in order to get organized grassroots structures through which fishing inputs could be distributed (See Kulmiye 2006b for more details). It was anticipated at the time that the associations would transform themselves into fully fledged, functional organizations, once the distributions were completed, that could register all fishermen in their respective districts, levy membership fees and look after the interest of their members. This has not happened and most of these associations now exist only on paper with little or no presence at all on the ground. Before 1991, all fishermen were required to register with Government sanctioned fishing cooperatives established as part of the

collectivisation programme of the 1970s. The cooperatives, which disintegrated in 1991, were hated by the fishermen not only for the compulsory levies they charged but also for the mismanagement, inefficiency and corruption that became the hallmarks of their operations. It is perhaps this nasty experience with the defunct cooperatives that the local fishermen are now averse to taking up membership of the current associations. The only time local fishermen associate themselves with the associations is when there are freebies being distributed by the humanitarian agencies through these associations.

### **5.1.7 Jetties and landing facilities in Puntland**

With the exception of Bosaso port and a small dilapidated jetty in Hafun, Puntland does not have landing facilities along its coastline at which fishing boats can moor to offload their catches at all tide levels. Bosaso port is for the exclusive use of dhows and other commercial vessels offloading and/loading cargo while Hafun jetty is so rundown that local fishermen avoid it altogether for safety concerns. Fishermen in Bosaso and elsewhere along the coastline use beaches which are in most cases dirty to offload their fish catches after fishing trips for lack of landing facilities. Generally, there are no sites designated as landing centres along the entire coastlines and the selection of a site as a landing beach by fishermen is determined by such factors as its proximity to towns, villages, and markets as well as availability of anchorage and natural shelters.

### **5.1.8 Processing, ice making and cold storage facilities**

Processing, ice making and/or cold storage facilities of one form or the other are available in almost all the major towns along the coastline (Table 6). In total, there are three fish canneries, seven ice plants and three cold storage facilities which have a combined installed capacity of 50 tons, 175 tons and 820 tons respectively in ice production, chill room and cold storage spaces. Similarly, the three fish canneries can together process 80 tons of fish/day. The majority of these facilities have been established over the last ten years either by the Diaspora in partnership with local Investors or by humanitarian agencies as part of their tsunami interventions. In addition to these fixed facilities, there are also over 100 of heavy duty refrigerated trucks and mobile reefer units which are mainly used in the lobster fishery.

All the facilities are currently operational except for the NECFISH cold storage in Bosaso which was established in 1987 by the last central Government with assistance from the World Bank. This cold storage ceased operations immediately after the collapse of the Government in 1991 as it could not cover its overheads let alone make a profit without government support. However, the ice production unit continued working until 1999. The Puntland Government by way of a presidential letter rented the factory out in 2003 to a group of local businessmen who tried but failed to revive it. According to a former factory manager who still oversees it, these businessmen now seek US\$300,000 from the government which they claim was spent on the factory though there is little to show for such an investment at the factory barring a 2m high perimeter wall erected around the factory. Even if the dispute is resolved there is no guarantee that the factory will be revived easily since its machines have been idle for the last 20 years, gathering dust and rust.

All the seven ice plants and one cold storage are located on the east coast while all the three canneries and two cold storages are found on the north coast. The ice plants, implemented by VSF Suisse and FAO as part of their tsunami interventions, are operated by local businessmen under a PPP agreement signed between them and the Ministry of Fisheries in the presence and blessing of the implementing agencies and the respective beneficiary communities. The Ministry of fisheries acts as the trustee of these facilities on behalf of the

communities. The ice plants are equipped with ice makers and chill room refrigeration units and thus store chilled fish which can be kept for a maximum period of two weeks. In contrast, the privately owned fish canneries and cold storages have canning equipment, deep freezers and/or cold stores and therefore can store fish for longer periods or process it into value added, less perishable products. Canned tuna, canned sardines and the newly introduced (by Las Qorey) fried sardines in sachets are the main products of the canneries. The cold storages produce frozen products such as fish fillets, whole fish, lobster tails, cattle fish, etc.

**Table 6 Installed ice making and cold storage facilities along the Puntland coastline**

| Coast        | Facility                         | Ownership | Status      | Main product type | Installed capacities (Tons) |            |              |            |
|--------------|----------------------------------|-----------|-------------|-------------------|-----------------------------|------------|--------------|------------|
|              |                                  |           |             |                   | Ice production              | Chill room | Deep freezer | Cold store |
| Gulf Of Aden | Las Qorey Canning Factory        | Private   | Working     | Canned fish       | 10                          | 10         | 6            | 300        |
|              | East Africa Fishing Co. (Bosaso) | Private   | Working     | Frozen fish       | 5                           | 20         | 5            | 100        |
|              | NECFISH (Bosaso)                 | Public    | Not working | Frozen fish       | 10                          | 15         | 5            | 250        |
|              | Kandala Canning Factory          | Private   | Working     | Canned fish       | -                           | -          | -            | -          |
|              | Habo Canning Factory             | Private   | Working     | Canned fish       | -                           | -          | 2            | 150        |
| Indian Ocean | Bargal Cold Storage              | Private   | Working     | Frozen fish       | -                           | -          |              | 20         |
|              | Bargal Ice Plant                 | Public    | Working     | Fresh fish        | 3                           | 20         | -            | -          |
|              | Hafun Ice Plant                  | Public    | Working     | Fresh fish        | 5                           | 20         | -            | -          |
|              | Barmadobe Ice plant              | Public    | Working     | Fresh fish        | 3                           | 20         | -            | -          |
|              | Bender Bayla Ice Plant           | Public    | Working     | Fresh fish        | 5                           | 20         | -            | -          |
|              | Durdura Ice Plant                | Public    | Working     | Fresh fish        | 3                           | 20         | -            | -          |
|              | Gara'ad Ice Plant                | Public    | Working     | Fresh fish        | 3                           | 20         | -            | -          |
|              | Dhinowda Ice Plant               | Public    | Working     | Fresh fish        | 3                           | 20         | -            | -          |
| <b>Total</b> |                                  |           |             |                   | <b>50</b>                   | <b>175</b> | <b>18</b>    | <b>820</b> |

### 5.1.9 Fisheries governance and management

The Ministry of Fisheries is the key government agency responsible for the protection, management and development of the fisheries resources of Puntland. The Ministry was formed soon after the establishment of the Puntland State in 1998 and within that year it managed to draft fisheries regulations and policy with the help of a consultant hired through the Somali Natural Resources Management Programme which was funded by the EC but implemented by IUCN. The fisheries regulations were based on the Somali Fishery Law No. 23. However, both the regulations and policy only came into force in 2006 when the Parliament had finally adopted it after many years of uncertainty. Despite the adoption, the regulations are not enforced due to the fact that the Ministry does not have the human, logistical and financial resources required for such undertaking. As a result, none of the fisheries is currently regulated even though there are signs that some of the inshore resources are exploited at irrational and unsustainable levels that may eventually lead to their collapse if urgent measures are not taken. Similarly, there is no systematic coastwise monitoring of fishing activities save for a VSF Suisse initiated data collection at the Durdura, Bender Bayla, Barmadobe and Hafun sites on the Indian Ocean coast. The Ministry of Fisheries also collects

some statistical information from the fish catches landed and sold at the Bosaso landing beach.

## **5.2 Destructive fishing Methods and their impacts**

There are several fishing gear and methods that are currently used in Puntland which can be classified as destructive because they either destroy sensitive habitats and/or generate a huge amount of by-catch and discards. These include:

a) Bottom trawling in inshore areas by IUU fishing vessels: The fishing activity by foreign ships in the unpatrolled waters of the country is reported to be responsible for the destruction of important, critical habitats such as coral reefs which provide food and shelter for many species. The trawlers concentrate their fishing operations within a few kilometres from the shore and in some cases even trawl as close as 1km to the shore. At least two such vessels were reported to run aground in Puntland in the last 3 years while conducting bottom trawling. According to the Somali Fishery Law, no trawling is allowed within 5nm from shore. Pieces of broken and uprooted coral reefs are reported to be scattered along the coastline where the IUU trawlers operate. This fishing activity also damages fish populations since it generates a lot of by-catch which may eventually cause the depletion of both commercial and non-commercial species. Endangered species such as dolphins and turtles are not spared either because none of these ships fix turtle and dolphin exclusion devised on their nets. Indeed, the IUU fishing activity is the single biggest threat to the biodiversity and marine environment in the Somali waters because of the unorthodox fishing practices they employ coupled with the sheer number of vessels involved (estimated to be over 800). According to Greenpeace International<sup>v</sup>, fish stolen by IUU vessels costs Somalia a staggering US\$ 300 million/year as lost revenue. However, Greenpeace estimated only the high value fishes that the vessels capture and take away and did not include in its estimates the value of discarded fishes, the damage inflicted on the habitats and the cost of swept up and destroyed fishing gear (and by extension local fishing communities livelihoods).

b) Drift-nets: The recent introduction of drift nets in the finfish fishery also generates high discards owing to the insistence of the Yemeni boats to accept only certain type of fishes. Local fishermen set drift nets in the evening and haul them early next morning by which time the nets have gilled various types of fish – both target and non-target. In most cases, non target fishes are thrown back into the water as there are no buyers or any other means to utilize them. The nets also accidentally catch endangered species such as turtles and dolphins. Indeed, the use of drift nets have been banned in many countries due to concerns for high turtle and dolphin mortalities associated with this fishing method. Even The United nations recommended a ban on the use of large scale drift netting operations on the high seas by all member states, beginning December 31, 1992<sup>vi</sup>.

c) Lobster nets: Fishermen – both foot and embarked - use lobster nets (mono- and multi – filament) set in shallow waters to capture lobsters. In addition to catching any animal that comes their way, the lobster nets are highly destructive to the environment as they entrap and destroy corals, sponges and seaweeds which are important habitats for many organisms. The effects of lobster nets on the environment have been well documented in a study conducted in the Spanish Atlantic and Mediterranean coastlines (Goñi *et al*, 2003). In their study, the investigators compared the ecological and economic efficiency of trammel and trap fisheries

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<sup>v</sup> Source: <http://www.greenpeace.org/international/en/campaigns/oceans/pirate-fishing>, accessed on 9th April 2010

<sup>vi</sup> Source: <http://www.whaletrackers.com/education/factsheet-illegal-driftnets.html>. Accessed on 9th April 2010

of *Palinurus elaphus* with a view to determining the likely cause of the observed collapse of Atlantic *P. elaphus* and the depleted status of the Mediterranean population. They found that trap fishery was more efficient than trammel net fishery in both ecological and economic terms. They attributed the major problems affecting the populations to the introduction of the nets in the fisheries in 1960-1970s which led to the virtual disappearance of the traps. While no such comprehensive research has been done in Puntland, many stakeholders blame the extensive and indiscriminate use of lobster nets in the fishery for the declining catches observed over the last several years.

d) Wire mesh lobster traps: Seasonal lobster fishermen also use wire lobster traps which corrode easily and have an average life span of approximately 20 days after which they are abandoned in the sea, in their thousands each year. The discarded wire mesh traps pose potential environmental pollution of heavy metals resulting from the materials used to construct the traps (galvanized wire mesh sheets with Pb welding).

e) Ghost fishing: the careless discarding of disused lobster traps, gill nets and other fish gear in the sea, which is common practice among the fishermen, is another problem that contributes to the environmental ills bedeviling the country. Because of their synthetic makeup, modern nets do not disintegrate easily and as such can stay intact for many years. Lost and/or carelessly discarded gill nets continue catching fish indiscriminately for years and years for no one but the ghosts thereby decimating whole populations in the process.

### **5.3 Value chain analysis**

The value chain describes the full range of activities which are required to bring a product or service from conception, through different phases of production, delivery to the final consumers and final disposal after use (Kapinsky and Morris 2000). The value chain in the fisheries sector can be defined as the movement of fish from the landing beach, through the supply chain, to the final consumer taking into the consideration the whole range of activities and the subsequent value addition undertaken by different stakeholders at various levels of the chain in lieu of a profit accruing to them from their operations. Value chain analysis can be a useful analytical tool in understanding the transition process undergone by a product (or service) before it is consumed, the value adding transactions involved and the key actors engaged in the chain. In the case of Puntland fisheries sector, however, a full value chain analysis cannot be done due to the fact that fish marketing is not well developed and that producers and consumers in most cases deal with each other without involving other intermediaries. Despite this shortcoming, an attempt will be made to analyze the current marketing channels, domestic and export supply chains, key actors involved in these chains and other relevant issues.

#### **5.3.1 Key actors in the domestic and export supply chains**

There are several actors in both domestic and export market chains who engage in various activities in lieu of returns accruing to them. These actors have defined roles specific to the activities they perform and/or services they provide within the chains. Based on their roles and responsibilities the actors present in the chains are as follows.

- Fishermen (producers)
- Fish mongers
- Village traders (shark products)
- Exporters (fresh fish, lobsters, shark products)
- Fish canneries
- Ice plants and cold storages

- Distributers of canned fish
- Wholesalers of canned fish
- Traders/retailers of canned fish
- Service providers

### **Fishermen (producers)**

This group forms the largest number of actors in the chain as it comprises the fishermen (producers) who can be further divided into embarked fishermen, foot fishermen and boat owners. Embarked fishermen are those who are hired to work on the boats of other people as they are too poor to buy their own boats. Foot fishermen are mostly pastoralists and IDPs who work on foot targeting lobsters in shallow waters during the fishing season. The latter group may also contain traditional fishermen who set their nets in the inshore areas mainly for subsistence fishing.

Foot fishermen keep the proceeds from the sale of their catch since they work individually on foot. They do not incur operating cost other than personal expenses. In contrast, embarked fishermen are paid on the basis of 50% of the total earnings generated through the sale of the catch per fishing trip after deducting the variable cost of the operation. The fishermen's share is distributed equally among the members who participated in the operation including the skipper of the boat who further gets a half of a crew's share more as a responsibility allowance from the boat owner's share. The average daily earning for individual fishermen depends on the amount and price of fish landed which in turn depends on the season, size of boat and gear employed. Table 7 presents the average catches landed by fishermen targeting pelagic fish on three different days categorized as good, average or bad on the basis of the prevailing weather and sea conditions.

Owners of the fishing boats also supply them with fishing gear (i.e. nets, hooks, etc) and other necessary equipment. They get 50% of the total earnings generated through the sale of the catch per fishing trip for their investment which may initially run into thousand of US dollars (see Table 4). Generally, boat owners do not accompany fishermen on fishing trips though there are instances where the owner also doubles up as the boat skipper but in this case he gets one share from the fishermen's 50% of the earnings like an ordinary crew member in addition to his 50% share of the proceeds. Even when the owner does not act as the skipper, he is still fully involved in the day to day running of his boat for he makes all the preparations on the ground including supplies and inputs required for fishing operations. He is also responsible for the sale of the catch at the landing beach and sharing out the proceeds among the crew members and the boat.

**Table 7 Average catches landed by embarked fishermen targeting pelagic fish based on the prevailing weather conditions.**

| Boat type    | Fishing method | Cost of operation per fishing trip | Catches       |                  |              |
|--------------|----------------|------------------------------------|---------------|------------------|--------------|
|              |                |                                    | Good day (Kg) | Average day (Kg) | Bad day (Kg) |
| Leyla Alawi  | Trolling       |                                    | 900           | 210              | 30           |
| Afdheer      | Drift netting  |                                    | 1,200         | 450              | 150          |
| Volvo (8.5m) | Drift netting  |                                    | 2,200         | 750              | 220          |

### **Fish Mongers**

Actors in this group are mostly IDP women and single mothers from local communities who eke out a living from selling fish mostly in Bosaso but also in other major towns. Members of



this group are the poorest among the actors in the chain. They buy fish from the fishermen at the landing beach and then sell it as either fresh or fried to the public at a small profit to support their families. They also act as agents for other women fish sellers and restaurant owners in Qardho, Garowe and Galkayo towns who give them a small commission for every consignment of fish they deliver. Due to lack of sanitary awareness, these women keep fish under unhygienic conditions often placing them on dirty surfaces; oblivious to the danger of contamination. Even though there is a high demand for fish in the local market, many potential customers shun buying fish from these women for fear of contracting diseases from eating the fish. As a result, these women play a minor role in the chain since the amount of fish they sell accounts for less than 10% of the daily landing in Bosaso. On average, each of these women makes about 6 dollars per day but in some cases may even make losses amounting to her entire meagre savings due to fish going stale before it is sold.

### **Traders (shark products)**

These actors are traders in the villages who buy shark products from the fishermen and then sell the same to the exporters who are based in Bosaso. These traders also sell fishing gear and other inputs and thus provide a vital supply of goods which are otherwise unavailable in the villages. In most cases, fishermen obtain the inputs they need for their fishing operations from the traders on credit with the tacit agreement that they will exclusively sell their catches to the concerned trader. These actors make a net profit of US\$2.5 and US\$0.25 respectively from each kilo of shark fin (large size) and dry meat they sold to the exporters in Bosaso.

### **Exporters (fresh fish, lobsters, shark products)**

There are three different actors in this group namely, the Yemeni boat operators, lobsters traders and shark product exporters.

- a) The operators of the Yemeni boats are mostly Somali traders who in the past operated the boats through direct hire and/or profit sharing agreements with the Yemeni owners but now own more than ½ of the estimated 120 boats that shuttle between Somalia and Yemeni during the fishing season ferrying fresh fish on ice. However, they opted to register their boats in Yemen in order to get access to that country's seafood market where there is a high demand for fish occasioned partly by the establishment of several fish canning factories in Mukalla over the last 10 years and partly by the reshipment of king fish and demersal fishes to Saudi Arabia. Both the initial investment and cost of operation of these boats are very high. For example, the initial capital needed to buy a new boat is between US\$75,000 and US\$95,000 depending on the size of the boat. The cost of operation for this boat per trip is also estimated to be US\$7,400 excluding the cost of fish which can be as high as US\$20,000. The boat makes 3 fish collection cycles per months from which the businessman can make approximately a net profit of US\$4,500 (i.e. US\$1,500 per trip). This constitutes approximately a third of the profit margin (i.e. US\$5000) the traders used to make from each trip a couple of years ago when the number of boats shuttling between Somalia and Yemen were fewer. Operators interviewed attributed this problem to the proliferation of the boats, in uncontrolled manner, which compete among themselves to flood the market with fish without regard to the prevailing demand on the Yemeni market. The lack of coordination among the Somalis has given the Yemeni fish buyers an opportunity to form cartels that set fish price at will often in their favour knowing very well as they do that the Somalis will accept whatever price they are offered as they cannot keep the perishable fish for more than a few days. The Somali operators see this as exploitative tactics on the part of the Yemenis but all the

same cannot muster the courage to challenge the status quo since they do not have alternative markets.

There is another group of Yemeni boats that do not buy fish from the local fishermen but carry out fishing on their own as they bring with them Yemeni fishermen who seem to be more skilled than their Somali counterparts. These boats hire the services of local sponsors who get between US\$500 and US\$1000 from each boat as facilitation (protection) fee while they are in the Puntland waters fishing for groups, snappers, emperors and other demersal fishes. Although these Yemeni fishermen employ hook and line fishing method which is selective, they nevertheless use bigger and more powerful boats as well as GPS technology that enable them to continuously fish at offshore reefs that are beyond the reach of the locals. These offshore reefs have largely remained unfished with near pristine conditions and are therefore home to larger specimens who act as the seed bank of the populations. The targeting and constant removal of larger fishes by these fishermen will in the long run lead to a severe loss of biodiversity and disruption of the coastal communities' livelihoods given the slow growing, late maturing nature of these animals and their vulnerability to heavy fishing pressure.

- b) The lobster traders are the pioneers of fish trade in Puntland having started exporting lobster tails to Dubai in early 1990 which at one time become the number one foreign exchange earner ahead of livestock exports. However, both the number of traders involved in this business and the quantity of lobsters exported has decreased over the years owing to the dwindling lobster catches which have resulted in many companies to go bust. Currently, there are only 11 lobster processing and exporting companies in Puntland down from more than 100 companies in the heydays of the 1990s. Like the Yemeni boat operations, the initial investment required to set up this business is relatively high (over US\$100,000) because of the need to acquire refrigerated trucks, boats, diving equipment and other fishing inputs not to mention the cash to buy the raw material. The operating cost is also very high mainly due to the habit of the traders to start operations at the start of the fishing season (October) and continuously operate without interruption until the end of the fishing season (April) even though there are strong winds that interrupt lobster fishing intermittently during the months of December and January. The traders make about US\$3/kg of lobsters tail exported to Dubai based on the current market price of US\$25/kg. However, they can increase their profit margins if they start their operations in mid February rather than October as is the case now. This will also go a long way in the conservation of this important resource as it will allow breeding females to shed their eggs undisturbed. The breeding season for lobsters falls within the northeast period which also happens to be the lobster fishing season but the majority of females breed in the October – December period. The traders are accused of being responsible for the overfishing of the lobster stocks because of their eagerness to accept berried females and undersized lobster from the fishermen.

By adopting the shorter fishing season, the traders can in fact export more lobster in terms of weight at much cheaper production cost and thus increase their profit margins owing to the fact that the under sized and juvenile lobsters which the fishermen catch and sell to the traders in the early part of the fishing season will have grown to adult size by mid February had they been left alone. Similarly, the berried females will also have shed their eggs and grown bigger by that time having channelled energy to somatic growth once gain after releasing their larvae.

- c) Shark product exporters are the Bosaso based businessmen who export dried shark meat and fins to overseas markets. Shark fins are air freighted to the Far East countries especially Hong Kong while the dried shark meat is transported by road up to Kismayo and then by boat to Mombasa which is the biggest market for dried shark meat in East Africa. Exporters of the shark fins had used to sell their products through middlemen in Dubai in the past but have in recent years established business relationships with their counterparts in Hong Kong with whom they now directly deal under binding contracts. This has made the export of shark fins much easier and more profitable for the exporters compared to the previous years when the product was sold in Dubai. In contrast, the export of dried shark meat is fraught with logistical and security problems as a result of various roadblocks through which the product must pass before it reaches Kismayo. Even in Mombasa, the traders often encounter problems as they do not often have valid documents permitting them to legally import their products into Kenya.

There are no much overheads in this business other than storage and transport costs but the working capital is very high because of the price of the fins whose purchase price in Bosaso is US\$100/kg. On average, traders make a profit of about US\$20 per each kilo of shark fins (large size) they export to Hong Kong.

### **Ice plants and cold storages**

These actors comprise two privately owned cold storages and seven VSF Suisse and FAO implemented ice plants. The latter facilities are operated by local businessmen under a PPP agreement. As has been mentioned earlier, the ice plants and cold storages are not currently playing a significant role in the wider domestic and export chains. However, they have a potential if complimentary infrastructure is implemented in the bigger towns which can serve as outlets for their products.

### **Fish canneries**

Actors in this group are the most important actors in the domestic chain in terms of capital investment, production and employment creation. There are currently three fish canneries in Puntland namely, Las Qorey, Kandala and Habo. Las Qorey is the oldest of the three having been established in the year 2000. It is also the biggest in terms of capital investment, production capacity and the number of people employed. Kandala is a small family run cannery and its products have been on and off the market since its establishment in 2003. Habo is a newly established factory which is in the process of starting production having undergone successful tests in the last two months (March and April). The capital investment required to set up these factories is very high and so are the variable cost to run them. For example, the shareholders of Las Qorey cannery pooled US\$4.3 million to put up the fixed capital like plant machinery, building, ice plants, cold storages, etc. Additionally, several hundred thousand US Dollars are required for the monthly variable cost in terms of purchase of raw product, salary, consumables and other overheads. As a result, there are very few actors in this segment. Because of supply constraints, most of these factories are not operating at full capacity and therefore their profits are eroded by fixed overheads which are incurred regardless of the capacity at which they operate. There is also a stiff competition from cheap imports which sometimes force the canneries to sell their products at production costs in order to maintain their market share.

### **Appointed distributors of canned fish**

These actors are the big import and export companies who also act as appointed distribution agents for the fish canneries with whom they have binding agreements which give them

monopoly to sell the canneries' products as primary distributors. In return, they are required to pay in advance for their orders at the beginning of each fishing season. The agents do not incur operating costs other than fixed overheads which are charged equally to all commodities sold in their stores. However, a large working capital is needed to meet the requirement by the canneries to get payments for the goods in advance.

### **Wholesalers of canned fish**

These are the wholesalers in Bosaso and in other big towns who buy canned fish from the appointed distributors and then sell the product as wholesale to the retailers. Unlike the distributors, actors in this segment are not required to pay for their orders in advance but to settle their invoices on delivery of goods. Bosaso based wholesalers have the freedom of procuring their orders from the distributors on daily basis and as such only need to set aside a small working capital to deal in this product. In contrast, the wholesalers who are based in other towns need to have a relatively higher working capital as they have to buy their requirements in bulk in order to minimize the cost of transportation and other overheads.

### **Retailers of canned fish**

These actors are the owners of kiosks and other small shops in big towns and small villages across Puntland where canned fish and other products are retailed. And as such they form the last link of the marketing chain of the canned fish. A large working capital is not required in this segment though the overheads are high because of the size and slow turnover of the business.

### **Service providers**

These are the providers of essential supplies and services such as spare parts, fuel, fishing gear and other inputs. Although they are not directly linked to the chains, they nevertheless play a crucial role in the wider fisheries sector.

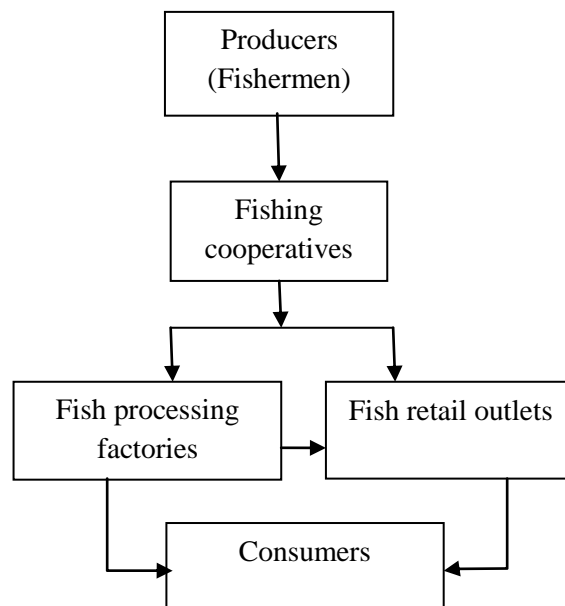
### **6.3.2 Domestic and international fish supply and marketing channels**

Fishing has not traditionally been an accepted economic activity for the Somalia people and in fact as recently as 40 years ago members of the traditional fishing communities were looked down upon to the extent that they were not allowed to marry into pastoralists and other non-fishing communities. Fish consumption was therefore limited to the fishing families and those living close to the coastal landing places. Fish trade was as well confined to the exporting of dry-salted shark products mainly to East Africa. However, the establishment of fish canneries and cold storage complexes at various locations along the coastlines from 1969 onwards and the subsequent fish eating campaigns carried out in Mogadishu and on the national radios had led to unprecedented improvement in domestic fish consumption. Through these facilities, good quality fish was made available to the public encouraging many people to include fish in their diet for the first time in their lifetime. Similarly, marketing of fish products also improved countrywide with the availability of ice and refrigerated trucks which allowed fish to be transported to the hinterland cities and towns where there were no ice, freezing and storage facilities. As a result, per capita fish consumption in the country has increased by 10 fold from 0.6 in 1970s the current to 1.6kg/year.

Prior to the fall of the Government in 1991, all the fish catch was primarily marketed domestically as the Government made little effort to export other than small shipments of lobster to Europe (primarily to Italy) and shark fin to the Far East. By law, all fishermen were required to sell their catch through fishing cooperatives to fish processing factories and/or

designated fish retail outlets which in turn sold the fish to the general public. The marketing chain was therefore short but well-structured comprising five stakeholders namely, producers, middlemen, wholesalers, retailers and consumers (Figure 1). As depicted in the Figure, there were three intermediary stakeholders between the producers (fishermen) and consumers (the general public) i.e. the fishing cooperatives which acted as middlemen, fish processing factories which acted as both wholesalers and retailers, and designated retail fish outlets which acted as retailers. Since both lobsters and shark products have never been consumed domestically, the marketing chain depicted in the Figure involved only finfish which was sold to the consumers as either fresh, or frozen or canned. However, this marketing channel ceased to function due to collapse of the Government and subsequent disintegration of the fishing cooperatives and looting of the country's fishery infrastructure including cold storages, ice plants and refrigerated trucks.

In Puntland, marketing of fishery products was marginal both domestically and internationally until local businessmen started exporting lobster tails to UAE in the early 1990s which at one become the number one hard currency earner for the State ahead of livestock exports. The businessmen have since widened their involvement in the fisheries sector and invested in fish canneries, cold storages, and transport boats with insulated fish holds. The establishment of ice plants at seven locations along the Indian Ocean coastline by the VSF Suisse and FAO as part of their tsunami intervention has further improved the post harvest fishery infrastructure in Puntland. The availability of this infrastructure and transport facilities has made possible for the businessmen to export large quantities of fresh fish to Yemen and intermittently frozen fish to Oman, UAE and Iran.



**Figure 1 Supply and marketing chain of finfish in pre-war Somalia**

In spite of the improvement in the marketing of fishery products in neighbouring countries over the last couple of years, there has been little or no improvement at all on the domestic front with fish (with the exception of canned fish) still not readily available in the major urban centres including the coastal city of Bosaso which ironically has the biggest fish landing beach in Puntland. Stakeholders interviewed for this study cited the absence of complementary post-harvest-fishery infrastructure in urban areas as the biggest obstacle to the development of an effective domestic fish marketing and distribution network in

Puntland. The majority of the existing cold storage facilities and ice plants are located at remote coastal villages and/or towns and none has even one single outlet in the bigger towns making it very difficult for them to market their perishable products in these towns where there is a high demand for fish. Currently, only 40% of the installed potential capacity is being utilized because of lack of markets. The existence of a high demand for fish in Puntland is indicated by the importation, production and high consumption of canned fish which is available even in small villages deep in the hinterland. Because of the perishable nature of the fresh and frozen fishery products and the lack of complementary facilities in the major urban centres coupled with the poor condition of the trunk and feeder roads linking the coastal villages with the urban centres, many potential businessmen are reluctant to venture into wholesaling and retailing of fish in the domestic market for fear of losing their investment. As a result, domestic fish trade is rudimentary and still confined to the coastal areas where the catches are landed.

### **5.3.3 Supply chain in domestic market**

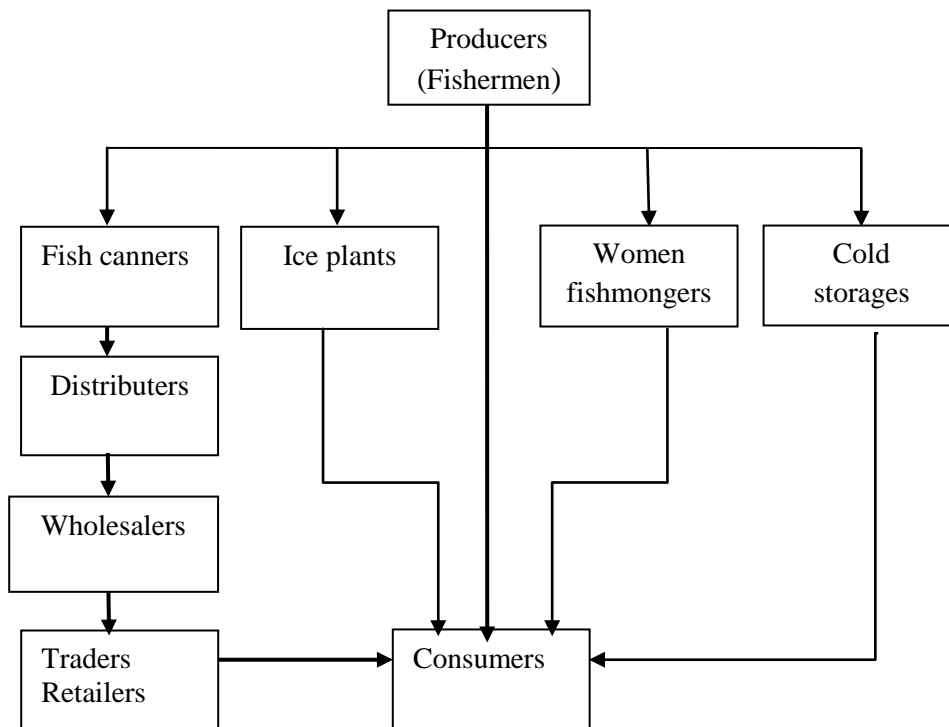
The supply chain involves only finfish as lobster and shark products have never been consumed locally. Because of the factors highlighted above, domestic fish marketing is not well entrenched in Puntland and as a result there are generally no intermediary stakeholders between the producers and consumers operating in the chain. Even in Bosaso which has the biggest landing beach and therefore the biggest domestic fish market, the bulk of the landed catch is sold directly to the general public at the landing beach without the involvement of any intermediary stakeholders. Even though there is a group of women fishmongers who act as middlemen at the landing beach, most fish buyers prefer dealing directly with the fishermen mainly due to quality concerns. Because of this, less than 10% of the landed catch goes through these women who are mostly IDPs from the south and who eke out a living from selling fish to the public at a small profit. Elsewhere along the coastline, fish landed for domestic consumption is rarely sold but distributed among the villagers who happened to be at the beach at the time of landing as per the local marine norms especially when there are no outside buyers. Any surplus of tuna and king fish is smoked and later sold in Bosaso or exported to Yemen.

With the exception of the fish canneries, the existing facilities currently do not play a significant role in the wider domestic supply chain, though they are important in the long run, owing to the difficulties highlighted in the preceding sections. In contrast, marketing of locally produced canned fish is well established compared to other products as it involves various actors through whom the product passes before it reaches the consumer. Factory appointed distributors, wholesalers; traders and retailers are the intermediary stakeholders between the fish canneries and the consumers in the marketing chain of locally produced canned fish. Generally, the domestic fish supply chain can be depicted graphically as follows (Figure 2).

### **5.3.4 Supply chain in export market**

Since the fall of the Government in 1991, Somali fishery products have had difficulties accessing key international seafood markets mainly due to the absence of a recognized competent authority in the country that can issue the necessary health certificates and give guarantees to the importing countries for the quality and safety of the exported fishery products. Another problem is the lack of products of appropriate quality that can compete with other products from countries with recognized competent authorities and well-entrenched inspection and quality control mechanisms. Currently, none of the existing facilities both in Puntland and elsewhere in the country is employing Good Manufacturing

Practices (GMP) let alone HACCP and ISO quality control procedures and because of this their products cannot satisfy the stringent quality standards required for export of fish (e.g. the European Council Directives, USDA and other food safety standards). As a result, the country's fishery exports have been limited to a few low-volume-high-value products such as frozen lobster tails and shark fins which always have a high demand on the international markets.



**Figure 2** Supply and marketing chain of finfish (fresh, frozen or canned) in the domestic market

In recent years, however, Puntland businessmen have made inroads into the seafood markets of neighbouring countries especially in Yemen where they export large quality of fresh fish on ice during the fishing season using boats with insulated fish holds which are locally known as the Yemeni boats. There have also been intermittent exports of frozen fish to Oman and Iran with little success as issues concerning the quality of the products were raised on several occasions by these countries. Concerns about the quality of Puntland fishery products are not limited to the frozen fish as there have also been similar insinuations when whole consignments of some Yemeni boats were almost rejected on quality grounds. Even the frozen lobster tails exported to UAE are subjected to reprocessing and repacking as they cannot satisfy in their original form the high quality standards required by importing countries in America and Europe. As has been noted in the preceding sections, the lobster tails are frozen and stored in refrigerated trucks that serve as both deep freezers and cold storages due to limited freezing space causing the frozen tails to develop black spots as a result of temperature fluctuations occasioned by mixing of the day's catches with frozen tails from previous days.

Ice plant operators and managers of fish canneries interviewed for this study attributed the problem of low product quality to the reluctance of the fishermen to carry ice and chill fish

onboard which often lead to the landing of fish at an advanced stage of spoilage. However, neither the existing facilities nor the Yemeni boats supply ice to fishermen for free or at a discounted price and as such local fishermen may not introduce ice into their fishing operations any time soon due to its high cost which they cannot recoup from the sale of chilled fish since most fish buyers in Puntland are not ready at this point in time to pay premiums on quality. Trading in fish is always fraught with unique problems owing to the delicate nature of the product which can spoil very quickly unless properly handled, processed, frozen and stored following relevant international standards.

For the quality of Puntland fishery products to improve, all stakeholders need to work together and introduce the necessary measures including HACCP and ISO quality control procedures. More importantly, fishermen need to be trained on modern fish handling techniques including the need to chill fish as soon as it is caught. Indeed, the role of the fishermen in ensuring fish quality cannot be overemphasized since they are the first persons in the supply chain in which every link must help maintain top quality

Like the domestic fish supply chain, there are no stakeholders between the producers and exporters in the export supply chain with the only exception being in the marketing of shark products where village traders act as middlemen between the fishermen and the exporters. In contrast, lobster traders and Yemeni boats directly deal with fishermen whom they give incentives such as discounted fuel, food and fishing inputs in order to secure the monopoly to buy their catches throughout the fishing season. Managers of Fish canneries, cold storages and ice plant regard this practice of giving incentives to the fishermen especially by the Yemeni boat operators as unfair competition intended to undercut them. At the heart of the dispute is the price of fuel which the Yemeni boat operators sell to the fishermen at US\$50/drum (200liters) as opposed to prevailing market price of US\$170/drum. The operators procure their fuel directly from Yemen duty free and then sell to the fishermen at purchase price without even charging transport costs. They neither pay applicable import duties nor other local taxes unlike other traders who import fuel through the Bosaos port and who as a result pay all applicable duties and taxes. In contrast, fish canneries, cold storages and ice plants get their fuel supply from the market and cannot therefore afford to sell it at US\$50/drum without incurring huge losses. Because of the cheap fuel and other incentives, fishermen sell their catches exclusively to the Yemeni boat operators despite the fact that fish canneries, cold storages and ice plants accept all the landed catch and offer similar prices.

In most cases, exporters of lobster and shark products have binding contracts and/or business relationships with importers unlike the fish exporters who haphazardly take their products to the external markets without confirmed orders from the buyers. This is particularly more so with the Yemeni boat operators who are not organized and who compete among themselves to oversupply the markets with fish without considering the prevailing market demand for their product.

#### **5.2.4 Value addition in the domestic market**

In a long and well-established supply chains where there are many intermediaries between the producers and consumers, value addition starts from the first dealing of fish at the landing site and continues up to the consumer increasing along the way as it passes through different intermediaries. In Puntland, however, value addition is either small or nil for fresh fish in the domestic fish market due to the fact that fish marketing is not well developed and that producers and consumers in most cases deal with each other without involving other intermediaries. In the few cases where there is an intermediary actor (e.g. women fish



mongers) between the fishermen and the general public, the value added is so small that it does not warrant a full analysis. For example, a 5kg fish sold by women fish mongers as by piece at the Bosaso landing site with an initial purchase price of US\$5 accumulates a value addition of only 4.5% between the fishermen and the customers even when 2% municipal tax is included.

As has been mentioned before, marketing of canned fish is relatively well entrenched in the country in comparison with fresh and frozen fish with a sizeable number of intermediaries operating between the canneries and consumers. An attempt is therefore made here to analyze the value added to the product along the supply chain in terms of costs and margins for the different actors based on a carton (48p x 185g) of Las Qorey canned tuna fish sold in Bosaso (Table 8). Such a carton costs UD\$29.6 to produce at the factory and is retailed in Bosaso at an equivalent of US\$60 in Somali Shillings. This shows that the carton accumulates a total value addition of US\$30.4 (or 103%) as it passes through different actors along the supply chain between production and consumption. Of the total value added, US\$20.2 is added as profit margins for the actors and the rest (US\$10.2) as overheads and sales tax. Among the intermediaries, the retailers earn the highest profit margin (US\$10.0) followed by the factory (US\$8.4). These two marketing levels also account for more than 93% of the total value added to the product. The distributors and wholesalers receive the lowest profit margins of US\$0.9 each. Similarly, the value addition taking place at the latter two marketing levels is also small representing only 6.6% of the total value added to the product.

**Table 8 Costs and margins for the actors involved in the production and marketing of a carton of Las Qorey canned tuna sold in Bosaso**

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

\*Share of value addition = (value added at market level/Total value added) \*100.

## 6. Constraints

Despite its ever increasing significance, the Puntland artisanal fisheries subsector and indeed the wider Somali fisheries sector as a whole is currently facing various challenges that may

affect its long term viability if proper and coordinated interventions are not done. These problems may include but not limited to the following:

- Irrational and unsustainable exploitation of the fisheries resources by IUU foreign fishing vessels and by local fishermen who target coastal resources.
- The lack of fisheries infrastructure particularly jetties, fish markets, feeder roads and airstrips as well as complementary post harvest facilities in the bigger towns that can serve as outlets for the existing facilities on the coastline.
- The absence of governance and a regulatory fisheries management framework.
- The lack of local and international marketing outlets
- The absence of credit facilities for the stakeholders
- The lack of certification mechanism owing to the absence of a competent authority in the country.
- Fishermen's lack of modern fishing techniques including fish handling and preservation
- The lack of products of appropriate quality that can access international markets.
- Direct and indirect negative effects of the activities of piracy and anti-piracy foreign navies

## **7. Recommendations**

Although some of the challenges listed above require the attention and intervention of the central Government, the consultant believes that the Puntland Government through its Ministry of Fisheries can address the most pressing issues currently affecting the subsector if it takes a proactive leading role by mobilizing its own resources and support of the partner agencies. It is therefore recommended that:

- The Ministry of Fishery should as a matter of urgency take the necessary steps to introduce and enforce the State's fisheries regulations in a systematic manner involving all the stakeholders in order to stem the problem of overfishing and irrational exploitation of the coastal fisheries resources.
- The Ministry of Fisheries should also take charge of the existing data collection and at the same time explore ways to reciprocate it in other parts of the coastline. In order for the fisheries monitoring programme to succeed, the Ministry should:
  - a) Take inventory and register all fishing boats within the State's boundaries.
  - b) Provide proper training on fisheries monitoring and data collection to its extension workers and data collectors.
  - c) Register and license all fishermen in the State.
  - d) Designate specific sites as fish landing beaches.
- The Ministry of Fisheries should liaise with other relevant Puntland authorities and advocate for the banning of importation and use of any fishing gear deemed destructive. These may include but not limited to monofilament nets and wire mesh traps.
- Fishing Associations should be reorganized and consolidated through free and fair elections of the board of directors.
- The Ministry of Fisheries should put in place the necessary legal framework requiring all fishermen to register with and become members of the existing fishing associations.
- There is an urgent need to conduct stock assessment, surveys and other relevant studies in order to establish status, distribution, abundance and fishery potential of the key target species known to be vulnerable to fishing pressure such as lobsters, sharks, groupers and other demersal fishes.
- Proper and relevant training should be provided to fishermen in order to enhance their skills.

- Fishing communities should be encouraged to initiate campaigns once in a while to collect and remove discarded fishing gear from the sea. Cash for work programmes funded by partner agencies may be used to fund communities' campaigns.
- By creating the necessary awareness, fishing communities should be encouraged to take part and have a bigger say in the conservation of the resources upon which they depend for their livelihoods.
- The businessmen involved in the fish trade should be sensitized and encouraged to play a role in the conservation efforts.
- The Ministry of Fisheries should with the support of the partner agencies embark on the implementation of the necessary infrastructure in the fisheries sector starting with the construction of complementary facilities such as cold storages, ice makers, etc. in major towns which will boost the domestic fish trade by serving as market outlets for the existing post harvest facilities along the coastline.
- The Ministry of Fisheries should regulate the operations of the Yemeni boats in order to safeguard the interests of the operators and at the same time protect the ice plants and other facilities from unfair competition practices.
- A proper and useful way must be found to stem the problem of fish discards by encouraging establishment of fish meal production for use in livestock/poultry industry.
- The Ministry of Fisheries should develop the necessary guidelines Good Manufacturing Practices (GMP) for handling, retailing, and processing of fishery products in the State in order to ensure product quality.
- Owners and managers of the existing facilities especially the fish canneries and cold storages should adopt GMP and other quality control systems in their operations to improve the quality of their products.
- Private sector should be encouraged and facilitated to invest in the domestic fish trade.
- The PPP model adopted for the ice plants should be strengthened and replicated in other relevant areas that are deemed important to enhance not only public private cooperation but also profitability of the concerned enterprises for the benefit of all stakeholders.
- The Puntland Government should impose high tariffs to canned fish imports in order to protect the nascent local fish canneries from unfair competition.
- The Ministry of Fisheries should with the support of the partner agencies explore the possibility of establishing a certification mechanism for the Puntland fisheries products akin to that of livestock sector.
- A series of stakeholders meeting should be organized to discuss the above-mentioned challenges and to chart the way forward for the fisheries sector.
- The Puntland Government should seek the support of the international community to combat the twin menaces of IUU and piracy.

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## **9. Annexes**

- 9.1 Annex 1. Terms of references