Somalia Fisheries:

Untapped Potential Held Back By Skills Shortage

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ABBREVIATIONS AND ACRONYMS

ARC	American Refugee Council
DFI	Development finance institution
EEZ	Exclusive economic zone
FAO	Food and Agriculture Organization
FGDs	Focus group discussions
FGS	Federal Government of Somalia
FMS	Federal member state
GDP	Gross domestic product
HACCP	Hazard analysis and critical control points
KIIs	Key informant interviews
IDPs	Internally displaced persons
IFI	International financial institution
INGOs	International non-governmental organizations
IOTC	Indian Ocean Tuna Commission
IUU	Illegal, unreported and unregulated
LME	Large marine ecosystems
LNGOs	Local non-governmental organizations
MCS	Monitoring, control and surveillance
MoFMR	Ministry of Fisheries and Marine Resources
MoPIED	Ministry of Planning, Investment and Economic Development
MSY	Maximum sustainable yield
NDP	National Development Plan
PGD	Postgraduate diploma
SCLME	Somali Current Large Marine Ecosystem
SGS	Société Générale de Surveillance
TVET	Technical and vocational education and training
UAE	United Arab Emirates
UGD	Undergraduate diploma
UN	United Nations
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Program
USSR	Union of Soviet Socialist Republics
VSF – CH	Vétérinaires Sans Frontières – Switzerland

EXECUTIVE SUMMARY

This report presents the findings of a study conducted in the federal member states of Puntland, Galmudug, Hirshabelle, South West and Jubaland as well as the Banadir region. It is part of a wider research project on the state of human capital development in Somalia, with a special emphasis on the important sectors of agriculture, education, fisheries, health, labor and livestock. The project, funded by the Somalia Stability Fund (SSF), was implemented by a consortium comprising the Heritage Institute for Policy Studies (HIPS) and City University of Mogadishu. The overall objective was to develop an inclusive, indigenous and sustainable human capital development strategy for Somalia based on the outcomes of detailed assessments of relevant sectoral components. This strategy is intended to serve as a guide for Somali authorities and their development partners when drafting national human resources development plans for the individual sectors.

This study assesses the current status of the fisheries sector. It looks at: existing skills development initiatives and their relevance to the needs of the sector; local institutions of higher learning and the quality of their fisheries-related academic programs; other providers of training relevant to fisheries; the job readiness of local graduates; and challenges affecting human capital development in this sector. The study employed a combination of techniques to collect qualitative and quantitative data including key informant interviews (KIIs), focus group discussions (FGDs), observations and self-administered questionnaires. The study conducted a total of 16 KIIs and 14 FGDs involving 107 individuals selected to represent a wide range of stakeholders in the fisheries sector and academia.

The key findings of the study are as follows:

- While the fisheries sector is underdeveloped at present, it nevertheless supports over 400,000 Somalis who depend upon it for their livelihoods, income and employment.
- The contribution of the sector to the national economy is tiny (around two percent of gross domestic product) but it has the potential to be one of the largest and most profitable fisheries in the world if fully developed.
- Domestic fish production is exclusively based on the artisanal fisheries subsector since industrial catches are not landed in Somalia.
- The industrial subsector is dominated by illegal, unreported and unregulated (IUU) fishing, which costs the country hundreds of millions of dollars each year in lost revenue.
- Within the artisanal fisheries subsector, there are three major fisheries (lobster, shark and finfish) of which the finfish fishery is the largest in terms of production, employment opportunities and revenue generation.
- Challenges facing the sector include: poor infrastructure; inadequate cold chain facilities and onshore support services; limited access to international markets; lack of reliable data and nationwide data collection system; IUU fishing and unsustainable exploitation of resources; lack of monitoring, control and surveillance (MCS) capability; the absence of sector-oriented policies and strategies; weak institutional and legal frameworks; acute shortage of skilled manpower; and limited investment.

- The most serious challenge is the shortage of a skilled workforce as this affects both the fishing industry and the institutions tasked with the management, development and conservation of fisheries resources.

- A sector-wide skills shortage of over 70 percent currently exists, and the most in-demand jobs are those that require technical qualifications or extensive hands-on industry experience.

- Several factors are responsible for the skills shortage, including the abrupt cessation and belated reintroduction of maritime and fisheries education; an exodus of fisheries professionals from the country at the height of the civil war; a graduate skills mismatch; and the absence of government-funded and sector-oriented technical and vocational education and training (TVET) programs, colleges and universities.

- A total of six institutions of higher learning, comprising five universities and one diploma-awarding technical institute, currently provide maritime and fisheries education in the study area.

- These six institutions offer a total of 12 fisheries-related academic programs, consisting of 11 undergraduate courses and one postgraduate diploma course.

- A total of 352 students are currently enrolled in the 12 academic programs, comprising 333 males and 19 females. A further 119 students have graduated from local institutions, with a similarly skewed gender ratio.

- Analysis of student enrollment by course reveals that 239 (out of 352) students are enrolled in four undergraduate courses in marine and fisheries sciences, making these courses the most popular field of study. A further 86 students are pursuing a degree in fisheries science either as a standalone course or in combination with nautical science or marine environment. The rest of the students (27) are enrolled in the undergraduate courses of maritime law, and marine navigation and mechanics.

- There is a high unemployment rate among maritime and fisheries graduates, with only nine percent of alumni having secured jobs in their field of study. Managers of fishing companies and government officials interviewed for this study attributed graduate unemployment to a mismatch between the kind of training the graduates received at their alma maters and the current skills needs of the fisheries sector.

- The study revealed several infrastructural, technical and financial challenges facing the six institutions that negatively affect the quality of their academic programs and the job readiness of graduating students. These include: inadequate teaching and learning facilities; limited number of qualified teaching staff; limited fields of study and courses not tailored to market needs; lack of financial resources; limited research and publishing capacity; lack of standards and quality assurance systems; and graduate unemployment

- Analysis of employees of the ministries of fisheries and marine resources at the federal and state level shows an acute shortage of maritime and fisheries professionals, with only 19 out of 274 staff holding qualifications related to fisheries.

Based on its findings, the study proposes a five-point strategy (with various interventions) to develop the current and future skills needs of the fisheries sector:

1. Improve FGS and FMS laws, regulations and policies to optimize fisheries management for economic growth and employment creation

2. Promote, support and facilitate private investment in the fisheries sector

3. Address skills shortages and gaps in the fisheries sector through improved quality of education and training

4. Create a maritime and fisheries graduate employment initiative as a means of enhancing employability and job prospects post-graduation

5.. Establish, consolidate and improve the capacity of fishing cooperatives to co-manage all coastal fish stocks and other marine resources.

1.0 INTRODUCTION

Somalia is endowed with diverse and rich fisheries resources thanks to its highly productive coastal and upwelling systems. The national fisheries sector is still underdeveloped but is nevertheless very important as it provides food, livelihood, income and employment opportunities for over 400,000 Somalis who directly or indirectly engage in various activities in the fisheries value chain and related services.[1] It is also a major source of protein for many internally displaced persons (IDPs) and other urban poor (especially those living in coastal areas) who cannot afford the basic traditional staples of meat and milk due to high inflation. At the national level, the fisheries sector generates $135 million in value per year, which is equivalent to around two percent of gross domestic product (GDP).[2]

Although the sector has seen significant growth over the last 30 years, both in terms of fish production and fisher population, its overall contribution to the national economy is still very small compared to the contributions of agriculture and livestock. However, it has the potential to be one of the largest and most profitable fisheries in the world if fully developed, considering that the current annual catches represent only a small fraction of the country's estimated fishery production potential of over 800,000 tons per year.[3]

Renewed interest from investors and development partners is expected to keep the sector's growth on an upward trajectory over the medium to long term. However, there are a number of challenges that could impede growth and threaten the viability of the sector in the long run if urgent measures are not taken to address them. These include: poor infrastructure and inadequate cold chain facilities; limited access to international markets; lack of reliable data and nationwide data collection system; illegal, unreported and unregulated (IUU) fishing and unsustainable exploitation of resources; lack of monitoring, control and surveillance (MCS) capability; the absence of sector-oriented policies and strategies; weak institutional and legal frameworks; acute shortage of skilled workers; and limited investment. The most serious challenge is the shortage of a skilled workforce, which affects both the fishing industry and the institutions tasked with the management, development and conservation of fisheries resources.

Prior to the civil war, Somalia was able to produce a sufficient supply of job-ready, properly trained graduates with the skills and knowledge required for the maritime and fisheries sectors. However, the civil war and the ensuing periods of instability disrupted formal education, training and other skills development programs, curtailing the country's ability to meet its human resources requirements. The war also forced many technicians and professionals who were the backbone of the manufacturing and productive sectors of the economy to flee the country. Those who opted to stay behind were too few to satisfy the increased labor market demands for skilled workers.

In the fisheries sector, the cumulative effects of the emigration, mortality and retirement of pre-war trained technicians and professionals and the belated reintroduction of maritime and fisheries education (unlike other fields of study), as well as a mismatch between the training offered at tertiary institutions and the skills needs of the sector, have created a skills shortage of over 70 percent which cannot sourced from the local job market.

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[1] Anon (2011). Fish Consumption in Somalia. Food Security and Nutrition Analysis Unit, Somalia.
[2] Glaser, S.M., Roberts, P.M., Mazurek, R.H., Hurlburt, K.J., and Kane-Hartne, L. (2015). Securing Somali Fisheries. Denver, CO: One Earth Future Foundation.
[3] Ibid.

As the expected growth in the sector gathers momentum in coming years, this deficit is expected to climb even higher unless drastic action is immediately taken to address some of its root caues. Compounding the problem is the lack of a national human capital development plan that could provide strategic direction for the ministries of fisheries and marine resources at the federal and state level to develop and implement sector-oriented education, training and other capacity building programs in order to address current and future skills needs.

The pivotal role of human capital in economic development cannot be overemphasized. Economists have long recognized human capital development as a key prerequisite for a country's socio-economic and political transformation. The impressive economic development achieved by developed countries is largely attributed to their commitment to human capital development.[4]

A country's level of socio-economic development is correlated with the quality and quantity of its human resources. Japan is a good example of how human capital can be used to develop a post-war country and make it a leading world economic power within the span of a few decades, even when it does not have many natural resources. Japan has achieved its remarkable level of development by investing in and promoting the knowledge, skills and abilities of its people through quality education, training and other capacity building programs.

In Somalia, where more than three decades of instability depleted the nation's skilled workforce, the need to develop robust human capital cannot be overstressed. As the country stabilizes and becomes more peaceful, the demand for trained manpower to spearhead recovery and reconstruction efforts will increase, further exacerbating existing skills shortages and gaps in many sectors of the economy.

Having recognized and appreciated the extent of the current manpower shortages, the Ministry of Planning of the Federal Government of Somalia (FGS) has identified human capital development as one of its priority areas for action in the recently launched ninth National Development Plan (NDP) 2020 – 2024. Similarly, a consortium comprising the Heritage Institute for Policy Studies (HIPS) and City University of Mogadishu has undertaken a multi-sectoral research project with the aim of developing an inclusive, indigenous and sustainable human capital development strategy for Somalia. The research, funded by the Somalia Stability Fund (SSF) and backed by the federal and regional governments and the private sector, places special emphasis on the important sectors of agriculture, education, fisheries, health, labor and livestock.

This study covered the fisheries component of the research project.

2.0 OVERALL OBJECTIVE

The overall objective of this study was to develop a robust human capital development strategy for the fisheries sector based on the outcome of a detailed assessment of the sector and its skills needs as well as existing sector-oriented academic programs, training and other skills development initiatives in the country.

[4] Dauda, RO (2010). Role of Human Capital in Economic Development: An Empirical Study of Nigerian Case. 2010 Oxford Business and Economics Conference. ISBN: 978-0-9742114-1-9

2.1 Specific objectives

The specific objectives of the study were to:

- Conduct a detailed assessment of the fisheries sector, emphasizing the status and potential of fisheries resources, value chains, governance, skills needs and existing challenges and opportunities.
- Evaluate the relevance, quality and quantity of existing sector-oriented academic programs, training and other skills development initiatives in relation to the skills needs of the fisheries sector.
- Evaluate the capacity of institutions of higher learning that offer fisheries-related academic programs in terms of their human, financial and infrastructural resources.
- Identify key challenges and constraints facing institutions of higher learning that negatively affect the quality of their academic programs and the job readiness of graduating students.
- Identify skills mismatches, employment barriers and opportunities for local graduates in the fisheries sector.

3.0 STUDY AREA AND METHODOLOGY

This study was conducted in the federal member states of Puntland, Galmudug, Hirshabelle, South West and Jubaland as well as the Banadir region between July and November 2019. For the purpose of data collection, three federal member states (Puntland, Jubaland, South West) and the Banadir region were visited to obtain primary information from relevant stakeholders in the fisheries sector and academia. The other two states (Galmudug and Hirshabelle) were not visited due to logistical and time constraints, but data were collected through self-administered questionnaires emailed to the respective MoFMR and in-depth interviews conducted in Mogadishu with the fisheries ministers of the two states.

“A total of 16 KIIs and 14 FGDs were conducted involving 107 individuals

The study used a combination of techniques to collect quantitative and qualitative data including key informant interviews (KIIs), focus group discussions (FGDs), observations and self-administered questionnaires. A total of 16 KIIs and 14 FGDs were conducted involving 107 individuals. The total number of participants in each FGD ranged from five to 17, except for two FGDs in which respondents numbered three each due to logistical constraints. In order to get the views and opinions of all key stakeholders in the fisheries sector, study respondents were selected from fisheries authorities at both the federal and state level, fishing cooperatives, women’s groups (fishmongers), the private sector, civil society, young people (graduates) and institutions of higher learning that offer fisheries-related academic programs.

KIIs and FGDs were first captured via audio recording and later transcribed to text. For accuracy and quality assurance, a second transcriber reviewed the transcriptions against the original audio recordings. In addition to the primary data collected for this study, a desk review of existing reports was undertaken to extract relevant information.

4.0 LIMITATIONS OF THE STUDY

Overall, field data collection was completed successfully, with no major challenges or constraints encountered in the study period. However, as is the case with all studies of this nature especially one conducted in the current context, there were some shortcomings or drawbacks though they did not affect the overall quality of the study. The consultant encountered the following limitations:

- Paucity of relevant and up-to-date secondary data/literature on many aspects of the fisheries sector and related institutions which could have been used as reference materials for the study
- Reluctance of some stakeholders to provide information about their institutions, despite initially agreeing to do so, even after several follow-up phone calls and office visits
- Insecurity and road closures in Mogadishu, which made data collection tedious and time-consuming.

5.0 KEY STUDY FINDINGS

5.1 Distinctive features of the Somali coast

"Somalia's coastline is the longest in Africa, covering a distance of 3,898 kilometers from Djibouti in the north to Kenya in the south

Somalia's coastline is the longest in Africa, covering a distance of 3,898 kilometers from Djibouti in the north to Kenya in the south.[5] The coastline is divided into the north coast, which borders the Gulf of Aden, and the east coast, which forms the western edge of the Indian Ocean. The north coast is relatively straight and mostly comprises sandy beaches interspersed with rocky outcrops and cliffs, except in the area east of Bosaso where high mountains extend down into the shallow waters. The coastal plain along the Gulf of Aden is generally narrow, varying in width between five and 10 kilometers, except near the Djibouti border where it widens to 35 kilometers. Coral reefs are sparse with very low diversity due to upwelling and associated high turbidity. However, the Sa'ad ad-Din islands, Habo and the area between Bosaso and Buru' reportedly have thriving patchy coral reefs.[6] Mangrove stands (*Avicennia marina*) occur on the banks of small dry rivers, and isolated mangrove forests are present in Zeila and Khoor Shoora in Somaliland and along Puntland's Alula and Habo creeks. No extensive seagrass beds are reported to occur in this area due to the dominance of sterile shallow sandy substrata in the subtidal zone.[7]

[5] UNEP (2005). National Rapid Environmental Desk Assessment on Somalia. Nairobi, Kenya.
[6] Glaser, S.M., P.M. Roberts, R.H. Mazurek, K.J. Hurlburt and L. Kane-Hartne (2015). Securing Somali Fisheries. Denver, CO: One Earth Future Foundation.
[7] Schleyer, M.H., and R. Baldwin (1999). Biodiversity Assessment of the Northern Somali Coast East of Berbera. IUCN Eastern Africa Regional Office, Nairobi, Kenya.

The coastal plain along the Indian Ocean is narrow in the north, but widens to 125 kilometers in the south and to 200 kilometers in the Juba River valley. Between Ras Asir and Eyl, the coastal plain is five to 10 kilometers wide and is backed by a steep escarpment, which rises abruptly to a plateau just over 200 meters in height, and farther inland to 500 meters above sea level. From Eyl, the rocky outcrops gradually transition into a wider coastal plain with an extensive network of sandy beaches.

A series of dune fields devoid of vegetation are located some 10 kilometers inland, running parallel to the stretch of coastline between Gara'ad and Dhinowda. There are no coral reefs north of Adale due to the presence of an ocean current, which causes an upwelling further north that brings deep cold water to the surface. Fringing coral reefs appear at Adale and continue south to the Kenyan border. The only major break in this reef is off Mogadishu, where patchy coral reefs are scattered within seagrass beds.[8]

Three prominent features found along the southern part of the east coast are: the Merka red sand dune complex; the Bajuni Archipelago that forms a protective barrier for the mainland coast across a narrow channel;[9] and the estuary at Jumba, Gobweyn, where the River Juba drains into the sea. The Bajuni archipelago is located off the coast of Jubaland south of Kismayo and consists of several islands and small islets, the biggest of which are Chandra, Koyama, Ngumi, Chovaye, Chula and Darakasi. The islands are fringed with coral reefs and extensive flats interspersed with large seagrass meadows and mangroves in intertidal flats. The tidal creeks at Istanbuul, Kudhaa and Buurgaabo villages are also lined with relatively dense mangrove forests, although some mangrove stands have been completely denuded for building poles and charcoal production.

"Somali waters encompass the convergence zone of the Gulf of Aden, the Arabian Sea and the Indian Ocean and as such are regarded as a major ecotone (transitional region) between the fauna and flora of the three seas

The continental shelf covers a surface area of 56,000 km2 and is relatively narrow in most places (averaging 15 kilometers), although it extends to 80 kilometers offshore in the northeast region (Puntland) around Hafun.[10]

Somalia's Indian Ocean maritime zone forms part of the Somali Current Large Marine Ecosystem (SCLME). An important feature of this ecosystem is the monsoon-generated upwelling that spreads cold, nutrient-rich waters along the northeast coast in Puntland, primarily between Ras Asir and Ras Mabber, from May to August. Areas of upwelling are often associated with high levels of primary productivity and rich biomass, offering great economic value in terms of fisheries.

Somali waters encompass the convergence zone of the Gulf of Aden, the Arabian Sea and the Indian Ocean and as such are regarded as a major ecotone (transitional region) between the fauna and flora of the three seas. There are important turtle and seabird nesting sites along the Somali coast. Marine mammals such as dugong, dolphins (common, spinner, spotted and bottle-nose) and humpback whales frequent Somali waters.[11]

[8] Carbone, F. and G. Accordi (2000). The Indian Ocean Coast of Somalia. In: Sheppard, C.R.C. (ed) (2000). Seas at the Millennium: An Environmental Evaluation: Vol. 2. Regional Chapters: The Indian Ocean to the Pacific, Amsterdam: Pergamon, pp. 63- 82.
[9] Ibid.
[10] Fielding, P.J. and B.Q. Mann (1999). The Somalia Inshore Lobster Resource: A survey of the lobster fishery of the north eastern region (Puntland) between Foar and Eyl during November 1998. Nairobi. IUCN EARO.
[11] Kelleher, K. (2016). Somalia Sustainable Fisheries Development Note Identification of Areas for Possible World Bank Support Policy Note. World Bank. Washington, DC. USA.

5.2 Status of the fisheries sector

5.2.1 Fishery production potential

With a large (1,200,000 km2) exclusive economic zone (EEZ), inshore productive ecosystems and an offshore upwelling system, Somalia is recognized as having some of the most prolific waters in the western Indian Ocean. A recent model-based assessment of 54 large marine ecosystems (LMEs) ranks Somali waters among the world's highest in fishery production potential.[12] The Somali Current LME is ranked fourth in the world in fishery production potential behind the Baltic Sea, Canary Current and Benguela Current LMEs. The Arabian Sea LME, of which the Gulf of Aden is part, is ranked eighth in the world. Somalia's LMEs are potentially more productive than other comparable LMEs such as the California Current off the west coast of the USA and the Humboldt Current along the coastlines of Chile and Peru.[13]

Little is known about the abundance, composition and distribution of fish stocks off the Somali coast other than outdated estimates made during fishery surveys conducted in the 1970s and 1980s by USSR fishing vessels and the expeditions of the research vessel R/V Dr. Fridtjof Nansen. The 1970s surveys put the potential sustainable annual fish yields in the order of 200,000 tons per year for pelagic fish stocks. With regard to coastal stocks, the corresponding figures suggested for demersal fish species, sharks and lobsters are 40,000, 30,000 and 2,000 tons respectively. The accessible stocks identified during those surveys included large pelagic species such as yellowfin tuna (*Thunnus albacares*), bigeye tuna (*T. obesus*), longtail tuna (*T. tanagol*), striped bonito (*Sarda orientalis*), skipjack tuna (*Katsuwonus pelamis*) and mackerel (*Scomberomorus spp.*); small pelagics such as Indian oil sardine (*Sardinella longiceps*), rainbow sardine (*Dussumieria acuta*), chub mackerel (*Scomber japonicus*), Arabian scad (*Trachurus indicus*) and anchovy (*Engraulidae*); and demersal fish such as emperors (*Lethrinidae*), groupers (*Serranidae*), snappers (*Lutjanidae*), sea breams (*Sparidae*) and goatfishes (*Mullidae*).

High seasonal variations in abundance were observed during the assessments for both large and small pelagic species in Somali waters, although the latter species were found to be more concentrated along the northeast coast with an estimated sustainable catch of about 70,000-100,000 tons per year.[14] Another fishery survey conducted a decade later (1984) reported much higher total potential yield estimates of between 40,000 and 80,000 tons for the Gulf of Aden coast and between 340,000 to 420,000 tons per year for the Indian Ocean coast.[15] In 2015, a model-based estimate put the annual fishery production potential in Somali waters at 835,000 tons, with planktivores (sardines) and benthivores (flatfish) rather than piscivores (tuna) accounting for much of the calculated fishery yields.[16]

Regarding lobster resources, a 1983 survey estimated the standing stocks of two deep-sea lobster species - the red whip lobster (*Puerulus carinatus*) and Arabian whip lobster (*P. sewellii*) - to be 639 tons and 1,094 tons respectively for the whole coast based on the catches of the fishing trawler F/T Osman Gheddi Raage from 5 March to 8 April 1983.[17]

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[12] Rosenberg, A.A., M.J. Fogarty, A.B. Cooper, M. Dickey-Collas, E.A. Fulton, N.L. Gutérrez *et. al.* (2014). Developing new approaches to global stock status assessment and fishery production potential of the seas. FAO Fisheries and Aquaculture Circular No. 1086. Rome: FAO.

[13] Glaser, S.M., P.M. Roberts, R.H. Mazurek, K.J. Hurlburt L. and Kane-Hartne, L (2015). Securing Somali Fisheries. Denver, CO: One Earth Future Foundation.

[14] Kelleher, K. (2016). Somalia Sustainable Fisheries Development Note Identification of areas for possible World Bank support Policy Note. World Bank. Washington, DC. USA.

[15] Stromme, T. (1984). The pelagic and demersal fish resources off northeast Somalia. Results of two surveys with the *R/V Dr. Fridtjof Nansen* in 1984. Institute of Marine Research, Bergen, Norway. NORAD/UNDP/FAO GLO/82/001.

[16] Glaser, S.M., P.M. Roberts, R.H. Mazurek, K.J. Hurlburt and L. Kane-Hartne (2015). Securing Somali Fisheries. Denver, CO: One Earth Future Foundation.

[17] Johnsen, T. (1984). Commercial trawling for fish and deep-sea lobster *(puerulus spp.)* off Somalia. Southwest Indian Ocean Project Document.

Similarly, an inshore scalloped spiny lobster (*Panulirus homarus*) stock assessment carried out along the northeast coast between Foar and Eyl in Puntland in 1998 put the total standing spiny lobster stock in the area at about 264 tons.[18] The same study estimated the annual lobster catch for the area at 280 tons based on fishers' lobster landings, showing a clear underestimation of the standing stock since it is unlikely that the total standing stock could be caught every year without causing a collapse.

The above potential estimates are either outdated, having been done nearly 40 years ago, or based on model-generated fish yields calculated from the total biomass of different fish categories in the food web. Although the current status of marine fishery resources is not known, it is widely accepted that some stocks are being exploited at an alarming rate, warranting immediate regulatory intervention from the authorities. Large pelagics (tuna and tuna-like fishes) and some demersal fish stocks are heavily exploited by foreign vessels in the EEZ and by industrial trawlers operating in coastal waters. Sharks and spiny lobsters are considered to be overexploited by the artisanal fishers based on declining catches, reduced sizes of landed specimens and the disappearance of a number of shark species from catches over the past few years.[19] There is currently no intensive commercial fishery targeting small pelagic species, which are largely used as bait for line fishing operations by artisanal fishers. The status of other coastal and deep-sea crustacean and cephalopod stocks is also not known due to lack of data.

There is a pressing need for rigorous scientific studies in order to precisely estimate the amount of fish that could be sustainably harvested from Somali waters. This is especially important at a time when some stocks are being overexploited beyond their maximum sustainable yield (MSY) amid renewed interest in the fisheries sector from both local and international investors.

> *"A ministry dedicated to fisheries development was established in 1973 with a mandate to develop, manage and conserve the country's fisheries and other marine resources*

5.2.2 Artisanal fisheries

Exploitation of coastal resources for commercial purposes began in the 1930s when private Italian investors established two canneries in Qandala and Habo in present-day Puntland. The plants arguably served as the first major market for local fishers who had up until then only engaged in subsistence fishing for their survival and the occasional exchange of dry-salted products for imported commodities from the Arabian Peninsula and East Africa. It was only after Siyad Barre took power that local authorities began to appreciate the potential of the underutilized fishing sector for food and export products.[20] Consequently, a ministry dedicated to fisheries development was established in 1973 with a mandate to develop, manage and conserve the country's fisheries and other marine resources.

Local fishers were organized into 21 district-level fishing cooperatives and provided with technical and financial assistance in the form of training and fishing inputs such as motorized fishing boats, subsidized fuel, spare parts, fishing gear, office blocks and storage facilities for salt-dried products. A total of 15,000 drought-affected nomads were resettled in the coastal towns of Eyl, Adale, Eel-Ahmed and Barawe and trained in fishing skills with a view to providing them with an alternative means of livelihoods and food security. This infusion of human resources into the sector contributed significantly to both the general consumption of fish at the national level and the production of fishery-related products.[21]

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[18] Fielding, P.J. and B.Q. Mann (1999). The Somalia Inshore Lobster Resource: A survey of the lobster fishery of the north eastern region (Puntland) between Foar and Eyl during November 1998. Nairobi. IUCN EARO.
[19] Tello, G., D. Signa and A.J. Kulmiye (2005). Second Tsunami Assessment Mission. Field Report. Nairobi, Kenya. FAO Somalia.
[20] Glaser, S.M., P.M. Roberts, R.H. Mazurek, K.J. Hurlburt and L. Kane-Hartne (2015). Securing Somali Fisheries. Denver, CO: One Earth Future Foundation.
[21] Mohamed, M. and M. Hirzi (2005). Feasibility report on the fisheries sector in Puntland. Nairobi: OTP/UNDP Somalia.

In an effort to increase artisanal production, extensive shore-based facilities were established through bilateral and multilateral investments at various locations along the coastline from Ras Kamboni in the south to Zeila in the north. Notable among those installations were: freezing plants in Kismayo, Bosaso, Berbera and Barawe; a tuna cannery in Las Qoray; a modern fish market and fiberglass boatyard in Mogadishu; and fish collection centers with ice makers, chill rooms and in some cases cold stores in Ras Kamboni, Kudhaa, Booli Moog, Habo, Qandala and Zeila.

Thanks to the government's efforts, domestic fisheries flourished over the next 15 years and for the first time Somali fishery products accessed international markets in Africa, the Middle East and Europe, either directly or through third countries. The liberalization of the economy in the mid-1980s further encouraged a number of local businessmen to invest in the sector, giving it a much-needed boost at a time when fishing cooperatives were struggling to provide services to their members due to mismanagement, corruption and the discontinuation of government support. It was also around this time that the government initiated a credit scheme that provided fiberglass boats and other fishing inputs to retiring defense and civil service personnel as well as secondary-school leavers who wanted to join the fisheries sector.[22]

The civil war that broke out in 1991 not only toppled the government but also reversed gains made in infrastructure development. The fisheries sector was not spared and all its existing facilities were either looted or left in ruins during the war and the ensuing period of lawlessness. However, even without supporting infrastructure the fisheries sector has remained valuable to the national economy thanks to local investment and international donor support.

Due to the Gulf States' ban on livestock imports from Somalia in the 1990s and a lack of opportunities in other sectors of the economy, local investors decided to venture into the fisheries sector, initially focusing on processing and exporting of lucrative lobster tails, which at one time became the number one hard currency earner for Somalia ahead of the livestock sector.

However, the bonanza did not last long and within a short period of time lobster catches started to decline due to high fishing pressure,[23] prompting local investors to switch to fresh fish exports to Yemen and Kenya where there was high demand. Buoyed by new capital injections from the diaspora, local businesspeople have in recent years expanded their footprint in the fisheries sector by establishing new modern fish processing plants and boatyards in various parts of the country. These include the tuna canneries in Las Qoray and Habo and several cold storage facilities in Berbera, Bosaso, Hobyo and Mogadishu. At least eight boatyards are currently operational, manufacturing more than eight types of fiberglass fishing boats ranging in size from 6.5 to 10.3 meters.

The sector also greatly benefitted from the timely intervention of various international donors, which not only replaced fishing gear and boats that were destroyed by the 2004 tsunami but also provided ice makers, chill rooms and other facilities that enabled coastal communities to quickly recover their disrupted livelihoods.

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[22] Kulmiye, A.J. (2010). Assessment of the Status of the Artisanal Fisheries in Puntland through Value Chain Analysis. UNDP/ VSF-CH. Nairobi, Kenya.

[23] Fielding, P.J. and B.Q. Mann (1999). The Somalia Inshore Lobster Resource: A survey of the lobster fishery of the north eastern region (Puntland) between Foar and Eyl during November 1998. Nairobi. Kenya. IUCN EARO.

Somalia's artisanal fisheries can be classified into three main categories on the basis of the target stocks involved: shark, finfish and lobster. While the shark and finfish fisheries are carried out along the entire coastline, the lobster fishery is mainly restricted to the east coast where commercial lobster landings are harvested. Other fisheries that are occasionally targeted include sea cucumbers, clams, cuttlefish, mud crabs, oysters and shrimps. A recent assessment report on the status of Puntland's artisanal fisheries describes the characteristics of the three fisheries in detail,[24] which can be considered more or less representative of the entire artisanal fisheries subsector given the similarity of fishing gear, catching methods and target species across different fishing zones.

"Currently, shark meat is salted, sun-dried and transported overland to Kismayo for onward export to Mombasa (Kenya), the main market for dried shark meat in East Africa

5.2.2.1 Shark fishery

The shark fishery is a traditional fishing activity that has been undertaken along the Somali coast for centuries. Fishing methods have changed little over time and stationary gillnets and longlines are still the main gear used. Various species of sharks and rays are targeted and both fins and meat are now utilized, unlike 20 years ago when fishers used to throw the carcasses back into the water after cutting off the fins due to the lack of a market for the meat. Currently, shark meat is salted, sun-dried and transported overland to Kismayo for onward export to Mombasa (Kenya), the main market for dried shark meat in East Africa. Shark fins are flown to Hong Kong and Singapore where they are regarded as a delicacy. Shark liver oil from the dwarf gulper shark is exported to Japan via Salalah (Oman) or Dubai (UAE).

The dwarf gulper shark (*Centrophorus atromarginatus*) is found in the Gulf of Aden off Somalia's north coast in the 300-800 meter depth range. It was not commercially exploited until the fourth quarter of 2015 when local businessmen received orders for gulper shark oil from the Far East, leading them to mobilize artisanal fishers in Puntland and Somaliland. The fishery soon became a big business that attracted more and more fishers from other regions when locals could not land enough sharks to satisfy the growing demand for liver oil. Initially, fishers were able to land over 100 tons of this catch per day in Bosaso alone. As there was no market for the meat, truckloads of rotting gulper shark carcasses (each weighing about 2.5 kilograms minus the liver) were taken from the landing beach and disposed of at dumpsites. Alarmed by the unsustainable rate at which the species was being exploited, the Puntland Ministry of Fisheries and Marine Resources (MoFMR) put a two-year moratorium on gulper shark fishing, effective September 2017. Somaliland authorities followed suit and banned fishing for this shark species due to conservation concerns. Although the ban still stands in Somaliland, it is no longer in force in Puntland, having been overturned after one year due to pushback from politically-connected businesses. If Puntland does not reimpose the ban, the gulper shark will soon join the ranks of other once-abundant shark species (e.g. the saw shark) that have disappeared from Somalia's artisanal catches.

5.2.2.2 Finfish fishery

The finfish fishery is a multi-species fishery that targets both large pelagics and demersal fish, mainly for the local market and to a lesser extent for regional markets in Yemen and Kenya. It is by far Somalia's largest fishery in terms of production, employment creation and revenue generation. A variety of catching methods

[24] Kulmiye, A.J. (2010). Assessment of the Status of the Artisanal Fisheries in Puntland through Value Chain Analysis. UNDP/ VSF-CH. Nairobi, Kenya.

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There has been a growing domestic demand for fish over the last two decades, indicating a cultural shift in the traditional eating habits of Somalia's urban population

such as handlining, trolling, driftnetting, ring-netting, and beach seining are employed in finfish fishing, which is mostly undertaken out of coastal towns and cities with fish processing plants and established fish markets where demand is high. In remote areas, finfish are caught for sale only when Kenyan and Yemeni shuttle dhows are in the vicinity due to a lack of alternative markets. These dhows are mostly Somali-owned but flagged to Kenya and Yemen for logistical convenience and market access. The dhows dock regularly at coastal villages within their respective operating ranges in Puntland, Somaliland and Jubaland to buy fish that they transport back to Yemen and Kenya and informally sell as local landings.

These dhows appear to fulfill an important role in providing not only a market for many remote coastal communities but also fuel and fishing gear for local fishers at discounted prices. Finfish fishers operating out of major cities sell their catches on the beach either to the highest bidder at auction, as is the case in Kismayo and Mogadishu, or to specific fishmongers with whom they have special arrangements, as is the case in Berbera and Bosaso. A significant amount of the landed catch is marketed and consumed in the inland cities of Garowe, Galkayo, Hargeisa, Burao and Baidoa thanks to the establishment of cooling facilities and the emergence of trust-based fish distribution networks. There has been a growing domestic demand for fish over the last two decades, indicating a cultural shift in the traditional eating habits of Somalia's urban population, which now accepts fish as a healthy source of protein and an alternative to red meat.

5.2.2.3 Inshore lobster fishery

Commercial exploitation of inshore lobster resources began in the mid-1980s following the liberalization of the economy. The lobster fishery is export-oriented and although its significance has decreased over time due to dwindling catches, it is still important for the local economy as it brings in much-needed hard currency from the export of frozen tails and live lobsters while providing employment opportunities for many vulnerable communities. The fishery exploits the ornate spiny lobsters (*Panulirus ornatus*), long-legged spiny lobsters (*P. longipes*), scalloped spiny lobsters (*P. homarus*), painted spiny lobsters (*P. versicolor*) and pronghorn spiny lobsters (*P. penicillatus*), all of which occur in nearshore areas but with different spatial distributions along the coastline. Lobster fishing is undertaken throughout the year but its main season falls during the northeast monsoon season (November-April) when the sea is calm and climatic conditions are at their best for diving operations.

While all the five species are harvested off the southeast coast between Adale and the Kenyan border, production along the northeast coast of Puntland is exclusively based on *P. homarus*. Small catches of *P. versicolor* are landed on the north coast. Landed lobsters are either processed into frozen tails and air freighted to Dubai (mostly from Puntland) or exported live to Hong Kong (from Mogadishu via Addis Ababa) and Kenya (mostly from the Bajuni Archipelago to Kiunga across the border).

In Puntland, a variety of fishing methods (tangle nets, traps/pots, skin/scuba diving) are employed to catch lobsters but in Jubaland diving is the only method in use as the targeted lobsters do not enter traps. The fishery is open-access with no regulatory input or output controls, and as a result, the selling and landing of egg-bearing (berried) females and small lobsters is widespread at all landing beaches. 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 declining catches over the last 10 years.[25]

Lobsters are one of the world's most expensive seafood products, second only to prawns in dollar value among crustaceans. In Somalia, lobsters are one of only three low-volume-high-value fishery products that access international markets (the other two being shark fins and sea cucumbers).

"Lobsters are one of the world's most expensive seafood products, second only to prawns in dollar value among crustaceans. In Somalia, lobsters are one of only three low-volume-high-value fishery products that access international markets (the other two being shark fins and sea cucumbers

The export of live lobsters and frozen tails brings in over US$15 million per year to the economy. At the community level, the lobster fishery provides employment opportunities for many vulnerable communities including subsistence fishers, IDPs, ex-pirates and even pastoralists who took up fishing as an occupation after they lost their livestock through prolonged droughts. Lobster fishing also represents one of the few activities from which local fishers derive a good return for their labor since spiny lobsters fetch a much higher price per unit of weight than finfish or other crustaceans.[26]

Despite their high value, lobster resources are on the verge of collapse due to unsustainable exploitation by local fishing communities, which seem to have little appreciation of the value of the resources on which they depend for their livelihoods. A complete collapse of the lobster stocks could have serious social, economic and security repercussions for Somalia, potentially leading to social upheaval including a reemergence of piracy in the coastal areas. The majority of lobster fishers do not have fishing skills other than setting their nets and traps in shallow waters on foot and will need to be retrained on new fishing methods should the lobster fishery collapse. The lack of opportunities in other sectors of the economy will force redundant fishers to join countless other unemployed youth swelling the already bursting ranks.

Besides their economic value, spiny lobsters play an important ecological role in the food chain as predators and prey species. As important predators, lobsters can alter the composition of benthic invertebrates through direct predation of herbivores and other space competitors. As abundant prey species, they form a significant part of the flow of energy up through coastal ecosystem food chains. Removal of important predators from an ecosystem has been shown elsewhere to have massive ecological effects in the form of trophic cascades across food chains and ecosystems, leading to a loss of biodiversity.

5.2.2.4 Fishing season

Fishing along the Somali coastline is subject to the prevailing monsoon winds and sea conditions. The main fishing season corresponds with the northeast monsoon period between October and April when the sea is calm and climatic conditions are at their best for fishing. During the southeast monsoon period, little fishing activity occurs along much of the east coast due to strong and persistent winds that make fishing difficult, unproductive and potentially dangerous for artisanal fishers. In contrast, fishing operations in the Gulf of Aden and around the protected lagoons in Jubaland continue uninterrupted over the summer months, albeit at a much lower intensity than in the main fishing season. Finfish and shark fishing seasons are longer on the north coast than on the east coast and last for about 11 months. Among the three categories, the lobster fishery has the shortest fishing season of approximately five months owing to the strong northeast monsoon winds that intermittently interrupt operations during December through February. The approximate harvesting seasons for different fish species caught off the Puntland coastline are presented in Table 1.

[25] Kulmiye, A.J. (2010). Assessment of the Status of the Artisanal Fisheries in Puntland through Value Chain Analysis. UNDP/ VSF-CH. Nairobi, Kenya.
[26] Kulmiye, A.J. (2005). Growth and moulting of captive panulirus homarus in Kenya, western Indian Ocean. New Zealand Journal of Marine and Freshwater Research. Vol. 39: 539-549.

Table 1: Harvesting seasons for species caught off Puntland coast

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

Source: Kulmiye, A.J. (2010). Assessment of the Status of the Artisanal Fisheries in Puntland through Value Chain Analysis. UNDP/VSF-CH. Nairobi, Kenya

5.2.2.5 Fishing cooperatives

"The formation of fishers' organizations was first initiated in Somalia in the early 1970s when the government created 21 district-level fishing cooperatives as part of its collectivization program

The formation of fishers' organizations was first initiated in Somalia in the early 1970s when the government created 21 district-level fishing cooperatives as part of its collectivization program. Four additional fishing cooperatives were later established following the resettlement of 15,000 drought-affected nomads in the coastal towns of Eyl, Adale, Eel-Ahmed and Barawe, increasing the total number to 25. The latter fishing cooperatives (aka resettlements) were overseen by the Coastal Development Project, unlike the district cooperatives which fell under the Ministry of Fisheries. Later, all cooperatives in the country were brought under the administration of the Union of Somali Cooperatives Movement and fishing cooperatives were given greater autonomy to elect their officials, who were previously appointed by the Ministry of Fisheries in Mogadishu.

In 1983, the government stopped the grants and subsidies it used to provide to fishing cooperatives following the liberalization of the economy. As a result, many cooperatives found it difficult to stay solvent based on the meager earnings they generated from member subscriptions and levies charged to fish sales. Cooperative members were allowed to borrow money from local banks through a credit scheme to buy collectively owned boats for which they paid monthly installments. After the civil war, the cooperatives failed to provide any meaningful services to their members for lack of funds, leading to their disintegration.

Several attempts have been made to revive fishers' organizations over the last 15 years, with mixed success. In 2005, the Puntland fisheries ministry, in collaboration with partner agencies involved in the fisheries sector, established five fisheries associations in the tsunami-affected districts of Jarriiban, Eyl, Bender Bayla, Hafun and Bargaal and provided them with skills training, revolving funds and draft statutes for their approval and implementation. During the establishment process, some procedures were either overlooked or fast-tracked in order to get grassroots structures on the ground for aid distribution, with the understanding that the associations would be reformed as soon as distribution was completed. Unfortunately, the associations did not receive further assistance towards their consolidation and ceased operations soon after the completion of tsunami projects.

> *A total of 20 fishing cooperatives are currently registered with ministries of fisheries at the federal and state level*

Early in 2019 the ministry, in consultation with district authorities, initiated another process and has so far (re)established five fishing cooperatives in Bosaso, Jarriiban, Eyl, Dan Goroyo and Bargaal districts. The ministries of fisheries in the other states and at the federal level have not yet taken such an initiative in their respective jurisdictions but do offer registration to artisanal fishers who organize themselves of their own volition and seek formal registration for their cooperatives. A total of 20 fishing cooperatives are currently registered with ministries of fisheries at the federal and state level. Besides the registered cooperatives, there are many small unregistered fisheries associations or independent working groups in coastal areas that cater to their members' welfare.

5.2.2.6 Artisanal fisher population

The artisanal fisher population can be classified into two groups on the basis of their skills and mode of operation: permanent fishers and seasonal fishers.[27] Permanent fishers work out of boats and engage in finfish and shark fishing up to 50 kilometers offshore while seasonal fishers mostly work on foot and catch lobsters with nets and pots in shallow waters. Among the ranks of the seasonal fishers are pastoralists and IDPs who go to the coast purely for lobster fishing and return to their places of origin at the end of the fishing season. Prior to 1991, there were 3,000 full-time and 5,000 part-time fishers who operated from a network of some 50 villages.[28] In 1996, 90,000 persons were engaged in occupations related to fishing such as gear repair, cold chain supply and processing.[29]

There is currently neither a systematic registration of Somali nationals wishing to take up fishing as an occupation nor is there any legal requirement for artisanal and subsistence fishers to obtain fishing permits from federal and state fisheries ministries. In the absence of a nationwide fisher registration system, it is difficult, if not impossible, to put a figure on the actual size of the fisher population. Nevertheless, fisher population estimates are available for Somaliland, Puntland and South Central based on anecdotal information gathered from the three areas by different agencies over the last 15 years. According to 2005 UNDP assessment reports, at that time there were 2,418 fishers in Somaliland, 5,812 in Puntland and 10,156 in South Central, a total of around 18,400.[30] In 2005, a Food and Agriculture Organization (FAO) assessment mission to Puntland estimated the total number of active fishers operating out of 28 villages along the northeast coast to be 49,685, comprising 22,260 and 27,425 permanent and seasonal fishers respectively.[31] In contrast, a joint UNDP/VSF – CH assessment in 2010 reported a much lower estimate of 12,730 permanent fishers for the entire Puntland coast, based on the number of fishers working out of the existing 3,136 fishing boats.[32]

During fisher registration exercises undertaken between 2014 and 2016, enumerators dispatched to coastal areas by fisheries ministries with assistance from FAO captured and documented biometric details from 3,100 fishers in Puntland, 768 in Galmudug, 551 in Jubaland and 2,000 in Somaliland through a computer-based registration system. The actual number of fishers registered in each state is significantly less than the total estimates given in the above-cited reports, indicating that the project ended before all bona fide fishers were registered. The respective fisheries ministries have not continued with the registration exercise, probably due to lack of funds.

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[27] Kulmiye, A.J. (2010). Assessment of the Status of the Artisanal Fisheries in Puntland through Value Chain Analysis. UNDP/VSF-CH. Nairobi, Kenya.
[28] Mohamed, M. and M. Hirzi (2005). Feasibility report on the fisheries sector in Puntland. Nairobi: OTP/UNDP Somalia.
[29] Lovatell, A. (1995). Final Report. EC Rehabilitation of Programme for Somalia – Artisanal Fisheries. Nairobi: the European Union.
[30] Gulaid, A.H. (2005). Feasibility Report on the Fisheries Sector in Somaliland. UNDP Somalia; Mohamed, M. and M. Hirzi (2005). Feasibility report on the fisheries sector in Puntland. Nairobi: OTP/UNDP Somalia; Sabriye, A.S. (2005). Feasibility Report on the Fisheries Sector in South & Central Somalia. UNDP Somalia.
[31] Tello, G., D. Signa and A.J. Kulmiye (2005). Second tsunami assessment mission. Field report. Nairobi: FAO Somalia.
[32] Kulmiye, A.J. (2010). Assessment of the Status of the Artisanal Fisheries in Puntland through Value Chain Analysis. UNDP/VSF-CH. Nairobi, Kenya.

The high fisher population estimates show the importance of the artisanal fisheries subsector as a major source of employment and income for many pastoralists and other groups who now seem to accept fishing as a worthy economic activity through which they can gain decent livelihoods. Pastoralists traditionally regarded fishing as a degrading occupation to be taken up only by people of low social status.

In addition to fishers, the sector supports an even larger number of people who are engaged in various activities in the domestic and export supply chains. In total over 400,000 persons (up from 90,000 in 1996) now depend directly or indirectly on the fisheries sector for their livelihoods.

5.2.2.7 Artisanal fishing fleet

The artisanal fishing fleet consists mainly of single-day, mechanized and non-mechanized fishing vessels of various makes and sizes. There is no precise information on the total number of fishing vessels currently used in the country for artisanal operations other than outdated estimates made for Somaliland, Puntland and South Central fishing fleets a decade or so ago. According to reports published in 2005, there was an estimated total of 4,731 fishing vessels in the three zones, of which 2,885 were motorized fiberglass vessels (6 - 9
meters), 66 were traditional wooden sailboats and 1,780 were five-meter long houris (canoes).[33] The assessments also found that a significant percentage (20–40 percent) of the boats in the three zones were nonoperational due to hull and engine problems. Another assessment conducted in Puntland in 2010 estimated the artisanal fishing fleet at 3,136 fishing vessels of which 3,074 were motorized fiberglass boats and 162 were houris, showing a significant increase in the fleet size within a span of five years, up from the 1,847 boats estimated in the 2005 assessment.[34] This increase could be attributed to the distribution of a large number of new fishing boats to coastal communities by international donor agencies in response to the 2004 tsunami that struck the Puntland coast.

More recently, during fishing vessel registration campaigns conducted between 2014 and 2016 as part of the activities of a project funded by the Trust Fund to Support Initiatives of States Countering Piracy off the Coast of Somalia, enumerators from respective ministries of fisheries were able to register 280 fishing boats in Somaliland, 731 in Puntland, 183 in Galmudug and 348 in Jubaland before project completion. An analysis of the vessel data collected from Puntland shows a clear size-related spatial distribution of fishing boats in line with the presence or absence of protected anchorages for sheltering boats during strong monsoon winds.[35] On the north coast and in the Hafun/Hurdiya area, vessels larger than eight meters (i.e. Volvo, Af-dheer) dominate the fleet whereas on the east coast, especially in Bender Bayla, Eyl and Jarriiban districts, boats smaller than six meters (i.e. Leyla Alawi, Runner) are the most prevalent, indicating that fishers' preference for a particular boat is mostly dictated by the availability of shelters.

[33] Gulaid, A.H. (2005). Feasibility Report on the Fisheries Sector in Somaliland. UNDP Somalia; Mohamed M and Hirzi M (2005). Feasibility report on the fisheries sector in Puntland. Nairobi: OTP/UNDP Somalia; Sabriye, A.S. (2005). Feasibility Report on the Fisheries Sector in South & Central Somalia. UNDP Somalia.
[34] Kulmiye, A.J. (2010). Assessment of the Status of the Artisanal Fisheries in Puntland through Value Chain Analysis. UNDP/VSF-CH. Nairobi, Kenya.
[35] Anon (2014). A rapid analysis of the fisher folk registration data in Puntland State of Somalia. FAO Somalia.

There are extensive protected anchorage sites on the north coast (Gulf of Aden) and in the Hafun/Hurdiya area in the form of creeks and sheltered bays, but there are no such protected areas on much of the east coast (Indian Ocean) and as such the shore is exposed to wave action. Fishers operating along the latter coast are therefore reluctant to invest in big vessels, mainly for lack of secure shelters, and instead opt for the small, versatile and beachable boats common in the area, even though the bigger vessels have many advantages including lower running costs, longer life span, higher fish carrying capacity, longer fishing expeditions and better handling in rough seas.

Although similar analysis for the other states is unavailable, the spatial distribution of fishing vessels in other parts of the country is expected to show patterns similar to those observed in Puntland, depending on the presence or absence of shelters.

Artisanal fishers are currently using 16 different fishing vessel types, which can be categorized into traditional wooden sailboats, rowing canoes (houris) and motorized fiberglass vessels (See Table 2). The majority of fiberglass vessels are made in the country from imported raw materials by boatyards in Kismayo, Merka, Mogadishu, Bosaso and Berbera. Wooden sailboats and canoes are handmade by traditional boat builders mainly in and around the Bajuni archipelago where wooden boats are still used for fishing as well as for cargo and passenger transportation. In an attempt to renew the fishing fleet, FAO Somalia recently completed the design and construction of four vessel prototypes that have now undergone several sea trials at different locations along the coastline to test their performance and general seaworthiness. The trials have been largely successful, barring reservations expressed by some fishers about the vessels' suitability for use on the east coast in the absence of sheltered mooring facilities, given their size and weight.

Table 2: Technical features of artisanal fishing vessels used in Somalia

	Fishing vessel	Length in meters	Hull Material	Mode of Propulsion	Country of origin
1	FAO 01*	10.3	Fiberglass	Inboard engine	Somalia
2	Sri Lankan	9.0	Fiberglass	Inboard engine	Sri Lanka
3	FAO 02*	9.0	Fiberglass	Inboard engine	Somalia
4	2000	9.0	Fiberglass	Outboard engine	Yemen
5	Af-dheer	9.0	Fiberglass	Outboard engine	Somalia
6	Traditional sailboat	9.0	Wood	Sail	Somalia
7	Volvo	8.5	Fiberglass	Inboard engine	Somalia
8	FAO 03*	8.3	Fiberglass	Inboard engine	Somalia
9	Greek	8.0	Fiberglass	Inboard Engine	Greece
10	FAO 04*	7.5	Fiberglass	Inboard engine	Somalia
11	Traditional sailboat	7.0	Wood	Sail	Somalia
12	SAAB	6.7	Fiberglass	Inboard engine	Somalia
13	Leyla Alawi	6.0	Fiberglass	Outboard engine	Somalia
14	Runner	6.0	Fiberglass	Outboard	UAE
15	Balan-baalis	5.5	Fiberglass	Outboard	Somalia
16	Houri	5.0	Wood	Paddle	Somalia

*Indicates an arbitrary numbers assigned to the yet to-be-named four boat prototypes designed and constructed by FAO Somalia.

5.2.3 Industrial fisheries

Somalia has never had a large-scale fishing fleet of its own to exploit its vast resources on an industrial scale. It has over the years issued licenses to foreign-owned vessels engaged in industrial fishing operations in its waters. Prior to the civil war, most foreign-owned vessels fishing in Somali waters operated under the authority of either individual fisheries concessions or joint venture agreements. Notable among the joint venture agreements that the Somali government established with other governments or private firms in the 1970s and 1980s were SOMALFISH (with the USSR), SIADCO (with Iraq), SOMITFISH (with Italy) and Booli Moog (with an Italian company). The SOMALFISH and SIADCO joint venture agreements were part of wider bilateral collaborations involving other sectors as well.

SOMALFISH, SIADCO and SOMITFISH operated between them a total of 17 freezing trawlers that targeted deep-sea crustacean and demersal fish stocks. Booli Moog was engaged in tuna freezing operations at its plant in Booli Moog town on the Gulf of Aden, which had installed freezing and cold storage capacities of 50 and 2,500 tons respectively.

SOMITFISH was established in 1983 and immediately started operations with three Italian-built and financed stern trawlers: the F/T Osman Gheddi Raage, the F/T 21st October and the F/T Farah Omaar. The trawlers were found to be uneconomical due to high operating costs, limited diesel storage capacities and short fishing expeditions. As a result, operations were suspended altogether and the vessels were left moored at the port of Mogadishu for three years before the government bought out the Italian shareholders and revived operations under a new fully-owned company (SHIFCO) with six vessels comprising the three old trawlers, two new trawlers and one refrigerated cargo ship.

SHIFCO continued to function after the collapse of the government until 2007 when its last operational trawler (F/T 21st October) ran aground about 10 kilometers south of Gara'ad due to technical problems. With its other four trawlers already moored at a Yemeni port for similar reasons, SHIFCO ceased operations altogether and left stranded hundreds of Somali crew members who had not received their salaries for months. The whereabouts of the reefer ship is unknown. In 1979 Somalia bought 12 small fiberglass-hulled shrimp trawlers from Yugoslavia but the vessels were immediately sold off when the government realized that they were not suitable for offshore fishing due to issues surrounding their stability at sea.

"Between 1978 and 1990, Somalia granted offshore fishing rights to several foreign companies from Egypt, Spain, South Korea, Italy, Greece and Thailand from which it collected a royalty of 20 percent of the total catch

Between 1978 and 1990, Somalia granted offshore fishing rights to several foreign companies from Egypt, Spain, South Korea, Italy, Greece and Thailand from which it collected a royalty of 20 percent of the total catch.[36] Following the collapse of the government in 1991, hundreds of illegal, unreported and unregulated (IUU) fishing vessels from around the world swarmed the unpatrolled Somali EEZ, taking advantage of nonexistent fisheries enforcement and legal ambiguity arising from Somalia's claim of 200 nautical miles of territorial waters, which resulted in a lack of recognition of the Somali EEZ.

[36] FAO (1987). Identification of Agricultural Development Project for African Development Bank (AFDB) and Agricultural Sector Review (ASR), Mogadishu – Somalia.

Many experts have either questioned or altogether dismissed the illegality of foreign fishing during this era on the grounds that Somalia had not declared its EEZ.[37]

Although it signed and ratified the United Nations Convention on the Law of the Sea (UNCLOS) in 1982 and 1989 respectively, it was not until June 2014 that Somalia officially proclaimed its EEZ in accordance with the maritime zones recognized under UNCLOS. It has been reported that between 800 and 1,000 vessels were actively engaged in IUU fishing operations in the Somali EEZ at any given time during the 1990s and 2000s, costing the country more than $300 million each year in lost revenue from stolen fish.[38] More recently, the foreign catch was estimated to be in the region of 132,000 tons in 2013, accounting for 56 percent of total catches taken in Somalia's EEZ.[39]

In addition to the IUU vessels in the EEZ, bottom trawlers from Egypt, Greece, Italy, Kenya, South Korea, Russia and Thailand operated intermittently in inshore waters under dubious fishing permits issued by different Somali administrations.

In recent years, a number of the bottom trawlers, which are still active in the area, have been reflagged to Somalia on the request of Somali businessmen who claimed to have bought them from their original foreign owners. This was possibly done to circumvent the ban on foreign vessels engaging in fishing activities within the 24 nautical mile exclusion zone reserved for local fishers. Although the trawlers now fly the Somali flag and, in most cases, have fishing permits obtained from FMSs, their fishing operations can still be considered illegal as they contravene both federal and state fisheries laws prohibiting trawling of any kind in Somli waters.

Local fishers have accused the trawlers of overfishing, depleting fish stocks, destroying important marine habitats through bottom trawling and disrupting communities' livelihoods by sweeping away their stationary fishing gear. It is widely recognized that the piracy off the Somali coast that overwhelmed the shipping industry in the 2000s and early 2010s began as local fishers' resistance against the illegal activities of bottom trawlers.[40]

Following the February 2018 National Security Council revenue sharing agreement, the federal Ministry of Fisheries and Marine Resources issued fishing licenses legally and transparently for the first time in almost three decades to 31 Chinese longliners, earning a total of $1.05 million in license fees. The fees were initially deposited in an account at the Central Bank of Somalia but later shared among FGS, Puntland, Galmudug, Hirshabelle, South West and Jubaland in line with a revenue sharing agreement reached in Addis Ababa in March 2019.[41]

It is worth mentioning that apart from meager license fees, Somalia does not benefit much from the operations of licensed industrial vessels that neither process nor transship their fish catches at Somali ports, mainly due to the absence of suitable infrastructure, bunkering facilities and chandlery services that support the offshore fishing industry. While development of a homegrown, robust offshore fishing industry may take years if not decades, the country can still maximize revenue from its offshore resources through improved joint ventures and an appropriate licensing system for fishing by foreign fleets with provisions for a strong training component for national crew and a requirement for all vessels to transship their catch at local ports.

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[37] Weldemichael, A.T. (2019). Piracy in Somalia: Violence and Development in the Horn of Africa. Cambridge University Press. Cambridge, United Kingdom.

[38] Lehr, P. and H. Lehmann (2007). Somalia - Pirates' new paradise. In Lehr, P. (ed.), Violence at sea: piracy in the age of global terrorism. Taylor and Francis Group LLC, 2007, New York, U.S.

[39] Cashion, T., S.M. Glaser, L. Persson, M. Paige, P.M. Roberts and D. Zeller (2018). Fisheries in Somali waters: reconstruction of domestic and foreign catches for 1950–2015. Marine Policy 87 (2018) 275-283.

[40] Weldemichael, A.T. (2012). Maritime corporate terrorism and its consequences in the western Indian Ocean: illegal fishing, waste dumping and piracy in twenty-first-century Somalia. Journal of Indian Ocean Region. V. 8: 110 – 126.
Kulmiye, A.J. (2001, July 9). Militia vs Trawlers: Who is the Villain? The East African Magazine. Nairobi, Kenya.

[41] Anon (2019). Somalia: First Review under the Staff-Monitored Program—Press Release; and Staff Report. International Monetary Fund. Washington, DC. USA IMF Country Report No. 19/343.

5.2.4 Fisheries infrastructure and fish processing facilities

As discussed in the preceding sections, the entire fisheries infrastructure was either looted or left in ruins during the civil war and the ensuing period of lawlessness. Some fisheries infrastructure has been revived in various parts of the county over the last two decades, either through donor-funded projects or through private sector investment. Following the 2004 tsunami, FAO and VSF – CH established a total of 10 fish receiving facilities at major fishing centers along the Puntland coast as part of their intervention. Later on, FAO, UNDP and FairFishing also established four fish markets in Bosaso, Qardho, Garowe and Galkayo with a view to putting in place complementary facilities in these major cities that could serve as outlets for the fish receiving facilities in the coastal areas. In Somaliland, FairFishing set up similar facilities in Berbera, Zeila, Bulla-Har and Burao - the latter being a fish market. Furthermore, FairFishing established one fish receiving station in Las Qoray town in Puntland. And in Jubaland, the American Refugee Council (ARC) constructed a small fish processing facility in Kismayo for local fishing communities. Despite being small-scale in nature, the facilities nevertheless provide essential services to beneficiary communities in the form of flake ice, chill rooms, a market for fishers and in some cases electricity.

"The first big investment was made in 2001 when members of the diaspora in partnership with local investors established a tuna canning factory in Las Qoray town

On a larger scale, the private sector has invested in fish processing plants (canning, freezing), fiberglass boatyards, shuttle dhows and reefer trucks, further contributing to the revival of fisheries infrastructure. The first big investment was made in 2001 when members of the diaspora in partnership with local investors established a tuna canning factory in Las Qoray town, several hundred meters from the former tuna cannery.[42] Unfortunately, the factory has not been operational for the last eight years due to financial and management issues - a recurring problem that has shut down the factory twice in its short existence. A decade later, another tuna cannery was established in Habo – another town with a history of tuna canning dating back to the 1930s. Unlike the factory in Las Qoray, the cannery in Habo is currently working thanks to the ingenuity of the current owner, who foresaw the problems and bought out the other shareholders following a brief closure.

In recent years, several modern fish processing plants specializing in frozen products have been established, notable among which are freezing and cold storage facilities belonging to the Horn of Africa Fishing Company and Oceanic Fisheries in Bosaso, and Blue Basin Fisheries and Somali National Fishing Company in Mogadishu. Table 3 below presents the total ice making, chilling and cold storage capacities of different fish collection and processing facilities established in each FMS and in the Banadir region.

With regard to docking and landing facilities, three jetties and four deep-water ports are strategically located in different parts of the country. However, only one jetty in Berbera caters to the needs of artisanal fishers when it comes to the landing of fish and mooring of boats. Two other jetties located in Zeila and Hafun are so dilapidated that local fishers avoid them altogether out of safety concerns. In Bosaso, FAO Somalia built a small floating jetty at the landing beach adjacent to the port in 2014 but a swell dislodged it barely two years after its inauguration. The four deep-water ports in Kismayo, Mogadishu, Bosaso and Berbera are designated for the exclusive use of commercial vessels and so are off limits to artisanal fishing boats.

[42] Gulaid, A.H. (2005). Feasibility Report on the Fisheries Sector in Somaliland. UNDP Somalia.

This lack of suitable landing facilities often forces local fishers to use dirty beaches that do not have support services or infrastructure for offloading, chilling, storing and transporting fish. There are no beaches officially designated as landing sites along the entire coastline and fishers' selection of beaches as landing sites is determined by such factors as their proximity to cities, towns and markets as well as the availability of anchorage and natural shelters.[43]

Table 3: Cold chain facilities established in each FMS and in the Banadir region

State/region	Installed Capacities in Tons			
	Ice making	Chilling	Deep freezing*	Cold storage
Puntland	99	223	56.5	2010
Galmudug	5	6	7	120
Hirshabelle	-	-	-	-
Banadir	12	31	10.5	215
South West	-	-	-	-
Jubaland	-	-	2	75
Total	**116**	**260**	**76**	**2300**

* per eight hour shift

5.2.5 Fishery production statistics

"Historically, artisanal and industrial fisheries were estimated to account for 60 percent and 40 percent of the total production respectively. The corresponding contributions of the two fisheries to the current catch are estimated to be around 74 and 26 percent respectively

Since the collapse of the government in 1991, there has been no systematic nationwide collection of catch data from artisanal and industrial fishing operations that could provide reliable information on actual fish landings from Somali waters. However, some agencies have estimated the country's fishery production based on anecdotal information or extrapolations from pre-war production levels. For example, in its latest (2017) Fishery and Aquaculture Statistics Report, FAO estimates annual fish landings to be 30,000 tons for the whole country – a figure that has remained unchanged over the last couple of years.[44] A catch reconstruction study on Somali fisheries, on the other hand, assessed the total landed catch at around 64,920 tons in 2010, comprising an artisanal landing of 32,730 tons, a subsistence catch of 8,120 tons and an industrial production of 14,540 tons as well as discards of 9,530 tons.[45] More recently, a study published in 2018 assessed the current catch to be 125,000 tons per year, down from an all-time peak of 150,400 tons in 2014.[46] In comparison, the pre-war marine production never exceeded 20,000 tons per year even when industrial catches from all licensed foreign fleets were included in the total landings.[47]

Historically, artisanal and industrial fisheries were estimated to account for 60 percent and 40 percent of the total production respectively. The corresponding contributions of the two fisheries to the current catch are estimated to be around 74 and 26 percent respectively, showing a sizable increase in the proportion of the artisanal catch over time. A further 11 percent of the overall catch was discarded at sea. Bottom trawlers, purse seiners, and artisanal fisheries (especially gillnet, ring-net and driftnet fishing), are the main sources of the reported discards.

[43] Kulmiye, A.J. (2010). Assessment of the Status of the Artisanal Fisheries in Puntland through Value Chain Analysis. UNDP/VSF-CH. Nairobi, Kenya

[44] FAO (2017). Fishery and Aquaculture Statistics Year Book. Retrieved from: www.fao.org/fishery/static/Yearbook/YB2017_US-Bcard/index.htm, last accessed on 31 January 2020.

[45] Persson, L., A. Lindop, S. Harper, K. Zylich and D. Zeller (2015). Failed State: Reconstruction of Domestic Fisheries Catches in Somalia 1950– 2010. pp. 111–127. In F. Le Manach and D. Pauly (eds.), Fisheries Catch Reconstructions in the Western Indian Ocean, 1950–2010. Fisheries Centre Research Reports 23(2). Fisheries Centre, University of British Columbia [ISSN 1198–6727].

[46] Cashion, T., S.M. Glaser, L. Persson, M. Paige, P.M. Roberts and D. Zeller (2018). Fisheries in Somali waters: Reconstruction of Domestic and Foreign Catches for 1950–2015. Marine Policy 87: 275-283.

[47] Sabriye, A.S. (2005). Feasibility Report on the Fisheries Sector in South & Central Somalia. UNDP Somalia.

The production figures cited above are mere estimates that should be used with caution, especially when designing development projects or making investment decisions. They were neither based on official catch data nor did they represent the catches of all artisanal and industrial vessels operating in Somali waters. This is not to say that these figures are incorrect but rather to highlight the lack of accurate and reliable statistical catch data at a time when the sector is receiving renewed interest from both local and international investors. The potential of the sector is far higher than the estimated catch considering that past fisheries surveys put the country's yearly marine finfish production in the range of 200,000 to 500,000 tons.[48]

Catch data is critical for fisheries management and sector development. With this in mind, Secure Fisheries and City University of Mogadishu have partnered with the federal Ministry of Fisheries and Marine Resources to initiate and implement a joint pilot fishery data collection program dubbed Project Kalluun. The project began in early 2018 at Lido landing beach in Mogadishu where on a monthly basis students from City University collected catch and effort data from artisanal fishers. The federal Ministry of Fisheries and Marine Resources presented the results of the project at the 14th Session of the IOTC Working Party on Data Collection and Statistics held in Victoria, Seychelles between 29 November - 1 December 2018. Following the success and positive reception of the pilot project, Secure Fisheries is partnering with other universities to expand the project [to Somaliland, Puntland and Jubaland]: Berbera Maritime and Fisheries Academy, East Africa University (Bosaso), and University of Kismayo.[49]

In Puntland, another data collection program has been ongoing for some time in which enumerators from MoFMR collect catch and effort data from the Bosaso fish landing beach on a daily basis. The establishment of the National Fisheries Data Collection Working Group (NFDCWG) in October 2019 is a good first step in a long journey towards setting up a nationwide comprehensive data collection system for sustainable fisheries management.

5.2.6 Marketing and distribution of fish and fishery products

Prior to the liberalization of the economy in the mid-1980s, the fish trade was controlled by the government and only fishing cooperatives, government-owned fish processing plants and designated fish markets (outlets) were authorized to distribute and market fish in the country. Similarly, local fishers were required by law to sell their catches through fishing cooperatives to plants and designated outlets which in turn sold the fish to the general public. Distribution and marketing of fish was initially confined to large coastal cities with fisheries facilities and infrastructure but later expanded to inland towns as ice and refrigerated trucks became more widely available.

Finfish was the main product distributed in the local market as neither lobsters nor shark products were consumed domestically in large quantities but rather exported to foreign markets. The domestic marketing chain was short but well-structured, with a few intermediary players between the producers (fishers) and consumers (general public). In this chain, fishing cooperatives acted as middlemen while processing plants and designated outlets acted as distributors and retailers respectively. Not much fish was exported from the country other than the catches of joint venture and licensed industrial fishing vessels, which were never landed at Somali ports but transshipped either at sea or through regional ports.

[48] See section 5.1.2 for details.
[49] Kulmiye, A.J. (2010). Assessment of the Status of the Artisanal Fisheries in Puntland through Value Chain Analysis. UNDP/VSF-CH. Nairobi, Kenya.

The role of the private sector in the fish trade was insignificant before the collapse of the government in 1991 but became more pronounced afterwards when local investors started exporting frozen lobster tails to the UAE. The private sector has since expanded its footprint in the fisheries sector and now plays a significant role in both domestic and export marketing chains. Domestic distribution and marketing of fish has improved over the years to a stage where fish is now readily available in all of Somalia's major cities and towns including those in the hinterland. Fresh fish, frozen fish and canned tuna are the main fishery products in the domestic marketing chain, of which canned tuna has the widest distribution network, spanning the entire country from big cities to small remote villages. This is attributed to the fact that canned products require neither ice nor refrigeration and can stay in good condition at ambient temperatures for long periods of time. Despite this improvement, the marketing chain is not well developed either in terms of products traded or the number of players involved in the chain who act as intermediaries between producers and consumers (See Table 4). As a result, most products do not accumulate much value addition as they pass through different players in the chain between producers and consumers. An exception to this general observation is locally produced canned tuna, which accrues slightly more than 100 percent in value between production and consumption owing to the number of players involved in distribution.[50]

Table 4: Domestic supply and marketing chain for finfish

Producer	Components	Market level				
Fishers	Fresh fish	Fishmongers	Fish fryers	Consumers		
			Consumers			
			Retailers	Consumers	Consumers	
				Fish fryers		
				Restaurants	Consumers	
	Frozen Fish	Freezing plants	Retailers	Fish fryers	Consumers	
				Restaurants	Consumers	
	Canned tuna	Tuna canners	Agents	Wholesalers Distributors	Retailers	Consumers

Unlike the domestic fish trade, little progress has been made in exporting fish over the last three decades, mainly due to the lack of quality infrastructure and regulatory mechanisms for the inspection, verification and certification of fish and fishery products for export. With the exception of a few low-volume-high-value products such as frozen lobster tails, shark fins and sea cucumbers, Somali fishery exports have had difficulty accessing international seafood markets because of issues surrounding their quality.

[50] Kulmiye, A. J. (2010). Assessment of the Status of the Artisanal Fisheries in Puntland through Value Chain Analysis. UNDP/ VSF-CH. Nairobi, Kenya

There have been instances in the past when whole consignments of fish exports from Somalia were refused entry to a number of countries in the Middle East on quality grounds.[51] It appears that little has changed in product quality as samples collected in 2018 from nine fish processing facilities in Kismayo, Mogadishu and Bosaso and tested at SGS laboratories in Kenya were found to have varying levels of contamination.[52] None of the local fish processing plants is HACCP (Hazard Analysis Critical Control Point) compliant let alone certified as adhering to various international quality standards for fish and fishery products. Despite these difficulties, fresh fish from Somalia has found its way into Kenyan and Yemeni seafood markets thanks to shuttle dhows that ferry large quantities of fresh fish on ice to those countries during the fishing season. Being informal, these exports do not generate the true value and potential earnings that would be expected if the products were exported through formal channels.

There have also been intermittent exports of fish to Oman and Iran with little success as issues concerning the quality of the products were raised on several occasions by customs and border agencies. Attempts to access the Ethiopian and Turkish markets also failed due to logistical problems and high import taxes, making the export of fishery products unprofitable. Lobster tails, shark products and sea cucumbers are the only processed fishery products that are formally exported and readily accepted on the international seafood market. The export chain is short, with almost no players between exporters and producers. This is particularly so in the lobster supply chain, in which processors and exporters buy lobsters directly from fishers without the involvement of middlemen as is the case with the domestic fresh fish trade.

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/or canned and hygienically stored following international standards. For Somali fishery products to access international markets, all stakeholders must work together and introduce the necessary international quality standards. To this end, the USAID-funded Growth, Enterprise, Employment and Livelihoods (GEEL) Project is assisting 10 Somali fishing processing plants with the adoption and implementation of HACCP principles into their operations. The government needs to establish a reliable and competent national authority with all the required regulatory powers and quality infrastructure to inspect, verify and certify fish and fishery products for domestic and export markets.

“At the FMS level, Puntland, Jubaland, Galmudug, South West and Hirshabelle all have MoFMRs with mandates and responsibilities similar to those of the federal ministry

5.3 Institutional and legal frameworks

5.3.1 Institutional framework (fisheries administration)

At the federal level, the Ministry of Fisheries and Marine Resources (MoFMR) is the national institution responsible for managing fisheries resources as well as promoting sustainable socioeconomic development, food security and livelihoods in the fisheries sector. At the FMS level, Puntland, Jubaland, Galmudug, South West and Hirshabelle all have MoFMRs with mandates and responsibilities similar to those of the federal ministry. In Somaliland, there was a separate ministry for fisheries until the current administration lumped it together with livestock, creating the Ministry of Livestock and Fisheries Development.

[51] Kabbis, C. and J. Rubandi (2017). Somalia Fish Facilities Assessment HACCP Awareness Training Inspection Sampling & Laboratory Testing. SGS. Nairobi, Kenya

[52] See Communique of the Consultative Meeting of the Fisheries Ministries of the Federal Member States of Somalia, 15 – 17 July 2018, Kismayo, Jubaland.

Due to the lack of a clear separation of powers and overlapping mandates, there have been serious disagreements in the past between federal and state fisheries authorities over management of the fisheries resources that have resulted in the suspension of collaboration and non-recognition of respective official documents.[53]

However, these disagreements have been resolved and the ministries now have good working relationships thanks to the February 2018 National Security Council revenue sharing agreement, which devolves some fisheries management responsibilities to the FMSs. According to this agreement, the FGS fisheries ministry is responsible for managing oceanic tuna fisheries beyond 24 nautical miles and up to 200 nautical miles while the FMS fisheries ministries are responsible for the management of riverine and coastal fisheries from the baseline up to 24 nautical miles. This devolved form of fisheries management is in conflict with certain provisions of the federal fisheries law and as such its legality could be challenged before a competent court. There is therefore a need to modify provisions that are not consistent with the agreement by way of amendments to the fisheries legislation so as to give legal backing to devolved fisheries management.

Although the level of competency of these ministries differs widely depending on their history and experience, they are generally weak and have limited human, financial and technical capacities to effectively carry out their mandates. As a result, important core functions of the ministries remain largely unfulfilled, resulting in weak fisheries governance, poor resource management and minimal development in the sector. However, there are several initiatives being undertaken to build the capacities of the ministries both at federal and state level.

5.3.2 Legal framework (fisheries legislation)

Current fisheries legislation has its roots in the Somali Maritime Code of 1959 (Codice Marittime della Somalia) which entered into force one year before independence, initially in the Italian Somaliland and later on in the Northern Regions (formerly British Somaliland) after the two political entities unified. It was amended twice, first in 1966 and then in 1967, but otherwise remained in force for 26 years until 1985 when a separate fisheries law was enacted (Somali Fisheries Law No. 23 of 30 November 1985) that superseded all earlier laws. In the interim, the government also promulgated Law No. 40 of 4 October 1973 on cooperative development which covered many aspects of the economy including fisheries production and marketing development.[54] Similarly, Law No. 37 of 10 September 1972 on the Somali territorial sea and ports also had a section dealing with fishing in the country's territorial sea and the regular transportation of persons and goods between Somali ports, which was reserved for authorized foreign vessels and vessels flagged to Somalia.

Fisheries Law No. 23 was more comprehensive than the 1959 Maritime Code as it applied to all fisheries (subsistence, artisanal and industrial) with an updated vessel licensing framework and a requirement for fisheries data collection. In 1985, the Ministry of Fisheries and Marine Resources issued Fisheries Joint Venture Guidelines to regulate joint venture agreements between Somali fishing companies and their foreign counterparts involving investments in the fisheries sector.[55]

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[53] Trans-Africa Consultancy and Coastal Resource Center, University of Rhode Island (2014). Fisheries Legislative Framework for Somalia. African Development Solutions (Adeso). Nairobi, Kenya.
[54] Guidelines for Fisheries Joint Ventures with Foreign Partners, issued by MoFMR on 1 April 1985.
[55] See Circular No. 97 of 8th July 1954.

> *Due to the collapse of the government in 1991 and the ensuing period of lawlessness, the national fisheries law was neither enforced nor updated for close to 24 years until 2014*

Due to the collapse of the government in 1991 and the ensuing period of lawlessness, the national fisheries law was neither enforced nor updated for close to 24 years until 2014. In the interim, Puntland and Somaliland enacted their own separate fisheries laws in 1995 and 2004 respectively, based on the Somali Fisheries Law No. 23 of 30 November 1985. Both laws have since been updated with more provisions and harsher penalties for offences, including confiscation of property and heavier fines.

The current federal fisheries law (Law No. 29 of 30 November 2014), which expanded on the Somali Fisheries Law No. 23 of 30 November 1985, applies to all fisheries and fishing activities. Somaliland does not recognize any post-1991 federal laws as it regards itself as a sovereign state separate from Somalia. Even Puntland which is, unlike Somaliland, part of the federal structure does not apply the national fisheries law and instead uses its own legislation when it comes to management of coastal resources in its waters.

Although the current fisheries law is far more comprehensive than the 1985 legislation, it still needs a thorough review and updating to make it more consistent with the federal system that the country has adopted and to incorporate the National Security Council revenue sharing agreement devolving some fisheries management responsibilities to the FMSs. State fisheries legislations also need reviews, enactment and harmonization with the federal fisheries law. Galmudug, Hirshabelle, South West and Jubaland do not currently have fisheries laws of their own but are reported to have started the drafting process with the support of partner agencies.

> *Galmudug, Hirshabelle, South West and Jubaland do not currently have fisheries laws of their own but are reported to have started the drafting process with the support of partner agencies*

Despite having relatively good fisheries legislation in place, neither the FGS nor authorities in Puntland or Somaliland currently regulate the fisheries in their respective jurisdictions due to a lack of a robust enforcement capacity in terms of human resources and equipment. It is therefore necessary for Somali authorities at the federal and state level to improve their enforcement capabilities in order to protect and sustainably manage their fisheries resources for the benefit of the Somali people.

In addition to the provisions of domestic fisheries legislation, Somalia is required to fulfill its responsibilities and obligations under various international treaties, conventions and protocols on fisheries and the environment that it has signed and ratified over the last four decades, including but not limited to those given in Table 5 below. The country is also part of a number of regional fisheries management organizations and projects dedicated to sustainable resource management, conservation and protection of marine and fisheries resources including the Indian Ocean Tuna Commission (IOTC), FISH-i-AFRICA, WIO LME SAPPHIRE and the Western Indian Ocean Sustainable Ecosystem Alliance (WIOSEA).

Table 5: Fisheries and environmental treaties, conventions and protocols ratified by Somalia

	Treaty, convention, protocol	Year ratified
1	Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing	2015
2	Basel Convention - Control of Transboundary Movements of Hazardous Wastes and their Disposal	2010
3	Cartagena Protocol on Biosafety - Safe Handling, Transport and Use of Living Modified Organisms (LMOs)	2010
4	Kyoto Protocol to the United Nations Framework Convention on Climate Change	2010
5	Convention on Biological Diversity	2009
6	United Nations Framework Convention on Climate Change	2009
7	Protocol Concerning the Conservation of Biological Diversity and the Establishment of Network of Protected Areas in the Red Sea and Gulf of Aden	2005
	United Nations Convention on the Law of the Sea (UNCLOS)	1989
8	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	1985
9	Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Eastern Africa Region (Nairobi Convention)	1985
10	Regional Convention for the Conservation of the Red Sea and the Gulf of Aden Environment	1985
11	Convention on the Conservation of Migratory Species of Wild Animals	1979

5.4 Challenges and opportunities in the fisheries sector

5.4.1 Challenges to growth

Despite its ever-increasing importance in terms of fish production, employment creation and generation of hard currency, the fisheries sector is currently facing critical challenges that may affect its long-term viability if proper and coordinated interventions are not implemented.

The main challenges can be summarized as follows:

- Weak institutional and legal frameworks for fisheries management and development
- Lack of reliable data (e.g. catch statistics, stock status)
- Poor supporting infrastructure and cold chain facilities for harvesting, processing and marketing of fish and fishery products
- Limited access to regional and international markets for Somali fish and fishery products
- Absence of a competent national authority responsible for the inspection, verification and certification of fish and fishery products
- Outdated and inefficient fishing gear and methods
- Illegal, unreported and unregulated (IUU) fishing activities
- Limited access to microfinance, credit facilities and fishing inputs
- Lack of appreciation of the value of fisheries resources among the general public
- Acute shortage of a skilled and professional workforce at all levels and occupations in the fisheries sector.

5.4.2 Opportunities for investment

Despite the challenges listed above, the fisheries sector still offers a number of opportunities for investment that can unlock its potential and increase its contribution to national economic development, food security, foreign exchange earnings and employment opportunities.

These opportunities include the following:

- Establishment of shore-based facilities and fishing ports to exploit abundant coastal and oceanic fisheries resources
- Establishment of bunkering facilities and chandlery services for the licensed tuna fleet
- Value addition and eco-labeling of fish and fishery products for domestic and export markets
- Production of quality fishmeal and oil
- Manufacture of appropriate fishing vessels, gear and other fishing inputs
- Sport fishing and eco-tourism development.

5.5 Status of human capital development in the fisheries sector

5.5.1 Pre-war situation

Fishing has never been a major economic activity for most Somali people owing to Somalia's nomadic culture, which does not favor occupations involving manual labor such as fishing. Small traditional fishing communities were shunned and discriminated against for centuries. As recently as 50 years ago, members of these communities were not allowed to marry into pastoralist and other non-fishing communities. Fishing communities were so isolated that in many parts of the country their members lived in makeshift camps located far from the main villages with little or no interaction between them and the wider non-fishing population. As a result, members of the non-fishing communities rarely took up fishing as an occupation. Traditional fishing communities relied for their survival on primitive fishing techniques using outdated gear and methods that were neither modified nor upgraded for centuries as they passed down through generations without any input from the outside world. There were no non-governmental organizations (NGOs) or government agencies providing training or capacity building programs to local fishers.

Systematic training and skills development for the fisheries sector was non-existent until 1954 when the Italian Trusteeship Administration (Amministrazione Fiduciaria Italiana della Somalia — AFIS) established the first Fisheries and Maritime Professional School (Scuola Professionale Marittima e di Pesca) in Mogadishu.[56] The school, which provided an intermediate level of education, was intended to train skilled workers for the maritime and fisheries sectors. It functioned through the mid-1960s but was closed for unknown reasons. It remained closed for several years and was only reopened in 1971, two years after Siyad Barre took power, under a new name (the Maritime and Fisheries Institute) with an upgraded status as a technical secondary school. Like all other technical schools at the time, the institute initially relied on the services of foreign teachers as there were not many Somalis in the country who were qualified to teach maritime and fisheries subjects.

In order to rectify this problem, in 1976 the government established the Technical and Commercial Teachers College to train teachers for three groups of schools, namely the Maritime and Fisheries Institute, the Mogadishu and Burao Technical Schools (Polytechnics) and the Sheikh Yusuf Al-Kowneyn Commercial Secondary School in Mogadishu. In the 1980s, another maritime and fisheries institute was established in Barawe to cater for the skills needs of the fishing communities in the Lower Shabelle region and surrounding areas.

The Technical and Commercial Teachers College had three departments, one of which offered maritime and fisheries education. The Maritime and Fisheries Department offered three bachelor of science (BSc) degree programs, in fisheries studies, nautical studies and marine engineering. The two institutes and the college were together able to produce a sufficient number of job-ready graduates, allowing the country to become self-reliant within several years when it came to the skills needs of the maritime and fisheries sectors.

[56] Hussein, A. Sh. A. (2015). Educational Challenges in Post-transitional Somalia. Heritage Institute for Policy Studies. Mogadishu, Somalia.

Training offered by the two institutes was so advanced that graduates, who were deployed as cadets on Somali-owned industrial trawlers, were able to replace all foreign officers and assume their duties and responsibilities within a relatively short period of time. Likewise, degree-holding graduates who opted to join the civil service climbed the government ladder and were playing important roles in both the fisheries and maritime sectors when the government collapsed in 1991.

In an effort to train more professionals for the fisheries and maritime sectors, the government also sent dozens of school leavers and employees of the ministries of fisheries, ports and marine transport abroad on scholarships, first to the USSR and later to Britain and Sweden, to study for bachelor's and master's degrees in maritime and fisheries. Another source of skilled workers and professionals for the fisheries sector was the Somali navy, which usually had a surplus of ship captains, marine engineers, coxswains, boatswains and other qualified technicians. Whenever there was a skills shortage, the government promptly transferred the required manpower on a secondment or a permanent basis, depending on whether or not a replacement could be found. What made the transfer much easier was the fact that the agencies making the requests were government-owned entities like fish factories and fishing companies (such as SHIFCO). In some cases, the government transferred naval or military officers to other state agencies including the fisheries ministry without any official requests from the beneficiary institutions.

Training and other skill development programs for the fishing cooperatives and private fishing companies were provided by the Ministry of Fisheries and Marine Resources through its fisheries extension services under the supervision and guidance of the Departments of Production and Training.

5.5.2 Post-war situation

The 1991 civil war demolished the education system and much of the infrastructure that supported it. The ensuing period of instability and conflict in many parts of the country further exacerbated the problem, making the recovery and reconstitution of the education system painfully slow and disorganized. Due to the absence of government-supported educational institutions, the private sector, diaspora, NGOs (both local and international), local communities and religious organizations filled the vacuum and began setting up schools and universities with limited regulatory oversight from national, state or local authorities.[57] Thanks to the initiatives of these different providers, hundreds of thousands of Somali children were able to access formal education from primary to secondary school and beyond, mostly in their own cities and towns. Unfortunately, the lack of regulatory oversight has led to the commercialization of the education sector and proliferation of institutions of higher learning, especially universities without adequate facilities or qualified teaching staff.

Recent studies on the higher education system have provided detailed analyses of local universities covering a wide range of issues including the quality and quantity of academic programs, qualifications of academic staff, student enrollment, learning and teaching facilities, research capacities, and challenges facing tertiary institutions.[58]

[57] Heritage Institute for Policy Studies (2013). The State of Higher Education in Somalia: Privatization, Rapid Growth and the Need for Regulation. Mogadishu, Somalia; Anon, (2018). Public-Private Partnership in Higher Education in Puntland. Ministry of Education and Higher Education of Puntland State and Vrije Universiteit Amsterdam.

[58] Somaliland Development Fund (2016). Functional Review of the Berbera Maritime and Fisheries Academy, March & April 2016 Final Report, 14 April 20

The studies have highlighted several glaring weaknesses in higher education that undermine the ability of local universities to produce job-ready, adequately trained graduates. These include an absence of regulatory oversight, duplication of academic programs, lack of coordination, shortage of qualified teaching staff, limited research and publishing capacity and limited learning and teaching facilities and resources.

“The studies have highlighted several glaring weaknesses in higher education that undermine the ability of local universities to produce job-ready, adequately trained graduates

Although pioneering higher learning institutions emerged on the education scene in the 1990s, maritime and fisheries education was not reintroduced until 2005 when the Berbera Maritime and Fisheries Academy opened its doors and began admitting students to its diploma programs. The academy was later elevated to a full university and currently offers four undergraduate degree courses in nautical science, fisheries science, marine engineering, and port and shipping management as well as various short training courses.

Seven years later, two universities (Darul Hikmah University and City University of Mogadishu – both in Banadir region) joined the Berbera Maritime and Fisheries Academy as the second and third institutions providing academic programs in the field of maritime and fisheries. Between 2013 and 2018, three more universities and one technical institute established maritime and fisheries faculties or departments and started enrolling students in their new academic programs. They include the Academy of Marine Studies, which is based in Mogadishu, and Bosaso University, East Africa University and the SMAFSI Institute, which are located in Bosaso.

None of the faculties and departments that currently offer maritime and fisheries education were included in the above-cited studies, though some of their parent universities were assessed. The management of the Somali National University in Mogadishu reported having admitted 100 students to its newly introduced marine science program last year (2019) but did not provide further details on the courses for analysis.

The following sections assess the current status of fisheries-related human capital development in the country, focusing on: local institutions of higher learning with maritime and fisheries academic programs; the quality, quantity and relevance of the existing fisheries-related courses; and the job readiness of locally-trained graduates. Other aspects to be analyzed include providers of non-academic training relevant to the fisheries sector; existing skills shortages and skills gaps; and the challenges affecting human capital development.

5.5.3 Academic institutions with maritime and fisheries courses

Seven higher education institutions, comprising six universities and one technical institute, currently offer academic programs in the field of maritime and fisheries (See Table 6). However, the Berbera Maritime and Fisheries Academy, which is one of the seven institutions, is not included in this analysis as it has recently been the subject of a similar assessment[59] and because this study does not include Somaliland. Of the remaining six institutions, three universities are based in Mogadishu while the remaining two universities and one technical institute are located in Bosaso, Puntland. Within the six institutions, faculties and departments that offer maritime and fisheries programs are relatively new, having been established over the last eight years. As a result, only three out of the six institutions have so far produced maritime and fisheries graduates while students at the other universities are still pursuing their studies.

[59] Hassan, W.M. (2016). Puntland Higher Education Labor Market Survey. Puntland Ministry of Education and Higher Education, VU University Amsterdam and CARE International.

In total, 12 academic programs are offered at these institutions, comprising 11 undergraduate courses and one postgraduate diploma course that usually take full-time students from one to four years, depending on the course (See Table 7). There are no distance or online learning options available to students living outside the two cities. Among the institutions, City University of Mogadishu, Darul Hikmah University and the Academy of Marine Studies have the largest number of academic programs, each offering three courses in total. The remaining three institutions offer only one course each.

With regard to fields of study, there are few areas of specialization available to students since seven out of the 11 undergraduate courses offered by the six institutions are in marine and fisheries sciences (save for two courses in which fisheries science is combined with either nautical science or marine environment instead of marine science). Other available courses include, maritime law, marine navigation and mechanics, nautical science and maritime transportation, shipping and ports administration, and maritime management and economics – the latter being the only postgraduate course in the field of maritime and fisheries currently available in the country. However, these courses are offered at only three Mogadishu-based universities. City University of Mogadishu is reported to be in the process of introducing a master's degree program in fisheries management in collaboration with the University of Tromsø in Norway.

Table 6: Maritime and fisheries academic institutions

	Institution	Location	State/region	Year established*
1	Berbera Maritime and Fisheries Academy	Berbera	Somaliland	2005
2	Darul Hikmah University	Mogadishu	Banadir	2012
3	City University of Mogadishu	Mogadishu	Banadir	2012
4	SMAFSI Institute	Bosaso	Puntland	2014
5	Academy of Marine Studies – Somalia	Mogadishu	Banadir	2015
6	East Africa University	Bosaso	Puntland	2017
7	University of Bosaso	Bosaso	Puntland	2017
8	Somali National University	Mogadishu	Banadir	2018

*indicates the year faculties and/or departments of marine and fisheries were established

Table 7: Maritime and fisheries courses offered at local academic institutions

	Institution	Course Name	Duration (years)
1	Darul Hikmah University	BSc in Fisheries Science	4
		BSc in Nautical and Fisheries Sciences	4
		Postgraduate diploma (PGD) in Maritime Management and Economics	1
2	City University of Mogadishu	BSc in Marine Science - Fisheries and Aquatic Sciences	4
		BSc in Marine Science - Shipping and Ports Administration	4
		BSc in Marine Science – Nautical Science and Maritime Transportation	4
3	Academy of Marine Studies – Somalia	Bachelor of arts (BA) in Maritime Law	4
		BSc in Marine Environment and Fisheries Science	4
		BSc in Marine Navigation and Mechanics	4
4	East Africa University	BSc in Marine and Fisheries Sciences	4
5	University of Bosaso	BSc in Fisheries and Marine Sciences	4
6	SMAFSI Institute	Undergraduate Diploma (UGD) in Marine and Fisheries Sciences	2

5.5.3.1 Teaching staff

The six institutions reported having a total of 35 lecturers with specializations in the field of maritime and fisheries (See Table 8). Among the institutions, the Academy of Marine Studies reported the largest number of lecturers (18), accounting for 51 percent of the total number of the academic staff teaching subjects in the maritime and fisheries fields. Bosaso and East Africa Universities have two lecturers each, making them the institutions with the lowest number of academic staff in the country. The four remaining institutions reported having either four or five lecturers. Bachelor's degree is the credential most commonly held by academics. All the lecturers are Somali nationals except for two foreigners, one of whom teaches at City University of Mogadishu and is the holder of the only doctorate degree reported. In terms of gender, 34 out of the 35 lecturers are male, showing the scarcity of female academics in maritime and fisheries education. It is possible that the lone female lecturer may have another specialization, as universities often share academic staff across common courses within their institutions. Fishing and related occupations is generally a male-dominated industry that attracts few female professionals.

Table 8: Specialization and credentials of academic staff

Institution	Area of specialization	Gender		Academic credentials					Total
		M	F	UGD	BSc	PGD	MSc	PhD	
Darul Hikmah University	Maritime and Fisheries	5			1		4		5
City University of Mogadishu	Maritime and Fisheries	4		1			2	1	4
East Africa University	Maritime and Fisheries	2			1		1		2
University of Bosaso	Maritime and Fisheries	2			1	1			2
Academy of Marine Studies – Somalia	Maritime and Fisheries	12			6		6		12
	Maritime Law	5	1		5		1		6
SMAFSI Institute	Maritime and Fisheries	5		1	3	1			5
Total		**34**	**1**	**2**	**16**	**2**	**13**	**1**	**35**
Percentage		**97.1**	**2.9**	**5.7**	**45.7**	**8.6**	**37.1**	**2.9**	**100**

5.5.3.2 Student population: current and past enrollment

The student population currently studying maritime and fisheries courses offered by the six institutions is estimated to be 352 undergraduate students (See Table 9). Among the institutions, City University of Mogadishu has the largest number of students enrolled in its BSc in Marine Science (Fisheries and Aquatic Sciences) program, comprising 123 males and five females. This is followed by Darul Hikmah University which has a student population of 63 scholars taking three different courses offered at its campus. The Academy of Marine Studies comes in third with 50 students, out of whom 48 are males and two are females.

Bosaso and East Africa Universities and the SMAFSI Institute have student populations of 48, 34 and 29 respectively. Like academic staff, few female students are studying maritime and fisheries courses at the six institutions, representing a mere 5.4 percent of the total student population. Analysis of student enrollment by course reveals that 239 (out of 352) students are enrolled in four undergraduate courses in marine and fisheries sciences, making these courses the most popular field of study. A further 86 students are pursuing a degree in fisheries science either as a standalone course or in combination with nautical science or marine environment. The rest of the students (27) are enrolled in the undergraduate courses of maritime law, and marine navigation and mechanics.

One reason for the popularity of the courses in marine and fisheries sciences among students could be their wider availability and the lack of many alternative courses in other fields of study in maritime and fisheries. A total of 119 students have so far graduated from local institutions, including 111 males and eight females. Like current students, most graduates took undergraduate courses in marine and fisheries science. A small percentage of graduates (8.4 percent) had done the only postgraduate course available in the country (offered by Darul Hikmah University).

Table 9: Current and past student enrollment by gender, course and institution

Institution	Course name	Current			Graduated		
		M	F	Total	M	F	Total
Dar Hikmah University	BSc in Fisheries Science	37	0	37	23	1	24
	BSc in Nautical and Fisheries Sciences	23	3	26	23	1	24
	PGD in Maritime Management and Economics	0	0	0	6	4	10
Academy of Marine Studies – Somalia	BA in Maritime Law	16	0	16	0	0	0
	BSc in Marine Environment and Fisheries Science	21	2	23	0	0	0
	BSc in Marine Navigation and Mechanics	11	0	11	0	0	0
City University of Mogadishu	BSc in Marine Science: Fisheries and Aquatic Sciences	123	5	128	23	2	25
East Africa University	BSc in Marine and Fisheries Sciences	46	2	48	0	0	0
University of Bosaso	BSc in Marine and Fisheries Sciences	27	7	34	0	0	0
SMAFSI Institute	UGD in Marine and Fisheries Sciences	29	0	29	35	0	35
Total		**333**	**19**	**352**	**111**	**8**	**119**
Percentage		**94.6**	**5.4**	**100**	**93.3**	**6.7**	**100**

“In the absence of national quality assurance standards and benchmarks in tertiary education, it is not easy to independently evaluate the quality of academic programs offered by local universities

5.5.3.3 Quality of academic programs

In the absence of national quality assurance standards and benchmarks in tertiary education, it is not easy to independently evaluate the quality of academic programs offered by local universities. In this study, the six institutions under assessment were asked about the measures they have in place to ensure program quality.

All the institutions reported having various measures including strict admission requirements (secondary school leaving certificate, entrance exam, proficiency in English), periodic student assessments, course requirements and rigorous quality assurance systems (See Table 10).

When asked about the learning and teaching facilities they have at their disposal in order to deliver good quality academic programs, the institutions listed the facilities they have as lecture halls (26 percent), workshops (22 percent), libraries (17 percent), computer labs (17 percent), wet labs (9 percent) and field stations (9 percent).

Among these institutions, the SMAFSI Institute had the fewest facilities, with just one lecture hall at its disposal. Bosaso University and City University of Mogadishu were the only institutions with wet labs and field stations. None of the six institutions has a large, dedicated research or training vessel despite offering maritime and fisheries courses that involve at-sea data collection and onboard practical training. However, City University of Mogadishu reported having five small boats, which are used for student training and inshore sampling expeditions. Moreover, students from this institution are frequently taken to the port of Mogadishu for practical training onboard docked commercial ships. Only three institutions (Academy of Marine Studies, City University of Mogadishu and Bosaso University) reported having foundation courses aimed at building students' knowledge base before they start their chosen courses. Subjects taught during foundation courses include English, core subjects, computer science and swimming skills. None of the institutions reported providing internships and placement programs for graduating students.

Table 10: Internal academic quality assurance measures

Measures	Respondents	Percentage
Strict admission requirements	4	21
Periodic student assessments	6	32
Degree requirements	4	21
External evaluations of final exams	2	11
Rigorous quality assurance systems	3	16
Total	**19**	**100**

5.5.3.4 Graduates' perceptions of the quality of academic programs

Eighteen graduates from two universities and one technical institute were interviewed to gauge their perceptions of the quality of the academic programs these institutions offer. When asked about the quality of learning and teaching facilities, 47 percent of the graduates reported that the facilities at their alma maters were good while 35 percent indicated that they were adequate and 12 percent rated them as poor. Only six percent of the graduates regarded the facilities as very good (See Figure 1a).

With regard to the overall quality of the academic staff, graduates rated their lecturers as adequate (59 percent), good (24 percent) or very good (18 percent) (See Figure 1b). One hundred percent of Darul Hikmah University graduates and 80 percent of SMAFSI alumni rated their lecturers as adequate while City University of Mogadishu graduates rated the academic staff as adequate (33.3 percent), good (44.4 percent) or very good (22.2 percent). The interviews were facilitated by the respective institutions and so it is not known whether the graduates were coached to answer research questions in a certain way or whether the answers reflected their true perceptions.

The graduates were also asked what motivated them to pursue an academic program in the field of maritime and fisheries (See Figure 2). The majority of the graduates interviewed for this study (52%) reported "interest in the profession" as their main reason. Twenty four percent of the graduates selected "interest in helping people in need" as their main motivation. "Attractive compensation" was the third most popular reason, cited by 18 percent of respondents. A small percentage of the graduates selected "accessibility" or "less competition" as the drive behind their choice. None of the graduates picked "family influence" or "affordability" as their motivation.

Figure 1 a & b: Graduates' perceptions of maritime and fisheries education quality (overall)

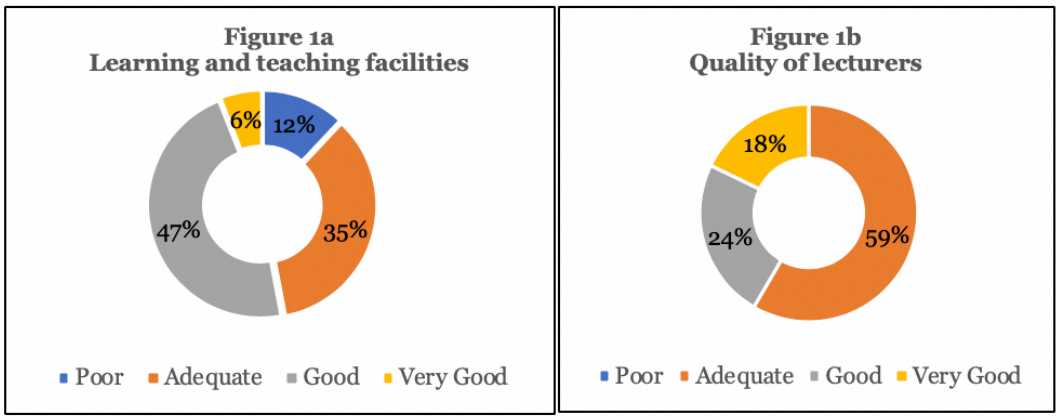
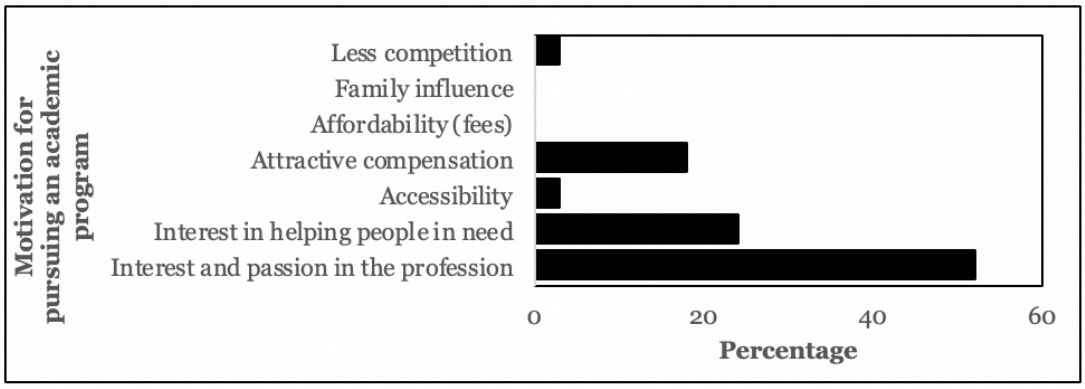


Figure 2: Student motivation for studying maritime and fisheries courses

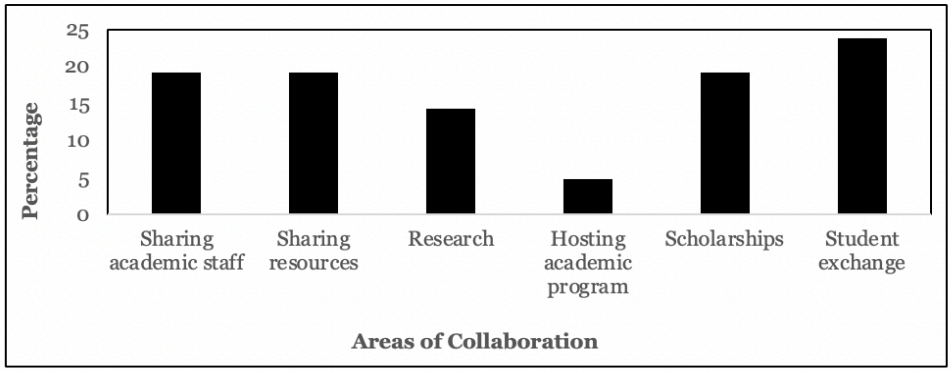


5.5.3.5 Partnerships with other institutions of higher learning

Collaborations and partnerships among institutions of higher learning are crucial not only for research and knowledge production but also for the exchange of innovative ideas. The six institutions were asked if they have partnerships or collaborations with local and international peers and if so, the main areas of collaboration.

All the six institutions reported having collaborative agreements of one form or another with local and international universities involving a wide range of issues, including student exchange, scholarships, research and sharing of academic staff and resources. Student exchange accounted for 24 percent of all collaborations (See Figure 3) while hosting academic programs on behalf of international universities represented the smallest number of collaborations, (five percent). Bosaso University reported the largest number of collaborations (five), followed by Darul Hikmah and East Africa Universities, each of which had four collaborative agreements with other universities. City University of Mogadishu and SMAFSI Institute had three collaborative agreements while the Academy of Marine Studies partnered with two peers.

Figure 3: Areas of collaboration with local and international universities



5.5.4 Challenges facing academic institutions

> *Key informant interviews (KIIs) and observations made in the course of this study revealed infrastructural, technical and financial challenges negatively affecting the quality of the six institutions' academic programs and the job readiness of their graduating students*

Maritime and fisheries education ceased altogether after the collapse of Somalia's government in 1991 and it has been reintroduced only recently, without proper planning, government support or regulatory oversight. Five out of the six institutions that currently offer maritime and fisheries courses are private entities that are under-resourced and operating under extremely difficult conditions. Key informant interviews (KIIs) and observations made in the course of this study revealed infrastructural, technical and financial challenges negatively affecting the quality of the six institutions' academic programs and the job readiness of their graduating students. Despite these challenges, the institutions provide valuable maritime and fisheries tertiary education to hundreds of secondary school leavers who would otherwise never have the opportunity to realize their career dreams, especially those from poorer families who are unable to pursue tertiary education abroad.

5.5.4.1 Inadequate teaching and learning facilities

Although all the six institutions reported having suitable learning and teaching facilities, observations made during site visits indicated that these facilities mostly fall far short of accepted international standards required to deliver high-quality academic programs. Facilities that are essential for conducting practical sessions, training and research were either absent or inadequate, such as equipped science laboratories, stocked libraries, marine field stations and in the case of nautical studies programs, maritime simulators and other navigational instruments. It is worth mentioning that City University of Mogadishu has an Automatic Identification System (AIS) at its disposal, which allows students and academic staff to monitor and track ships all over the world (especially those to and from Somali ports) by type, flag, port of registry, etc. All but two of the institutions operate out of small buildings or office blocks located in residential neighborhoods or on busy thoroughfares, offering a poor environment for gaining new knowledge and skills.

5.5.4.2 Limited number of qualified teaching staff

Regarding academic staff and their credentials, this research revealed that the six institutions do not have sufficient lecturers with relevant qualifications. The majority of the lecturers (51.4 percent) currently teaching in maritime and fisheries programs reportedly hold undergraduate diplomas or bachelor's degrees, with no further training or specialization in the courses they teach. Students are pursuing courses toward the same bachelor's degrees that their lecturers hold, in learning environments devoid of essential facilities required to deliver high-quality academic programs.

Reasons for the lack of qualified staff include: acute shortage of holders of higher degrees in the local market; lack of financial resources to hire qualified lecturers from abroad; and lack of staff development programs to strengthen the capacities of existing academic staff. Although a few lecturers have managed to get scholarships to study abroad either through their institutions or on their own initiative, the majority of academic staff do not have in-service research and staff development opportunities that would enable them to advance their careers. Moreover, Somali authorities, international donors and the private sector do not provide any meaningful support to the institutions in this regard.

To overcome the problem of academic staff shortages, City University of Mogadishu has resorted to using the services of qualified senior lecturers who are based in north America and Europe to virtually teach its maritime and fisheries courses via video conferencing. This is more convenient and cheaper than hiring foreign academics and bringing them into the country to teach in person. It represents commendable ingenuity that other tertiary institutions could embrace because, with good internet connectivity and modest investments in digital equipment, almost all theory classes and to some extent practical sessions could be delivered either online or through video conferencing by more qualified and experienced foreign lecturers. The result could be better learning outcomes for students.

5.5.4.3 Limited fields of study and courses not tailored to market needs

The six institutions offer limited fields of study; most of the undergraduate courses currently available are in marine and fisheries sciences. Moreover, these courses seem to have been developed without proper consideration for labor market needs or consultation with the private sector and other stakeholders. For example, the six institutions offer more or less similar undergraduate courses in marine and fisheries sciences, creating unnecessary and fierce competition among the institutions for students and leading to mass production of unemployable graduates who may never secure formal employment in the public or private sectors.

As detailed in section 5.5.4.7 below, graduate unemployment is a serious problem. Unless a solution is quickly found, these institutions may have to stop offering maritime and fisheries programs altogether for lack of intake as potential students opt for other courses that will help them get decent jobs after graduation. Some institutions have already reported having difficulties in securing enough student intake for their maritime and fisheries courses due to graduate unemployment and negative public perceptions surrounding fishing as an occupation. However, the problem is not about the courses themselves but rather that the curricula were not designed in response to the current skills needs of the market (see section 5.5.7 for details).

For graduates to be employable, the institutions need to either redesign their current courses or introduce new ones that are specifically tailored to market needs while at the same time giving new students more choices in their future career plans. They also need to consult widely with the fishing industry and government ministries before coming up with new academic programs.

5.5.4.4 Lack of financial resources

Establishing and running a successful institution of higher learning is a very expensive undertaking that requires huge financial resources, not only for day-to-day operations but also for teaching, research and other functions. The lack of reliable, sufficient funding sources is by far the biggest challenge that local institutions of higher education face since neither the government nor donor agencies provides meaningful financial support. Among the six institutions under assessment, the Academy of Marine Studies in Mogadishu is the only entity that receives government funding while the others rely exclusively on student tuition fees. None of these institutions reported having received non-tuition funding in the form of income from commercial operations, voluntary donations or philanthropic contributions.

“funding gaps have curtailed institutions’ ability to hire qualified lecturers, improve learning and teaching facilities, provide quality services and introduce industry-oriented academic programs designed to respond to the skills needs of the fisheries sector

These funding gaps have curtailed the ability of these institutions to hire qualified lecturers, improve learning and teaching facilities, provide quality services and introduce industry-oriented academic programs designed to respond to the skills needs of the fisheries sector. Some universities reported difficulties in funding their existing maritime and fisheries courses with the meager tuition fees they collect from students, forcing them to use income from other academic programs to subsidize these courses. The management of one institution revealed that members of its governing board had on many occasions contributed money from their own pockets to pay their lecturers’ salaries when tuition fees were not enough to cover all expenses.

5.5.4.5 Limited research and publishing capacity

Beyond teaching and knowledge transfer, research is another key mission of universities across the world. The importance of research by institutions of higher education as a tool for building knowledge and facilitating learning cannot be overemphasized. The aphorism “publish or perish” applies equally to universities and to individual members of academia. One key metric against which universities are evaluated and ranked is the volume of research and high-quality, citable publications they produce. However, none of the six institutions in this study currently engages in any meaningful research and publishing activities other than capstone projects undertaken by graduating students in partial fulfillment of the requirements for their bachelor’s degree courses.

This is quite understandable given the fact that most of these institutions have neither the required financial resources nor the qualified staff (and facilities) to conduct high-quality research. However, they can still initiate inexpensive but impactful research projects if they collaborate with local research organizations and foreign universities. Such collaborative research projects could enable universities to develop the capacity of their academic staff and students. Once their research capacity is built, the institutions can generate additional income from contract research conducted for private companies, donor agencies and government departments.

5.5.4.6 Lack of standards and quality assurance systems

The lack of an effective national authority responsible for the standards and quality of higher education remains one of the biggest challenges facing local tertiary institutions, which largely operate as autonomous private entities.[60]

These institutions mostly develop their academic programs and set their admission requirements, assessment criteria and quality benchmarks for their courses without much involvement, input, guidance or supervision of the ministries of education at the federal and state level. Although the federal Ministry of Education, Culture and, Higher Education has recently established a commission for higher education, the subsector remains largely unregulated beyond the requirement for all universities and mid-level colleges to register with relevant ministries at the federal and state level before they start operations.

[60] Hassan, W.M. (2016). Puntland Higher Education Labor Market Survey. Puntland Ministry of Education and Higher Education, VU University Amsterdam and CARE International.

Crucial oversight roles of the federal and state ministries of education such as harmonization of academic programs, overseeing quality standards, coordination, planning and development of higher education in the country are either lacking or inadequate. A large number of small for-profit private tertiary institutions have been established across the country without proper facilities or qualified academics. These institutions rarely collaborate among themselves or link up with more established universities to share staff, facilities, resources, knowledge or research outputs. The proliferation of these small universities has not only diminished the overall reputation of the country's higher education system but also produced unprepared, unemployable graduates who invariably join the ranks of jobless youth.

Although most of the six institutions under assessment are more established and better resourced than the small for-profit universities, they also operate in this unregulated environment and face the same challenges as their peers. The higher education subsector would greatly benefit if the new commission is institutionalized, empowered and facilitated to enforce laws, regulations and policies pertaining to higher education.

5.5.4.7 Graduate unemployment

It is every student's dream to secure a decent job relevant to their field of study as soon as they complete their courses. Unfortunately, this dream has not yet come true for many locally-trained maritime and fisheries graduates who remain unemployed for years despite an acute professional skills shortage in the fisheries sector. This study sought to better understand this paradox by interviewing graduates, officials of the federal and state ministries of fisheries and managers of fishing companies. Almost all respondents recognized graduate unemployment as a problem but expressed different views as to the cause.

Graduates identified the following challenges as barriers to securing formal employment:

- Hiring of unqualified individuals to fill vacant government positions on the basis of nepotism and cronyism rather than meritocracy, in blatant disregard for recruitment procedures
- The requirement that one has to have a guarantor before being considered for a government job (some graduates interviewed in Mogadishu claimed that they were told to bring their members of parliament or other high-ranking officials to act as guarantors - for security reasons)
- The underdeveloped state of the fisheries sector, which is now mostly made up of small, family-owned businesses that cannot absorb many locally-trained graduates; most vacant positions are low-skilled jobs that do not require a degree and are invariably given to family members or other unskilled persons who undergo on-the-job training
- The reluctance of job-seekers to accept unpaid positions offered by some ministries that could eventually lead to formal employment should they persevere and perform well in their assigned duties
- The limited number of NGOs and international development agencies providing employment for maritime and fisheries graduates

Managers of fishing companies attributed the problem of unemployment to graduates' lack of relevant technical skills, indicating a mismatch between training received and employment opportunities in the fisheries sector. When asked about graduates' skills and competences in terms of quality service delivery and their ability to fulfill professional job requirements, the managers rated locally-trained graduates as either poorly prepared (56.4 percent) or barely prepared (34.8 percent), with none of the respondents regarding them as well prepared to perform their duties. None of the managers had ever employed any maritime and fisheries graduates and might have based their views on past experiences of dealing with graduates from other specializations.

"Managers rated locally-trained graduates as either poorly prepared (56.4 percent) or barely prepared (34.8 percent), with none of the respondents regarding them as well prepared to perform their duties

Officials from the federal and state fisheries ministries echoed the views of the fishing company managers. One of the officials said that one graduate volunteering at a ministry "claims to have obtained a degree in marine science from a Mogadishu-based university and seems to know nothing about fisheries based on several assignments given to him…unless retrained, [these graduates] are poorly prepared."

There seems to be a direct relationship between potential employers' negative perceptions and graduates' unemployment as only nine percent of maritime and fisheries graduates have secured formal employment in the fisheries sector while another nine percent have gone overseas to further their studies.

When asked about their employment options, graduates opted for the federal and state ministries of fisheries as their preferred employer after self-employment, despite the alleged irregular hiring practices. However, the ministries are not in a position to offer employment opportunities for graduates due to the following challenges:

- The federal government's blanket moratorium on new recruitment in the public sector
- The unqualified staff that populate the federal and Puntland fisheries ministries, who cannot be dismissed outright for lack of funds to pay termination benefits
- The inability of FMS ministries of fisheries to employ maritime and fisheries graduates due to lack of financial resources

As some of these challenges may take years to resolve, graduates need to change their perceptions towards government jobs as a panacea and consider self-employment as an alternative route out of joblessness. As things stand, self-employment may be the best option for graduates considering that the fisheries jobs most in demand require a high level of technical skills and experience. Locally-trained graduates cannot meet this requirement unless they are upskilled and retrained through internship programs or on-the-job training for at least six months. However, this is too costly and time-consuming for the private sector. Self-employment is not only possible but also practical. For example, two teams of SMAFSI graduates recently started thriving fish distribution ventures in Bosaso with little start-up capital.

5.5.5 Other providers of fisheries training programs

There are several other providers of training programs in the fisheries sector including INGOs, UN organizations, international development agencies, fishing companies and fisheries ministries at the federal and state level. However, unlike academic programs offered at tertiary institutions, training programs implemented by the above-mentioned providers are mainly short courses designed to build the capacities of specific target groups selected from the wider fishing communities.

Among the providers, INGOs, UN organizations and international development agencies provide the vast majority of training programs, which are implemented either by the international providers themselves or through LNGOs, tertiary institutions (mostly City University of Mogadishu) and in some cases the ministries of fisheries. Donor-funded capacity building initiatives are rare and often form part of multi-activity fisheries projects. These trainings are often designed without much involvement or input from local authorities or other relevant stakeholders.

This top-down approach has a number of shortcomings that could reduce training quality and effectiveness in equipping trainees with valuable skills to improve their living standards. This study identified shortcomings such as courses not lining up with beneficiaries' actual needs, poor selection criteria for trainees, inappropriate timing, inadequate course duration and little or no practical work. The lack of coordination among providers also leads to duplication of training courses and their concentration within certain geographic areas. For training to be effective and beneficial, providers need to urgently address these shortcomings through better coordination and consultation with local authorities and other relevant stakeholders before designing capacity building initiatives.

Fishing companies do not provide training opportunities to stakeholders in the fisheries sector other than allowing academic institutions to use their facilities and products to train students. The ministries of fisheries do not initiate their own training programs due to lack of funds, but sometimes implement certain courses through letters of agreements (LOAs) with international partners.

"The ministries reported a total of 274 employees, out of whom only 19 (6.9 percent) had specializations in the field of maritime and fisheries

5.5.6 Ministry of fisheries staff with maritime and fisheries qualifications

Federal and state fisheries ministries were interviewed as part of this study and requested to provide information on their employees with academic qualifications. The ministries reported a total of 274 employees, out of whom only 19 (6.9 percent) had specializations in the field of maritime and fisheries (See Figure 4). Of the 274 total employees, 117 work for the Puntland government, 115 for the federal government, 15 for Jubaland, 10 for Galmudug, nine for Hirshabelle and the remaining eight for the South West state. Among government staff with maritime and fisheries qualifications, six hold diplomas, nine hold bachelor's degrees and four have master's degrees. None has obtained a doctorate degree (See Table 11).

With regard to the geographic distribution of maritime and fisheries professionals, nine are based at the federal Ministry of Fisheries and Marine Resources in Mogadishu, four in Hirshabelle, two in Puntland and two in Galmudug while Jubaland and South West States each have one. There are no women among employees with maritime and fisheries qualifications, a trend that was observed both in academia and among students pursuing courses in this field.

In Puntland, 98.3 percent of MoFMR employees have no qualifications in the field of maritime and fisheries. The corresponding figures for other ministries are 93.3 percent for Jubaland, 92.2 percent for the federal government, 87.5 percent for South West and 80 percent for Galmudug. Hirshabelle has the lowest number of employees (55.6 percent) without maritime and fisheries specializations. The number of maritime and fisheries professionals employed by the federal and state ministries of fisheries is unacceptably low for a country with the longest coastline in Africa and one of the largest EEZs in the Western Indian Ocean region.

Figure 4: Fisheries-related academic qualifications of MoFMR Staff

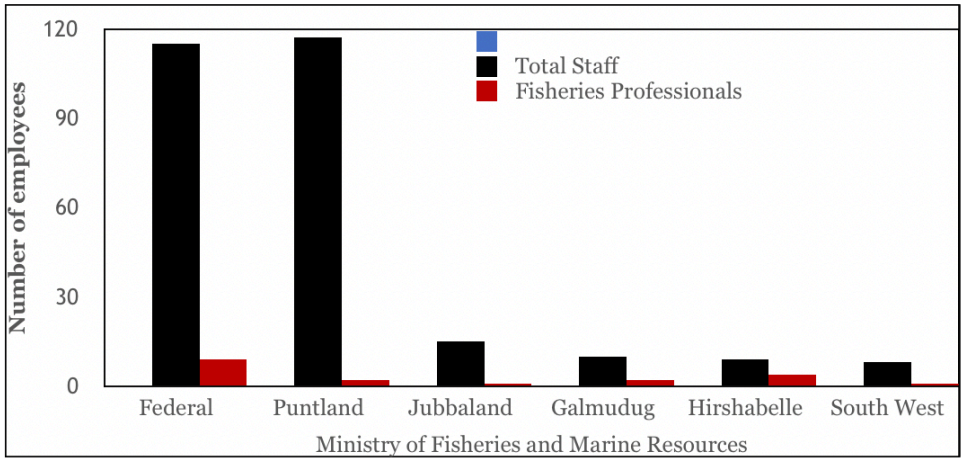


Table 11: Qualifications of MoFMR staff with maritime and Fisheries specializations

Institution	Area of Specialization	Gender		Academic credentials					Total*
		M	F	Diploma	BSc	PGD	MSc	PhD	
Federal Ministry of Fisheries	Maritime and fisheries	9	0	0	5	0	4	0	9(115)
Puntland Ministry of Fisheries	Maritime and fisheries	2	0	1	1	0	0	0	2(117)
Galmudug Ministry of Fisheries	Maritime and fisheries	2	0	2	0	0	0	0	2(10)
Hirshabelle Ministry of Fisheries	Maritime and fisheries	4	0	2	2	0	0	0	4(9)
South West Ministry of Fisheries	Maritime and fisheries	1	0	1	0	0	0	0	1 (8)
Jubaland Ministry of Fisheries	Maritime and fisheries	1	0	0	1	0	0	0	1(15)
Total		**19**	**0**	**6**	**9**	**0**	**4**	**0**	**18**
Percentage		**100**	**0**	**31.6**	**47.4**	**0**	**21.0**	**0**	**100**

*Figures in brackets indicate the total number of staff of respective ministries of fisheries.

5.5.7 Skills shortages and skills gaps

The fisheries sector has seen significant growth over the last 30 years, both in terms of fish production and fisher population. The observed growth is expected to continue its upward trajectory over the medium to long term, thanks to renewed interest from local and international investors. However, the sector may not be able to realize its potential unless existing challenges are urgently addressed. One such challenge is the lack of a skilled workforce to propel the sector forward and sustain its growth.

The following factors have impeded the development of a skilled workforce in the sector:

- The abrupt cessation of maritime and fisheries education as a result of the civil war
- The limited transfer of skills from the old generation to a new one due to emigration, mortality and retirement
- The reluctance of youth to pursue TVET programs and other technical education mainly due to a negative cultural mindset towards careers in trades
- The lack of a national skills development policy to cater to the sector's skills needs
- The absence of government-funded, sector-oriented TVET programs, technical colleges and universities
- The belated reintroduction of academic programs in the maritime and fisheries field by local tertiary institutions
- The mismatch between academic programs offered at tertiary institutions and the fisheries sector's skills needs
- A lack of appreciation of the value of fisheries resources among the general public.

"The industry is experiencing a skills shortage of more than 70 percent, with the most in-demand jobs being those that require technical qualifications or extensive hands-on experience

These factors have resulted in a severe shortage of skilled fishery workers and professionals which threatens the sector's long-term viability. This skills shortage is not confined to one particular area but affects the entire fishing industry as well as related institutions. According to the managers of fishing companies interviewed for this study, the industry is experiencing a skills shortage of more than 70 percent, with the most in-demand jobs being those that require technical qualifications or extensive hands-on experience.

"Information gathered in the course of this study indicated that the country has only two refrigeration engineers, neither of whom currently works in the fishing industry

A skills shortage in the refrigeration field is indicative of the challenges facing the fishing industry. Stories abound of fish factories, dhows and reefer trucks sitting idle for weeks or even months awaiting repairs due to an acute shortage of qualified refrigeration technicians and engineers. Information gathered in the course of this study indicated that the country has only two refrigeration engineers, neither of whom currently works in the fishing industry.

There are also a small number of refrigeration technicians who have never received any formal training but who have gained hands-on experience through many years of working in repair workshops. However, there is growing concern among fishing company managers about the capacity of some of these technicians to carry out effective repairs and maintenance of technologically-advanced refrigeration systems.

One manager described how a local technician spoiled his expensive (Thermo-King) reefer unit, accusing him of incompetence, carelessness and destructiveness. The unit was eventually taken to Dubai for professional repair. The manager recounted how the refrigeration engineer who eventually repaired the damaged unit reacted when he saw the damage, exclaiming "a rodent must have gnawed on the electrical wires as a qualified technician of sound mind could not have done such a shoddy job."

Qualified electrical engineers are also in short supply. In Mogadishu, six different companies including two fish processing plants and one meat factory have had to share the services of one qualified electrical technician. Specialists in inboard and outboard engine repair and maintenance are not that many either and can only be found in bigger cities. It is not unusual to see hundreds of fishing vessels strewn on remote coastal beaches for repairable engine problems that cannot be fixed in situ due to the lack of qualified engine repairmen.

Skills gaps also affect all levels of the sector, including the private sector, fishing cooperatives and government institutions. The vast majority of people working in the sector are either unskilled or semi-skilled and they urgently need retraining and upskilling in order to effectively perform their duties. Even artisanal fishers are not skilled enough to satisfy the growing market demand for fish. They lack modern fish harvesting skills and basic knowledge in proper fish handling, hygiene and sanitation practices, which are important for ensuring the quality of landed fish. Seamanship and safety at sea are other areas in which local artisanal fishers have gaps in their skills. Fishing companies are similarly skills-deficient in fish processing, quality assurance, cold chain management, and marketing and distribution of fish and fishery products.

Fisheries ministries at the federal and state level are responsible for the development, management and conservation of the country's fisheries resources, but they do not have sufficient cadres of fisheries specialists capable of implementing sectoral policies, programs, and other initiatives. The few senior fisheries experts the ministries have are well over the statutory retirement age of 60 and may not be around for long. This is compounded by a lack of mid-career professionals who could take the mantle from the retiring experts. The vast majority of federal and state MoFMR staff are poorly prepared to discharge their duties and lack the capacity to effectively respond to the increasing demands of an expanding and increasingly complex fisheries sector that is engaged in regional and international obligations and national cross-sectoral collaborations. Currently, the ministries have neither human resources development plans nor budgets allocated for staff development.

There are no quick fixes for the sector's current skills shortages and gaps but with better planning, commitment and investment in quality education and training, appreciable technical skills can be developed in critical areas of the fishing industry within a relatively short period of time.

Fisheries specialists recruited from the diaspora and attached to federal and state ministries of fisheries as senior advisors could alleviate skill deficiencies in these institutions in the short term. For the long term, the federal and state ministries of fisheries need to formulate and implement a sector-wide skills development policies that set out strategies, plans and interventions necessary to satisfy the sector's skills needs.

The current skills shortages and gaps are mainly in the following areas:

- Seamanship
- Modern fishing methods and fishing gear technology
- Fish handling, hygiene and sanitation practices
- Fish processing and preservation
- Fish inspection and quality assurance (FIQA)
- Refrigeration and cold chain management
- Marketing and distribution of fish and fishery products
- Repair and maintenance services for marine engines
- Boat building and boat hull repair and maintenance services
- Mariculture
- Fisheries management and development
- Fisheries research, data collection and analysis
- Fisheries enforcement and observer corps
- Extension services

6.0 FISHERIES SECTOR STRATEGIC INTERVENTION FRAMEWORK

The following strategic interventions are proposed to address existing challenges and constraints in the fisheries sector and related institutions.

Table 12: Fisheries strategic interventions framework

Strategy	Constraints	Potential stakeholders	Interventions
Improve FGS and FMS laws, regulations and policies to optimize fisheries management for economic growth and employment creation	The fisheries sector remains underdeveloped, undervalued, small-scale, and based mainly on artisanal production, contributing a mere two percent of the GDP. Applied fisheries technologies and formal production are severely underutilized. Scaled investment could improve community livelihoods and create employment. Moreover, Existing Somali fisheries authorities are ineffective, and lack coordination, policies and planning that successfully engages stakeholders	FGS & FMS ministries of fisheries & marine resources; Ministries of planning, finance, rural development FGS &FMS; Chambers of commerce; International development partners; Ministries of Ports & Marine Transport (FGS & FMS); Coast guard, Universities & research organizations	Strengthen the institutional capacity of the federal and state ministries of fisheries and marine resources through restructuring, sufficient budgetary allocations, and staff development
			Review, harmonize and update federal and state fisheries legislation with clear-cut mandates and jurisdictional powers for each level of government (federal, state and local).
			Enshrine in fisheries legislation the revenue-sharing agreement between the FGS and FMS
			Enshrine in FMS fisheries legislation the principles of co-management and the rights and responsibilities of resource users
			Develop and implement a national fisheries policy to guide the development, management and conservation of fisheries resources
			Develop and implement a master plan for fisheries development in Somalia covering all states, resources and distinct ecosystems
			Develop and operationalize an effective monitoring, control and surveillance system at the federal and state level

Strategy	Constraints	Potential stakeholders	Interventions
			Conduct periodic stock assessment surveys and other relevant studies to establish the status, distribution, abundance and potential of key target species
			Develop and implement a nationwide data collection system and fisheries management plans for the important target stocks that are currently considered to be heavily exploited, such as inshore spiny lobsters, sharks and demersal fish species
			Develop and implement a national action plan to protect both coastal and oceanic fisheries resources through prevention, deterrence and elimination of illegal, unreported and unregulated fishing and other maritime crimes
			Create and operationalize a competent national authority with regulatory and investigative powers based on Fish Inspection and Quality Assurance (FIQA) regulations, responsible for the inspection, verification and certification of fish and fishery products
			Develop a master plan to create public infrastructure for fisheries (ports, jetties, feeder roads), a modern cold chain and other onshore facilities in collaboration with the private sector and partner agencies

Strategy	Constraints	Potential stakeholders	Interventions
Promote, support and facilitate private investment in the fisheries sector	Somalia fisheries are overwhelmingly artisanal, with limited investment in commercial applications. Although improving, the fisheries sector cannot reach its full potential without significant growth in private sector investment. Domestic and foreign investment is constrained by the broader enabling environment for business and limitations in the investment climate	FGS & FMS ministries of fisheries & marine resources; Ministries of planning, finance, rural development FGS &FMS; Chambers of commerce; International development partners; Ministries of Ports & Marine Transport (FGS & FMS); Investors (local and foreign);	Establish collaboration with the FGS MoPIED Office of Investment Promotion (SOMINVEST) to enhance investment guides specific to coastal and oceanic fisheries to promote the business case for investing in Somali fisheries Explore the potential for regional or national targeted tax incentives for domestic and foreign investors to offset the heavy initial capital expenditures for fisheries operations within the Somali Exclusive Economic Zone Support the development of foreign direct investment or domestic investment-backed development impact funds and private impact investment funds specific to the development of sustainable fisheries ventures that offer, for example, combinations of catalytic and concessional loans, as well as technical assistance grants that target skills and operational expertise

Strategy	Constraints	Potential stakeholders	Interventions
Address skills shortages and gaps in the fisheries sector through improved quality of education and training	Skilled fishery workers are in short supply and difficult to source locally. Local technical and educational institutions lack the expertise to produce skilled fishery workers. Left unaddressed, the skills shortage will result in constrained investment. Existing skills development initiatives are not calibrated to labor market needs. Fisheries-related academic, applied skills and vocational programs at local institutions of higher learning are in dire need of improvement with regulatory oversight, support, coordination, planning and commitment from all stakeholders	FGS & FMS ministries of fisheries & marine resources; Ministries of education FGS &FMS; Ministries of planning and finance (FGS & FMS); Chambers of commerce; International development partners; Institutions of higher learning; Local & international NGOs	Design, develop and implement a specific human resources development plan for the fisheries sector
			Institutionalize, empower and facilitate the newly-appointed transitional National Higher Education Commission (NHEC) to exercise regulatory oversight in maritime and fisheries education
			Institute a regular review, harmonization and accreditation process for fisheries-related academic programs offered by local institutions of higher learning that screens for quality, relevance and skills match to the demands of the fisheries sector tied to a National Qualifications Framework (NFQ)
			Encourage institutions of higher learning to split their undergraduate degree courses into four progressive levels of education (certificate, diploma, associate degree and full degree) in order to enhance student employability and job prospects, and to alleviate skills shortages
			Establish strategically located, publicly funded, fisheries-specific TVET programs, technical colleges and university-level education with the necessary infrastructural, human and financial resources to produce adequately trained fisheries workers
			Establish a dedicated marine and fisheries research institute in Mogadishu with branches in all member states
			Encourage existing institutions of higher learning to specialize in academic and applied sciences programs that are responsive to the skills needs of the fisheries sector
			Ensure that fisheries-related short training courses provided by international agencies conform to the skills needs of the fisheries sector

Strategy	Constraints	Potential stakeholders	Interventions
Create a maritime and fisheries graduate employment initiative as a means of enhancing employability and job prospects post-graduation	Current training programs lack alignment between fisheries-related tertiary education and the market needs, which leaves graduates discouraged when seeking employment and employers unable to find skilled workers. Uncoordinated efforts serve to artificially discourage the nascent maritime and fisheries education sector and create negative consequences for human capital development	FGS & FMS ministries of fisheries & marine resources; Ministries of labor (FGS & FMS) Ministries of education FGS & FMS; Institutions of higher learning; Ministries of planning and finance (FGS & FMS); Chambers of commerce; International development partners; Institutions of higher learning; Local & international NGOs	Establish a fisheries stakeholder working group comprising representatives of academia, the private sector, relevant ministries, donors and students to explore emergent skills needs of the fisheries sector Establish partnerships with the private sector or other fisheries stakeholders for applied learning, internship programs and apprenticeships as a way of enhancing student job readiness and introducing potential new employees to employers Introduce incentives for employers such as tax breaks to provide internships and apprenticeships or hire local maritime and fisheries graduates Refine qualification guidelines for fisheries-related government jobs and recruit local graduates into open positions Publish labor demand statistics to match coursework for graduates with future job openings Provide business management coursework as part of fisheries technical training for students considering self-employment or business management careers Establish partnerships with impact or other funds that can facilitate access to start-up funds, grants, equipment subsidies or other incentives for local graduates to start their own small companies

Strategy	Constraints	Potential stakeholders	Interventions
Establish, consolidate and improve the capacity of fishing cooperatives to co-manage all coastal fish stocks and other marine resources	Local fishing cooperatives are institutionally weak and lack the capacity to participate in the management of coastal fisheries resources. Many fishers erroneously believe that the stocks they target are inexhaustible. Compounding this problem is the low barrier to entry and lack of restrictions in terms of input (effort) and output (catches). Sustainable fisheries necessitate the participation and involvement of fishing communities in the management of coastal resources. At present, Somalia does not have viable fishing cooperatives with the human, financial and technical resources necessary for the co-management of coastal fisheries resources	FGS & FMS ministries of fisheries & marine resources; Chambers of commerce / investors; Fisheries cooperatives; Local governments; TVET institutions International Development partners	Introduce a licensing system for all artisanal vessels with a view to restricting open access to coastal fisheries resources Designate official fish landing sites at all major fishing centers and ban landing of fish at undesignated beaches Establish beach management units to oversee all fishing activities undertaken at designated fish landing sites Establish new district fishing cooperatives and reorganize existing ones in a transparent and inclusive manner, including free and fair elections of executive committees Complete the stalled registration of artisanal fishers and fishing boats in Somaliland, Puntland, Galmudug and Jubaland and extend the process to Hirshabelle and South West states, ensuring that all bona fide artisanal fishers and fishing boats in the country are duly registered Make it mandatory for artisanal fishers to join cooperatives in their respective districts Provide capacity building (including training on co-management principles) to fishing cooperatives to enable them to effectively run their affairs and to co-manage coastal fisheries resources Provide education to fishing communities that promotes marine biodiversity, conservation, sustainable utilization of fisheries resources and use of non-destructive fishing gear and methods

Heritage Institute for Policy Studies and City University of Mogadishu