

Evidence-based and policy coherent Oceans Economy and Trade Strategies

BARBADOS

Sustainable Marine Fisheries and Seafood Processing Fact Sheet¹

DRAFT- Not for Quotation

1. Introduction

The project “Evidence-based and policy coherent Oceans Economy and Trade Strategies” aims to support developing countries such as Barbados, Belize and Costa Rica, in realizing trade and economic benefits from the sustainable use of marine resources within the framework of the 1982 United Nations Convention on the Law of the Sea (UNCLOS). This data factsheet presents detailed sectorial information of one (of the four) ocean sectors selected in Belize to facilitate the identification and informed selection of key sectors to be considered for the next phase of the project:

➔ Sector 1	➔ Sector 2	Sector 3	Sector 4
Sustainable Marine fisheries	Seafood manufacturing	Sustainable Aquaculture	Coastal and Environmental Services

Fish and seafood are one of the most traded food items. Some 35 to 38 per cent of the world production enters international trade generating US\$ 152 billion in 2017. Over 50 per cent of this trade originates in developing countries whose net trade income (export – import), valued at US\$ 37 billion in 2013, is greater than the net income of most other agricultural commodities combined (UNCTAD-FAO-UN Environment 2018). CARICOM exports of fish and seafood have been estimated

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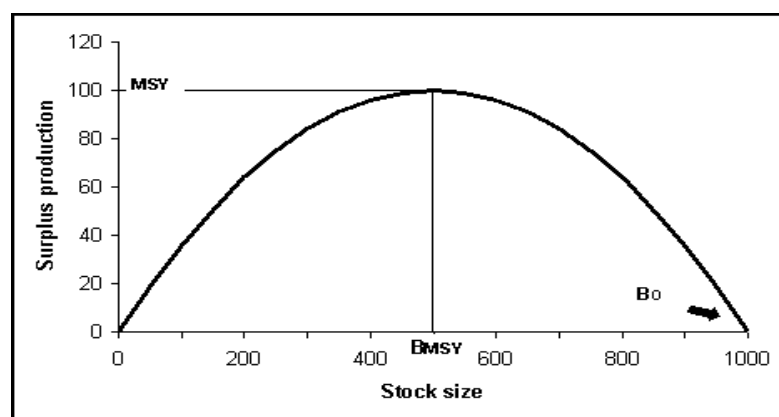
US\$ 400 million with a potential for additional US\$ 130 Million in exports, if appropriate food safety measures were in place (Jamaica Observer, May 29, 2016).

Sustainable Marine Fisheries

The word “fishery” can refer to the occupation, industry, or season for catching fish. It can also refer to the area of ocean where fish are caught, or the business of catching the fish. Generally, a fishery is an activity leading to harvesting of fish. It may involve capture of wild fish or raising of fish through aquaculture (NOAA Fish Glossary, 2006²). For the purposes of this fact sheet, marine fisheries do not cover inland or lakes fishing.

On an institutional basis, ‘sustainable fisheries’ can be perceived to be fishing practices and actions that follow, and effectively apply, relevant international agreements, guidelines and best practices agreed.³ A more methodological approach refers to the application of the maximum sustainable yield (MSY), in some cases updated by economic and social considerations. The UN Fish Stocks Agreement (1995) does provide obligations in relation to the sustainability of fish stocks using MSY.

Figure 1: Maximum Sustainable Yield



Source: FAO, 2002

Seafood Processing

Seafood processing refers to the activity that occurs post-harvest but pre-purchase, more specifically, the creation of value-added goods from aquatic life. Processing is the receiving and preparation of fish, including, but not limited to, cleaning, cooking, canning, smoking, salting, drying, or freezing (FAO Fisheries and Aquaculture Department, FAO, 2016).

2. The Seafood Value Chain

Marine fisheries and seafood processing closely relate to each other. Fish as well as other marine species are direct inputs for the seafood value chains which transforms them in a great variety of

² <https://www.st.nmfs.noaa.gov/st4/documents/FishGlossary.pdf>

³ See UNCTAD (2016) for a detailed discussion.

consumer goods. However, links may not necessarily exist based on domestic fish production exclusively. Imports may also play an important role in framing their relationship.

Upstream and downstream activities along the fish and seafood value chain provided significant employment and economic benefits to countries and local coastal communities. As a result, around 59.6 million people were employed in fisheries and aquaculture in 2016 and some 200 million direct and indirect employment opportunities occur along the fish and seafood value chain (UNCTAD-FAO-UN Environment 2018). The number of persons employed in direct production in the commercial marine capture fisheries and aquaculture sub-sectors in the Caribbean Regional Fisheries Mechanism (CRFM) region in 2013, was approximately 116,265 persons (97.5% employed in direct production in the marine capture fisheries and 2.5% employed in direct production in aquaculture). The total number of persons employed in the fisheries sector of the CRFM region was estimated at approximately 341,668 in 2013/2014 which was approximately 4.3% of the workforce of the region.

An important aspect of the seafood value chains is that it uses inputs from both the fisheries extractive sector and the aquaculture one to develop intermediate and consumer products. The seafood value chain can be disaggregated in the following activities: (i) harvesting: catching, cleaning, sorting, grading, and weighing; (ii) landing: cold storage, and icing, distribution to manufacturing point; (iii) cleaning: de-heading, slime removal, and meat/bone separation, and discarding waste; (iv) processing: salting, canning, packaging, branding; and (v) services and marketing: certification, transportation, marketing, wholesaling, and retailing (Graph 1). The manufacturing sector related to phase onwards in what is called post harvesting and includes cleaning, processing, services and marketing. At each stage of the seafood value chain, added value is expressed in terms of sale prices at landing, transportation fees, marketing fees, wholesale margins, retailer margins, profits by different intermediaries, final consumer prices, and taxes levied at various stages of the process.

GRAPH 1: A SIMPLIFIED REPRESENTATION OF THE SEAFOOD VALUE CHAIN



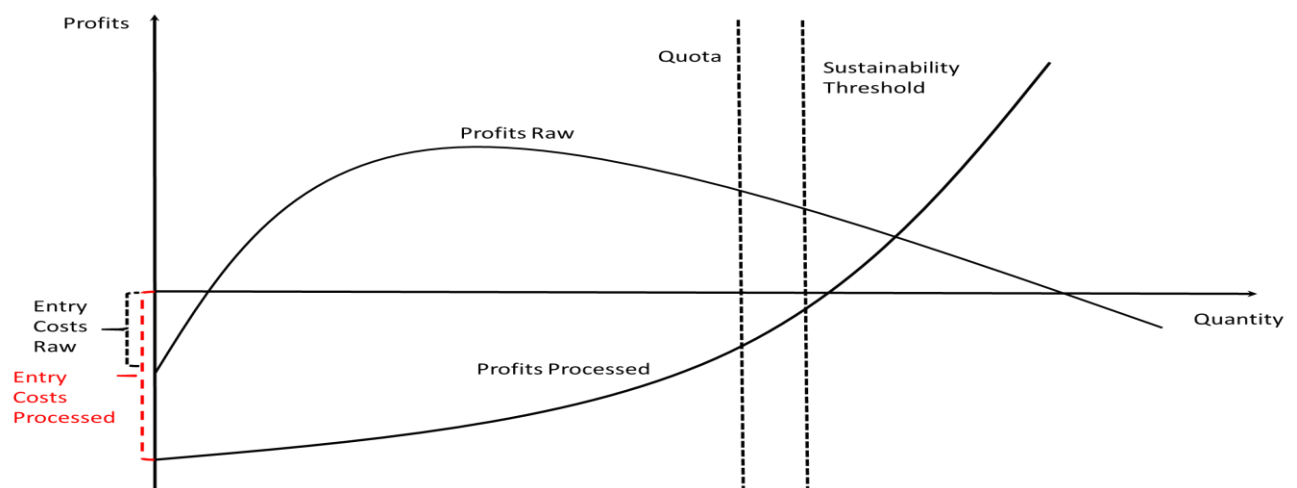
SOURCE: UNCTAD-FAO-UN ENVIRONMENT (2018)

Although value addition is generated by the transformation of the raw product into a more processed product, the price per unit of weight of the raw product may be lower when processed than when sold in its raw form as a fresh/chilled product. Production costs are expected to be larger for processed products as they may require costly technology and specific inputs such as aluminum in the case of canned products. Distribution/transportation costs however may be much higher for fresh and chilled products characterized by extremely constraining storage requisites. Based on this set of basic considerations, that would necessarily require refinement, a very rough conjecture would suggest that the profitability of raw production relative to that of processed production varies with the level of production itself. In other words, small production

levels may make raw products more profitable while higher levels may make processed products more profitable. A hypothetical situation is represented in Graph 2. The evolution of profits for raw products (fresh or chilled) wants to reflect the fact that transportation of larger quantities of fresh or chilled products may become more expensive as more distant markets have to be reached. Moreover, the cost of infrastructure to preserve the freshness of the products may increase non-linearly with the quantity to be stored. The evolution of prepared products profits reflects the possible existence of increasing returns to scale. As the size of the plant increases the average cost of production falls and overall profits increase proportionally more. The level of capture could be constrained by either a quota or some sustainability threshold. In graph 1 they are both located to the left of the crossing point of the two profit curves. This configuration would suggest that producing essentially raw products (everything else remaining the same) is a better strategy at least from a static point of view. The graph can be re-interpreted at different level of aggregation (i.e. plant, firm, cooperative, regional, national, international).

Graph 2 could be used as a basis for conceptualizing sectoral development strategies.

Graph 2: Profit Trajectory of Raw and Processed Fish Products



SOURCE: UNCTAD SECRETARIAT'S ELABORATION

3. Geographical and Institutional Context

Barbados has a very high exclusive economic zone (EEZ) to land territory *ratio of 1:434*. The local fishing industry is one of an open access, multi - species, multi - gear and seasonal nature. It is comprised of six main fisheries: shallow shelf reef; deep slope; coastal pelagic; large pelagic; flying fish, and sea urchins. Lobsters and conchs are of minimal importance and a fishing moratorium has been in effect for the sea turtle capture since 1998. In recent times the sea urchin (sea egg) fishery has operated under a semi - permanent closed season.

Figure 2: Barbados Fisheries – Sector Analysis



Source: FMP,2014; Barbados Economic and Social Report, 2017

There are over **1'000** registered fishing vessels in the commercial capture fisheries sector (Government of Barbados, 2014). There are approximately **30** fish landing sites around the island, categorized according to type of physical infrastructure and facilities as primary (markets), secondary (sheds) and tertiary (beaches). The majority of catches are landed at the primary sites and are often sold by the boat captain or owner directly to fish vendors (predominantly women), processors and consumers. The primary fish landing sites are at Bridgetown, Oistins, Consett Bay, Paynes Bay, Weston and Speightstown (Barbados Fisheries Division, 2004).

In 2016, within the traded sector, the contribution of non - sugar agriculture and fisheries to real GDP was estimated to be USD 19.8 million, an annual increase of 0.5 percent (Economic and Social Report 2016). Percentage contribution to GDP by the fishing industry is estimated at 0.15 percent. In 2016, the value of marine capture fish production was USD 7'910'852.

The contribution of fishing to the Barbados Gross Domestic Product (GDP) is currently undervalued and is usually cited as ranging between **USD 12-16 million per annum**. In terms of overall value, flying fish and dolphin fish account for more than **80** percent of the total value of fisheries. The GDP for Agriculture and Fishing industry for 2017 was BBD 129.3 Million (at current market prices) and BBD 105.5 million (using constant 2010 prices). The per capita GDP was BBD 28.6 thousand (Economic and Social Report 2016). Total value added at basic prices: BBD 8'482.8 million and GDP at market prices: 9'979 million (Barbados Statistical Service, 2017). Seafood processing⁴ directly occupies approximately **6** percent of total contribution of the fishing industry. Processing and export of fish and fish products accounts for **2 percent** of total use of fish.

The **Ministry of Maritime Affairs and the Blue Economy** (created in 2018) has primary responsibility for the fisheries sector through the Barbados Fisheries Division (BFD). Management measures for the fisheries of Barbados include legislation, a vessel and fisher registration systems, and technical measures.

The Fisheries Act (Cap 391) and the Fisheries Management Regulations (1998) are the legal authority for the management and development of fisheries in the waters of Barbados. A Fisheries

⁴ Seafood processing refers to larger scale processors operating outside of the market with investment in infrastructure. Processing refers to small processors that buy and clean fish; also known as vendors (pers comm, Fisheries Division, 2019).

Advisory Committee (FAC) comprised of stakeholders advises the Minister of Maritime Affairs and the Blue Economy. Updated draft management plans for some of the fisheries and an updated draft fisheries policy are currently under review. The policy prescribes the development and implementation of individual fishery management plans for each fishery.

The Barbados National Union of Fisherfolk Organisations (BARNUFO) is the umbrella fishing industry organization for its primary members which include five other fisherfolk associations as well as two boat owner associations, of which some are not currently active.

4. Production

4.1 Capture Landings

Fish landings are defined as the catches of marine fish landed in foreign or domestic ports. Marine capture fisheries landings are subject to changes in market demand and prices as well as the need to rebuild stocks to maximum sustainable yield levels in order to achieve long-term sustainable use of marine resources (OECD, 2016).

For the purpose of this document, the reported annual landings from FAO FishStat⁵ will be used. It must be noted that reported landings and those displayed by BFD differ for some years due to different adjustments/conversions being made⁶.

The vast majority of fish production in Barbados originates from marine fisheries, with landings ranging from **1.4 (thousand tonnes)** to **3.2 (thousand tonnes)** over the period 2000 – 2016 as shown in

Estimates (Barbados Fisheries Division, 2004) indicate that **53 percent** of all fish landed is distributed by vendors (already cleaned), **30 percent** is distributed via the processor (purchases made directly from boats or otherwise imports raw products), **9 percent** is purchased either directly from boat (whole) or vendor (cleaned), **2 percent** of whole fish is purchased from the landing site by the hospitality sector (hotels, restaurant and other places of business) the remaining **6 percent** is utilised by exporters (large fish such as tuna and sword fish and catches from long line vessels are mainly found here).

⁵ <http://www.fao.org/fishery/statistics/software/fishstatj/en>

⁶ For tunas, raised landings as required by ICCAT are reported. For the Barbados social and economic report, recorded landings are reported.

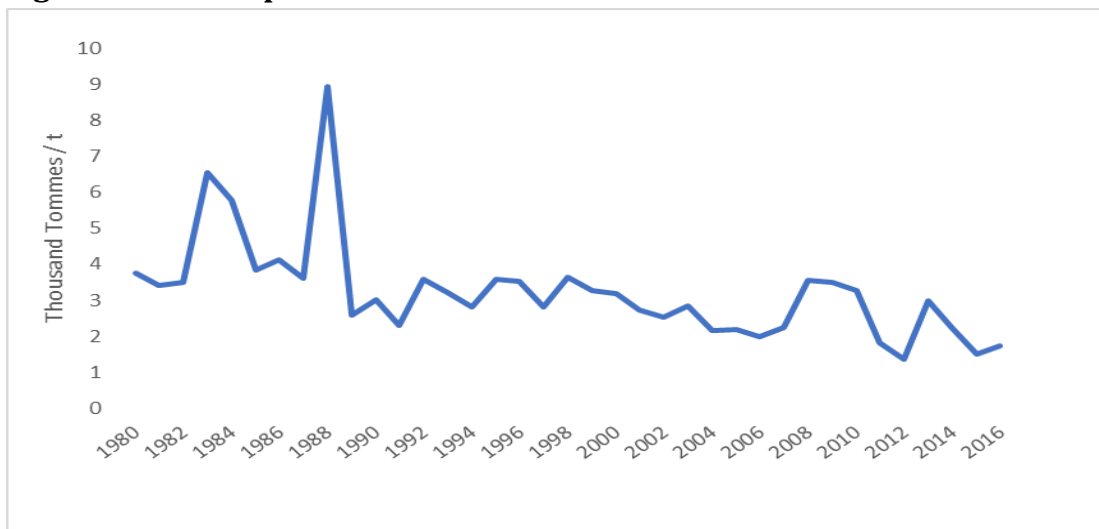
3.2 Species Composition

Traditionally Flying fish contributed to over 2/3 of the total annual landings followed by dolphin fish.

However, in recent years, there have been lower recorded total annual landings (see

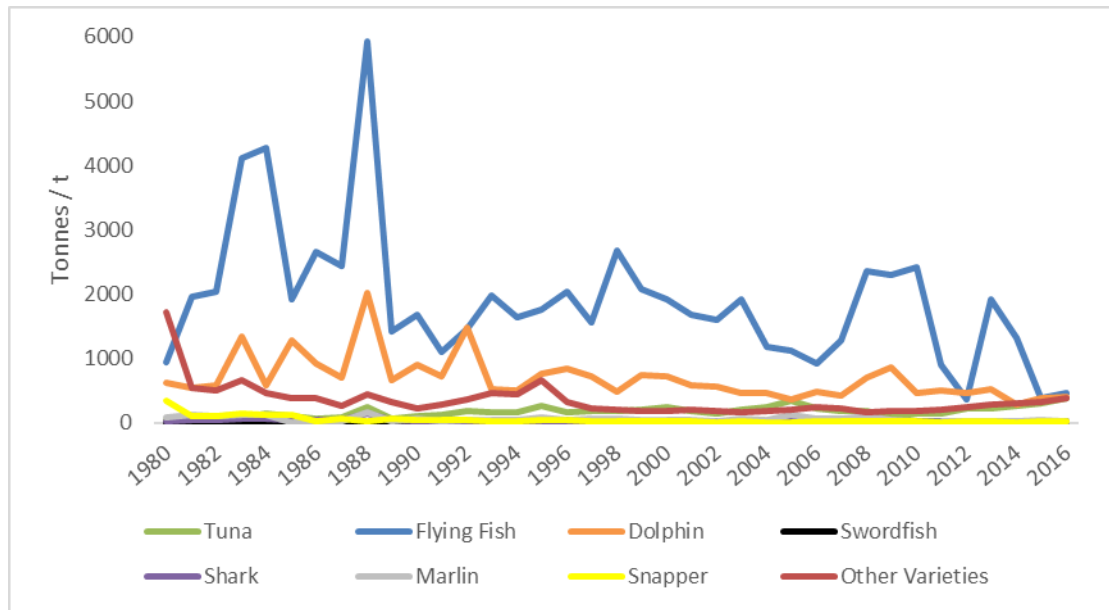
In 2016, flying fish remained the major contributor to the island's fish catch. Among the large pelagic species, catches of dolphin fish increased from 2015 to 2016 but are still below the average annual catch reported over the past ten-year period (Figures 4 and 5).

Figure 3: Total Capture Production for Barbados between 1980 – 2016



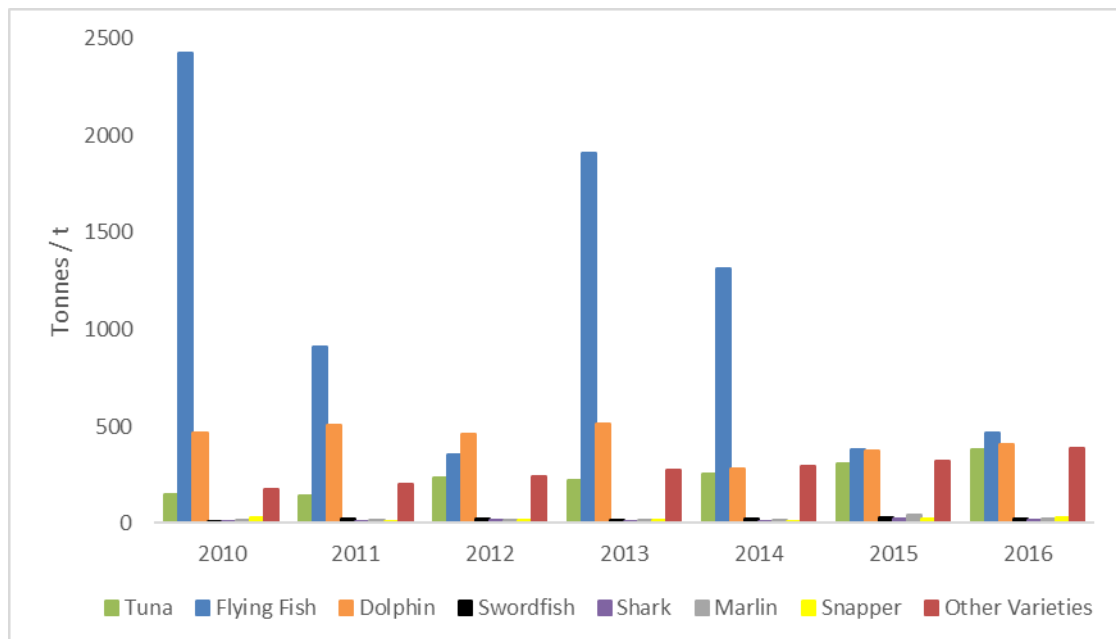
Source: FishStatJ, 2018

Figure 4: Fish Landings by Species for Barbados between 1980 – 2016



Source: FishStatJ, 2018

Figure 5: Fish Landings by Species for Barbados in recent years (2010 – 2016)

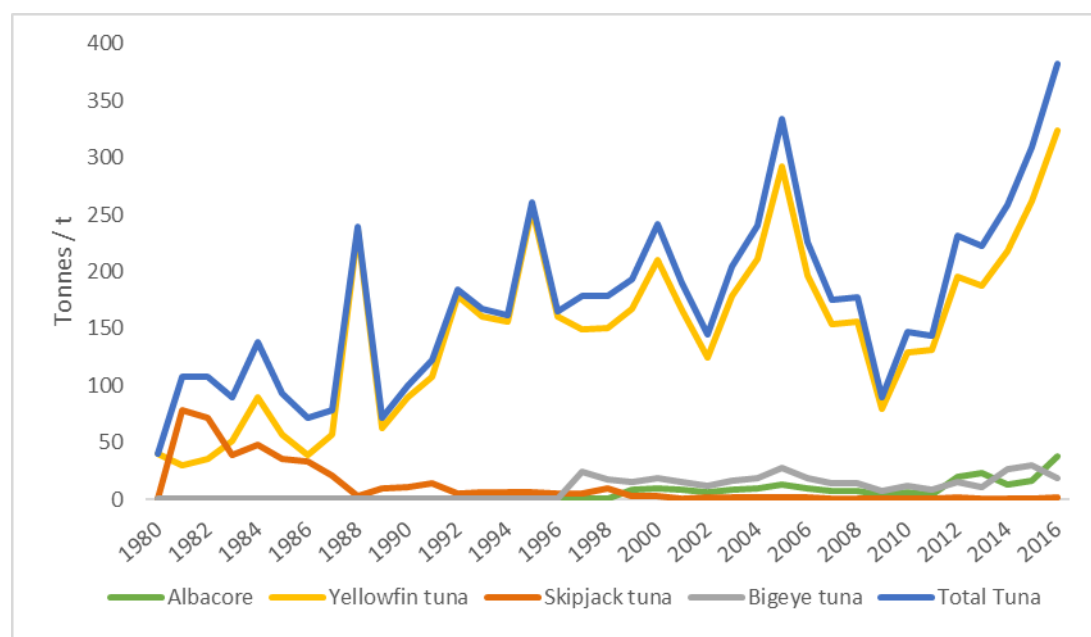


Source: FishStatJ, 2018

Tunas recorded an increase from **309 tonnes** in 2015 to **383 tonnes** in 2016 (

Figure 6). Most of the tuna landings comprise of yellowfin tuna while other tuna species landings appear to be marginal. However, skipjack has recorded an increase in landings over the past 2 years.

Figure 6: Tuna Landings for Barbados between 1980 – 2016



Source: FishStatj, 2018

Landings for most species have remained relatively stable over the past 5-year period with slight fluctuations. Of worthy note is the increase in almaco jacks (local name: amber fish) observed during periods of sargassum seaweed influx.

3.3 Seafood Processing

Seafood processing occurs at several sites across the island including Lashley and Waithe, Morgan's Fish House, Shorelinez, Atlantis Sea Food Inc and Ocean Fisheries being some of the more common seafood processing facilities producing products for both domestic consumption such as fish burgers and fingers as well as export. There is an interesting variety of seafood processed products in Barbados including frozen, fillets, fish fingers, sausages, and hamburgers among others.

Unfortunately, there is no readily and comprehensive available information about domestic production. International data sources such as UNIDO datasets on manufacture production are not based on a classification disaggregated enough to isolate seafood production from other type of processed food. The only figures that could be related to production will be export figures discussed below.

3.4 Fisheries Services

The current fishing fleet consists of over 1000 registered vessels including four main types of vessels: moses, day boats, ice boats and longliners with all boat types increasing in numbers over the past 5 years.

There appears to be potential expansion in the wooden boat building and repair area. However, this may require development of infrastructure in boatyards which are in need of upgrades but also maintenance. Repair and expansion of the current port infrastructure could lead to a larger supply of incidental fisheries services such as repairs and maintenance and to improvements in the capacity and security of the fleet and crews.

5. Socioeconomic

5.1 Employment

Employment in the fisheries sector has remained relatively stable over the last few years.

An estimated **6'000** individuals are employed in the fishing industry (directly and indirectly) with **3'000** of these being active fishers (Barbados Fisheries Division, 2004). Approximately half of these persons are officially registered and are therefore captured in the The Fisheries Information System (FIS) Database held at the Fisheries Division. An estimate conducted by CRFM in 2013 stated that employment was closer to 8,800 or 6.2 percent of the labour force (CRFM, 2016). It appears as though figures have not changed much over time.

Flying fish account for a large percentage of the production of the processing plants. The fishery is economically important with over **2'000 fishermen** and **500 vendors** seasonally employed in the fishery. In addition, **over 200 persons** are employed as scalers or boners at fish markets and approximately **125** are employed at fish processing plants. A significant share of the vendors and employees in processing plants are women.

The harvest sector is made up of fishers and boat owners. **Fishers make up 63 percent** of the harvest sector and **boat owners 37 percent**. Overall, **78 percent** of the primary stakeholders (including boat owners) are active fishers. The majority of fishermen and boat owners are males. **99 percent of fishermen and 91 percent of boat owners are males**. Recently, the post-harvest sector has grown, attracting both young women and men in considerable numbers. Vendors and boners make up the majority of the primary post-harvest stakeholders (37 percent and 39 percent, respectively).

5.2 Earnings/ Relative Earnings

Historically, there appeared to be a trend on the income earning ability placing processors over vendors, boat owners and fishers in that order (Barbados Case Study: the Fisheries Advisory Committee, 2003).

From informal discussions in the island's primary fish market over the past few months, some vendors stated that they can make approximately **USD 1'000 in one working day** during the pelagic season and some captains can come home with a maximum of USD 5'000 in one 14-day trip on a longline vessel. For an individual that conducts 2 fishing trips per month for 8 months, they can earn USD 80'000.

In a three-part economic valuation of the fisheries of Barbados study, for the longline fishery total fleet profit, before wages are paid, varies substantially from year to year, ranging from just over

USD 200'000 in 2002 to nearly USD 1.6 million in 2005. Profit after payment of wages ranges from just over USD 70'000 (2002) to well over USD 700'000 (2005) per year. Average profit earned per trip follows a similar pattern, ranging from roughly USD 2'000 to over USD 6'000 (Schumann et al 2010; Staskiewicz et al. 2008).

For the trap fishery, annual gross fleet revenues likely range between **USD 389'883 and USD 748'575**. Total net income earned by all fish trap vessel owners is likely between USD 47'386 and USD 125,662, while total crew net incomes are between USD 262'421 and USD 528'591 per year. A vessel deploying 9 traps operating 6 months (26 weeks) per year making 2 trips per week, can therefore be expected to earn between **USD 6'498 and USD 11'696 per year**. Vessels operating year-round would earn roughly double that amount, or up to USD 23'393. (Staskiewicz et al. 2008).

Assuming that the vessel and crew each earn one-third share of net proceeds after variable costs, vessel profit per trip (crew income per trip) likely ranges between **USD 34 and USD 45**. Crew members on a typical vessel fishing year-round, twice per week can be expected to earn between USD 3'499 and USD 4'699 per year from trap fishing. Nine-month fishers would earn between USD 2'624 and USD 3'524 per year.

The minimum wage in Barbados is BBD 6.25 per hour that is about USD 3.1.

5.3 Contribution to GDP

In 2016, within the traded sector, the contribution of non - sugar agriculture and fisheries to real GDP was estimated to be USD 19.8 million, an increase of 0.5 percent from 2015 (Economic and Social Report, 2016). **Percentage contribution to GDP by the fishing industry is estimated at 0.15 percent.** In 2016, the value of marine capture fish production was USD 7'910,852.

The contribution of fishing to the Barbados GDP is currently undervalued and is usually cited as ranging between BBD 12-16 million per annum. This is based on the ex-vessel and retail prices collected at major markets. The value of fish from vessel to plate nor the market pathway is not taken into account for this calculation.

In a market pathway study conducted by Mahon et al. (2007), the total value of local fisheries was estimated at about **USD 25 million in 2006** (about 0.5 percent of 2006 GDP). This includes both the ex-vessel value (the value of landed raw fish) and the on-shore value-added components such as deboning, filleting and processing into fish fingers and other convenience products. However, it does not include income generated by the sector nor the value of infrastructure in the fishery.

6. Ecological

6.1 Status of Local Fisheries

There have been few stock assessments carried out locally for Barbados' fishery resources. The status of the commercially exploited fish stocks varies from stable in the case of flying fish and dolphinfish to over-exploited in the case of sea eggs (a species of sea urchin). The status of a number of stocks is unknown (Barbados' Fisheries Sector Management and Development Policy Draft, 2018).

Much of the data collection includes collecting information on fishing effort and landings which is then used to estimate fisheries production. Catch per unit effort is calculated but there is not enough information to determine stock size or fishing mortality rates. However, there are local (e.g. sea eggs) and regional (e.g. flying fish and dolphin fish) stock assessments and monitoring work being conducted for example by the Caribbean Regional Fisheries Mechanism (CRFM).

The sea egg fishery had a one-month fishing season for October 2016 but was closed in both October 2017 and 2018. There appears to be limited scope to increase capture production in the Barbados fishery sector. However, there is expansion potential for tunas and swordfish and potentially a small deep-sea crab fishery.

However, research must be conducted on the deep sea crab fishery for example (such as the Atlantic deep-sea red crab and the Atlantic Golden crab) to determine if this could be sustainable.

Under the International Commission for the Conservation of Atlantic Tunas (ICCAT), of which Barbados is a contracting party, the allocated annual quotas for Barbados are 45t for swordfish, 10t for white marlin, and the default catch limits are 10t for Blue Marlin, 200t for albacore for 2017-2018 and 215t for 2019-2020 and 3500t for big eye tuna. There is no catch limit at present for yellowfin tuna. In most cases there are calculations based on base years that allow underages and overages to be calculated.⁷

6.2 Losses/waste

At the major market, the Bridgetown Fisheries Complex, approximately **2-3 tonnes** of fish offal are discarded daily. This offal could be used to supply the poultry industry with feed (known as fodder), agribusiness with fertiliser or can be composted. Rendering plant which collects, and processes waste is currently having difficulty with machinery.

⁷ <https://www.iccat.int/en/RecRes.asp>

EXPANSION POTENTIAL OF CAPTURE PRODUCTION

Tunas and swordfish

- Barbados is presently under the quota set by the International Commission for the Conservation of Atlantic Tunas (**ICCAT**) for tunas and swordfish.
- This provides the potential to increase production from tunas and swordfish without overfishing of stocks, destruction of their habitats or adversely affecting the other users of the marine space.
- This also affords the opportunity to expand the trade in tunas and swordfish products and value-added products (by developing existing markets and identifying new markets).

Deep sea crab and squid

- Limited information exists on the **deep-sea crab and squid** fisheries. There is a need for preliminary assessment to determine the potential of developing a market and a sustainable minor fishery. Both deep-sea crab and squid have the potential as inputs for seafood processed products.

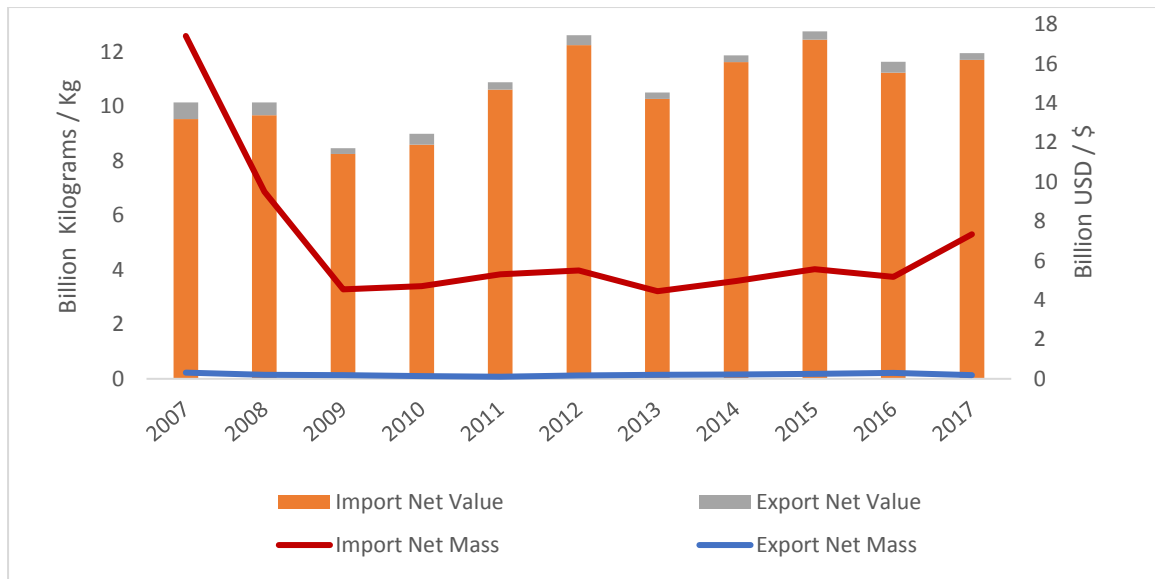
7. Trade

Over the past years, imports of fish and fish products for Barbados (net mass and value) are increasing and exports are decreasing as shown in Figure 7. In 2017, Barbados imported fish and fishery products for a total value of USD 16.2 million (BBD 32.4 million) and exported a total value at USD 0.3 million (BBD 0.67 million) (Figure 7). Such patterns may be due to a combination of factors including a decline in overall catch, higher internal consumption as well as a high number of tourists consuming fish.

Barbadians consume 5 '00 to 6'000 tonnes of fish annually, of which 3'000 tonnes are landed by Barbadian vessels. Fish is seen by Barbadians as a crucial source of proteins. The total fish supply per capita has been estimated by the CRFM to be about 26kg in 2016 if we assume that all fish imported are consumed by the local population.⁸ This figure only slightly above the regional average.

Figure 7 Import and export weight and value for fish and fish products for Barbados 2007 – 2017

⁸ Raw calculations based on the number of arrivals and the average length of stay indicate that tourist population would correspond to a permanent population of 20000. Assuming tourist and Barbadians have the same propensity to eat fish the total fish supply per capita would be slightly more than 24kg/capita.



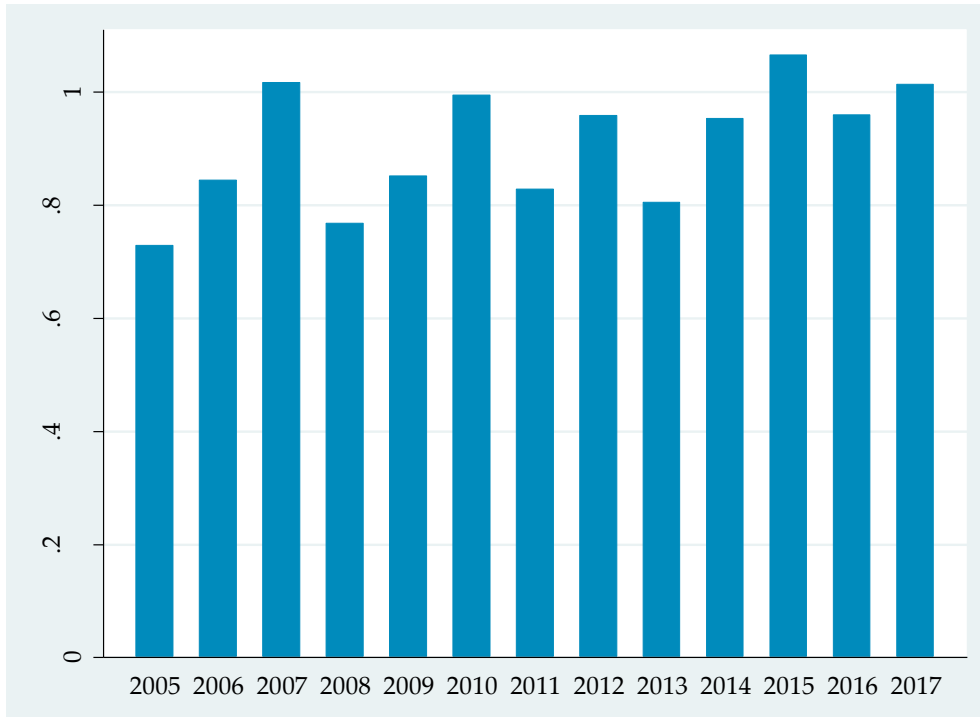
Source: Barbados Statistical Service, 2018

7.1 Imports

As mentioned previously Barbados is a net importer of fisheries and fish products. Domestic consumption is relatively high and demand from the tourism industry may further increase internal pressure on such products. Most recent estimates (CRFM, 2016) indicate that about 86 percent of internal consumption are covered by imports. Nevertheless, imports of fish and fisheries products represent about one percent of total imports in Barbados as can be seen from Figure 8. This share has remained relatively stable during the last fifteen years. While this number could be considered negligible the importance of food imports goes far beyond their value as they could significantly impact food security especially in confine territories such as the Barbados.

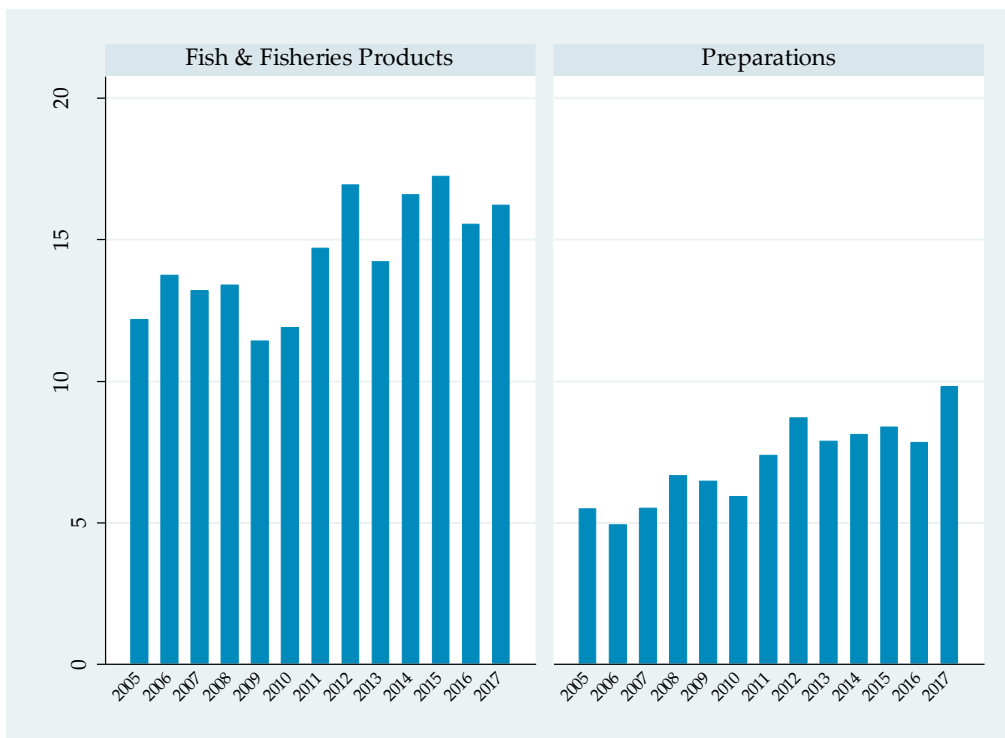
Figure 9 reports the value of imports of fish and fisheries products as well as that of preparations. During the last five years imports of fish and fisheries products have oscillated between USD 14 and 17 million. The figure shows that the value of preparations either of fish or crustaceans represents on average about half of that recorded for imports of fish and fisheries products. This can only accentuate the dependency of the country on foreign products. In 2017 about 5'300 tonnes of fish and fisheries products and about 3'400 tonnes of prepared (processed) products were imported. The corresponding figures five years before were 4'000 tonnes and 2'100 tonnes respectively.

Figure 8: Fish and fisheries products imports share in Total imports



Source: Authors' elaborations based on UN COMTRADE in WITS (Import declarations)

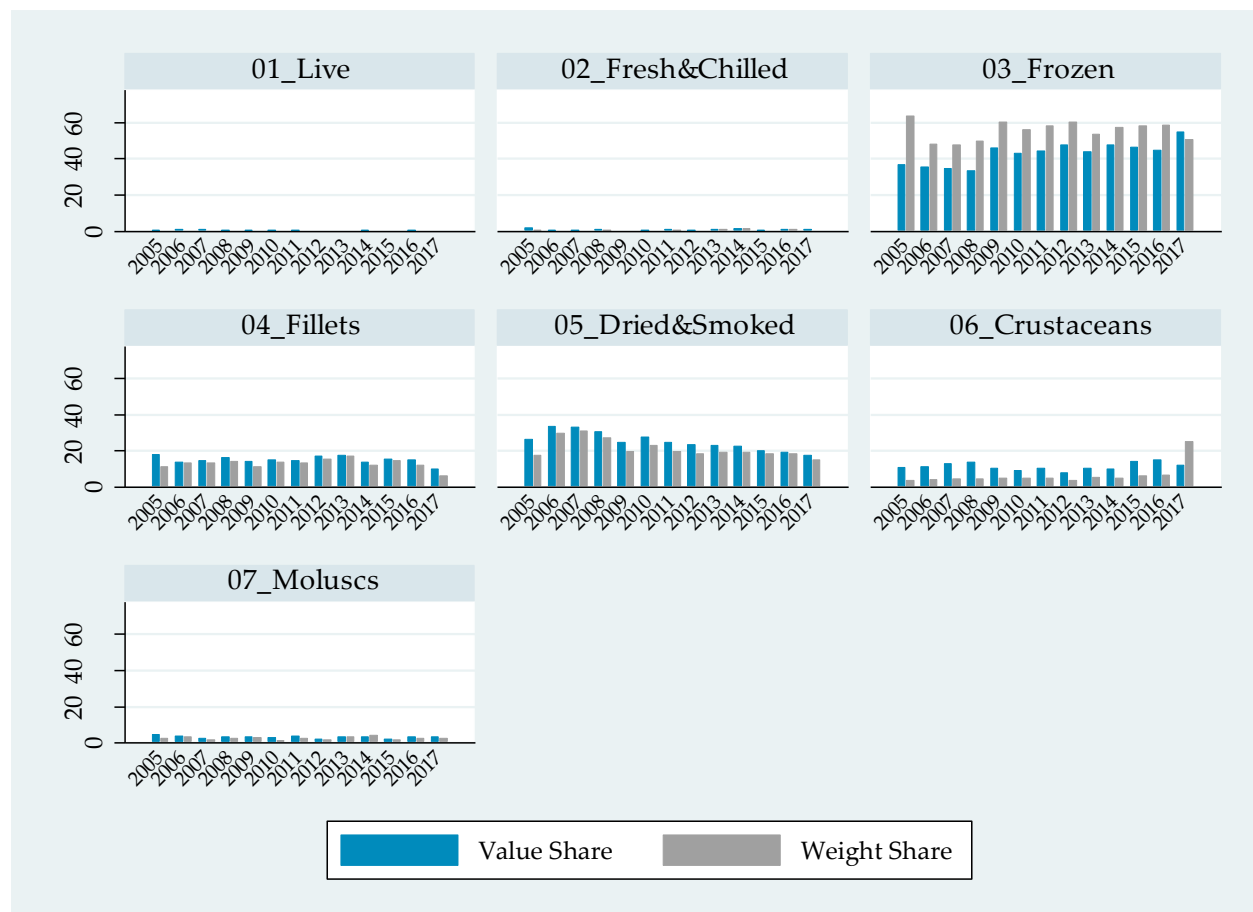
Figure 9: Fish and fisheries products and preparations imports in value (million USD)



Source: Authors' elaborations based on UN COMTRADE in WITS (Import declarations)

Figure 10 helps to identify easily the major category of imported products, namely frozen fishes followed by dried and smoked products and fillets. The ranking is verified both in terms of value and quantity. The value of imports of frozen fish is comparable to that of preparations.

Figure 10: Imports of fish products (HS 4-digit categories)



Source: Authors' elaborations based on UN COMTRADE in WITS (Import declarations)

Tables 1 to 3 focus on the largest categories of products imported in Barbados shown in Figure 10 and identifies the most important exporter-product pairs within each of them. More precisely the tables show countries whose export share in value is larger than one percent (average during the 2013-2017 period) of Barbados fish imports in their respective category (4 digit in the HS 2002 classification). As the underlying classification is the HS 2002 version several products are not specified. When the use of HS classification in its 2017 version will be possible the analysis will become more precise. For instance, product code 30379 has been disaggregated in 15 different products (species) in the 2017 version. These species could be of different families: from tilapias, catfish and carps, to Jack and Horse mackerel, Cobia and Swordfish or Rays and Skates. These unspecified products are imported from Suriname (49 percent overall on average during the 2013-2017 period of the category imports), Trinidad and Tobago and Panama. The only specified species imported frozen is Yellow fin tunas from Suriname and Trinidad and Tobago and Panama.

Table 1: Major exporters to BRB of Frozen fish (average 2013-2017)

Code HS-2002	Country	Product description	Imports (USD)	Quantity (tonnes)	Share (%) in Total Product Group Value
30379	SUR	Other	3.80E+06	1104.58	46
30379	TTO	Other	935677	220.69	11
30379	PAN	Other	741882	257.28	9
30379	OAS	Other	554989	122.49	7
30379	VNM	Other	364105	151.98	4
30379	FJI	Other	293048	74.49	4
30342	SUR	Yellowfin tunas (Thunnus albacares)	249861	102.92	3
30379	GUY	Other	196884	56.60	2
30379	CRI	Other	125500	20	2
30342	TTO	Yellowfin tunas (Thunnus albacares)	118345	30.06	1
30379	PER	Other	104296	28.72	1
30379	GHA	Other	99982.5	50.16	1
30379	CHN	Other	70668	26.03	1
30379	USA	Other	61235.4	13.9	1
30379	VCT	Other	56242.3	16.9	1
30342	PAN	Yellowfin tunas (Thunnus albacares)	45580.5	15.03	1

Source: Authors' elaborations based on UN COMTRADE in WITS (Import declarations)

As to fillets, the only possible distinction using the 2002 version of the HS classification is mostly between fresh or chilled and Frozen. The "Other" product refers to frozen fillets of unspecified species in the HS 2002 version. Largest exporters to Barbados of frozen fillets are Guyana, China Chile Suriname and Vietnam. As to Fresh or Chilled fillets largest exporters are the United States , the United Kingdom and Suriname.

Table 2: Major exporters to BRB of Fillets (average 2013-2017)

Code HS-2002	Country	Product description	Imports (USD)	Quantity (tonnes)	Share (%) in Total Product Group Value
30420	GUY	Frozen fillets	371851	91.26	15
30420	CHN	Frozen fillets	248264	52.48	10
30420	CHL	Frozen fillets	231859	17.75	9
30420	SUR	Frozen fillets	174587	54.75	7
30420	VNM	Frozen fillets	167351	52.37	7
30420	USA	Frozen fillets	133976	23.98	5
30490	VNM	Other	109856	40.73	4
30410	USA	Fresh or chilled	102259	13.98	4
30420	TTO	Frozen fillets	88165.2	23.73	4
30420	OAS	Frozen fillets	87477.7	12.92	4
30410	GBR	Fresh or chilled	85759	7.65	3
30410	SUR	Fresh or chilled	77151.6	17.95	3
30490	GUY	Other	72324.8	12.70	3
30420	NOR	Frozen fillets	70696.3	6.37	3
30490	TTO	Other	56687	12.75	2
30490	CAN	Other	55649.5	9.56	2
30490	USA	Other	49075.8	9.14	2
30410	TTO	Fresh or chilled	40149.6	5.66	2
30490	CHN	Other	37345	6.98	2
30410	GUY	Fresh or chilled	34744.8	6.05	1
30410	NOR	Fresh or chilled	26731.5	2.89	1
30410	VNM	Fresh or chilled	20219	8.01	1

Source: Authors' elaborations based on UN COMTRADE in WITS (Import declarations)

Table 3 refers to Barbados imports of Dried and Smoked products. As in other categories of products few species are identified in the 2002 version of the HS classification. Largest exporting countries are Canada, China, Norway. Canada and Norway not surprisingly are the largest exporters of cod followed by Great Britain, China and the United States .

Table 3: Major exporters to BRB of Dried and Smoked products (average 2013-2017)

Code HS-2002	Country	Product description	Imports (USD)	Quantity (tonnes)	Share (%) in Total Product Group Value
30559	CAN	Other	63224	129.80	16
30530	CHN	Fish fillets, dried, salted or in brine	52135	129.51	13
30559	NOR	Other	44457	93.42	11
30530	CAN	Fish fillets, dried, salted or in brine	34912	75.21	9
30551	CAN	Dried Cod (<i>Gadus morhua</i> , <i>Gadus ogac</i> , <i>Gadus macrocephalus</i>)	30665	66.94	8
30559	CHN	Other	25078	75.75	6
30551	NOR	Dried Cod (<i>Gadus morhua</i> , <i>Gadus ogac</i> , <i>Gadus macrocephalus</i>)	23529	45.56	6
30541	GBR	Pacific salmon, Atlantic salmon and Danube	19749	19.39	5
30559	BRA	Other	13235	28	3
30530	GBR	Fish fillets, dried, salted or in brine	96744	15.33	2
30559	USA	Other	92125	31.14	2
30541	USA	Pacific salmon, Atlantic salmon and Danube	89230	11.49	2
30569	CAN	Other	83359	21.48	2
30551	GBR	Dried Cod (<i>Gadus morhua</i> , <i>Gadus ogac</i> , <i>Gadus macrocephalus</i>)	78745	13.67	2
30551	CHN	Dried Cod (<i>Gadus morhua</i> , <i>Gadus ogac</i> , <i>Gadus macrocephalus</i>)	60720	11.43	2
30542	CAN	Herrings (<i>Clupea harengus</i> , <i>Clupea pallasii</i>)	55175	22.8	1
30551	USA	Dried Cod (<i>Gadus morhua</i> , <i>Gadus ogac</i> , <i>Gadus macrocephalus</i>)	46135	8.75	1
30562	GBR	Salted Cod (<i>Gadus morhua</i> , <i>Gadus ogac</i> , <i>Gadus macrocephalus</i>)	25806	4.02	1
30530	USA	Fish fillets, dried, salted or in brine	25204	6.97	1

Source: Authors' elaborations based on UN COMTRADE in WITS (Import declarations)

When looking at fish preparations imports (Table 4) are essentially Tunas, Sardines, Mackerel and Salmon products. The Barbados market is dominated by Thailand (55 percent overall), Canada(20 percent overall) and the United States (13 percent overall). From the region, only Costa Rica exports some tuna products.

Table 4: Major exporters to BRB of Fish Preparations (average 2013-2017)

Code HS-2002	Country	Product description	Imports (USD)	Quantity (tonnes)	Share (%) in Total Product Group Value
160414	THA	Tunas, skipjack and bonito (<i>Sarda spp</i>)	3.90E+06	992.73	49
160413	CAN	Sardines, sardinella and brisling or sprats	1.50E+06	353.73	19
160414	USA	Tunas, skipjack and bonito (<i>Sarda spp</i>)	553519	418.27	7
160415	THA	Mackerel	364262	196.03	5
160411	USA	Salmon	349306	73.49	4
160413	THA	Sardines, sardinella and brisling or sprats	182734	54.99	2
160414	CRI	Tunas, skipjack and bonito (<i>Sarda spp</i>)	165712	35.86	2
160419	USA	Other	101258	10.44	1
160414	CAN	Tunas, skipjack and bonito (<i>Sarda spp</i>)	90736	18.98	1
160420	USA	Other prepared or preserved fish	72537.6	14.69	1
160414	PHL	Tunas, skipjack and bonito (<i>Sarda spp</i>)	72000	19.48	1

160415	CAN	Mackerel	70506.3	32.24	1
160415	CHN	Mackerel	63068.3	28.42	1
160415	CHL	Mackerel	56255	23.42	1
160414	GBR	Tunas, skipjack and bonito (<i>Sarda spp</i>)	40065.6	62.28	1

Source: Authors' elaborations based on UN COMTRADE in WITS (Import declarations)

Moving to Crustaceans preparations (Table 5), major exporters are the United States (33 percent overall), Vietnam and China. The three countries cover more than 50 percent of total exports of crustaceans preparations.

Table 5: Major exporters to BRB of Crustaceans Preparations (average 2013-2017)

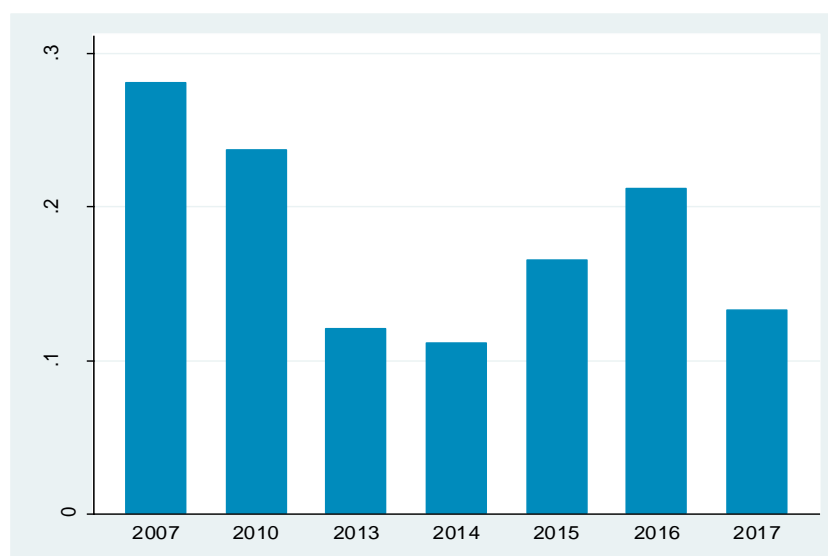
Code HS-2002	Country	Product description	Imports (USD)	Quantity (tonnes)	Share (%) in Total Product Group Value
160510	USA	Crab	155931	17.46	16
160520	USA	Shrimps and prawns	123148	15.36	11
160520	VNM	Shrimps and prawns	81250.8	6.48	10
160590	USA	Other	75849.6	14.01	6
160530	GRD	Lobster	45394	1.23	4
160540	USA	Other crustaceans	28946.4	3.44	4
160520	CHN	Shrimps and prawns	27052.5	2.80	3
160520	THA	Shrimps and prawns	26043.2	3.35	2
160540	CHN	Other crustaceans	16697.5	1.99	2
160530	USA	Lobster	13099.8	1.06	2
160520	IDN	Shrimps and prawns	11660.5	1.38	1
160520	IND	Shrimps and prawns	11024.3	1.25	1
160520	CAN	Shrimps and prawns	10428.3	0.71	1
160510	VCT	Crab	10064.6	0.46	1
160530	VCT	Lobster	9657	0.26	1
160510	IDN	Crab	7740.4	0.51	1
160510	RUS	Crab	7570	0.72	1
160530	BHS	Lobster	7471	0.17	1
160510	KOR	Crab	6061	0.39	1
160520	JAM	Shrimps and prawns	5249.6	0.63	1
160530	JAM	Lobster	4817	1.125	1
160510	CHN	Crab	4314.67	0.56	1
160520	ECU	Shrimps and prawns	4160.5	0.16	1

Source: Authors' elaborations based on UN COMTRADE in WITS (Import declarations)

7.2 Exports

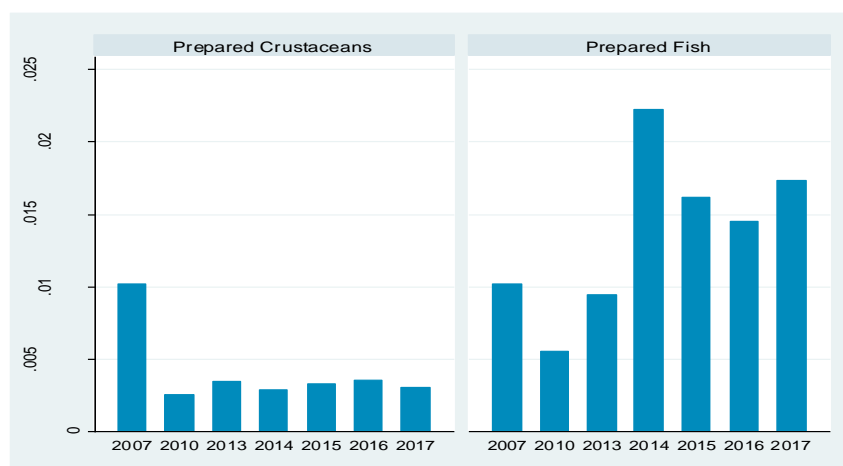
Exports of fisheries and fish products represent only a small share in value terms of total exports in Barbados. Figure indicates that for non-processed or semi processed products their share has varied between 0.28 percentage points at its highest in 2007 and about 0.11 percentage points at its lowest in 2014. In 2017, it was slightly more than 0.13 percentage points. As to processed products value shares are even smaller especially for preparations of crustaceans as shown in Figure 12. However, exports of fish preparations have increased steadily over the last five years with a pic met in 2014 showing an increase of their share of about 50 percent in five years between 2013 and 2017.

Figure 11: Share of fisheries and fish exports in total Barbados exports



Source: Authors' computations based on UN COMTRADE in WITS (Export declarations)

Figure 12: Share of exports of processed products in total Barbados exports



Source: Authors' computations based on UN COMTRADE in WITS (Export declarations)

Table 6 reports the evolution of the number of fisheries and fish products exported (re-exported products are excluded at least in principle) during the last decade. The number of non-processed (or semi-processed if we consider freezing or cutting in fillets some semi processing) products has varied between 7 in 2014 and 2015 and, 18 in 2016. Products exported during most of the period under consideration include Yellowfin tunas (HS 30232) some frozen fish species (HS 30379), fresh or chilled fish fillets (HS 30410), frozen fish fillets (HS 30420). More recently products such as ornamental fish (HS 30110) and Bigeye tunas (HS 30234) have had stable export records.

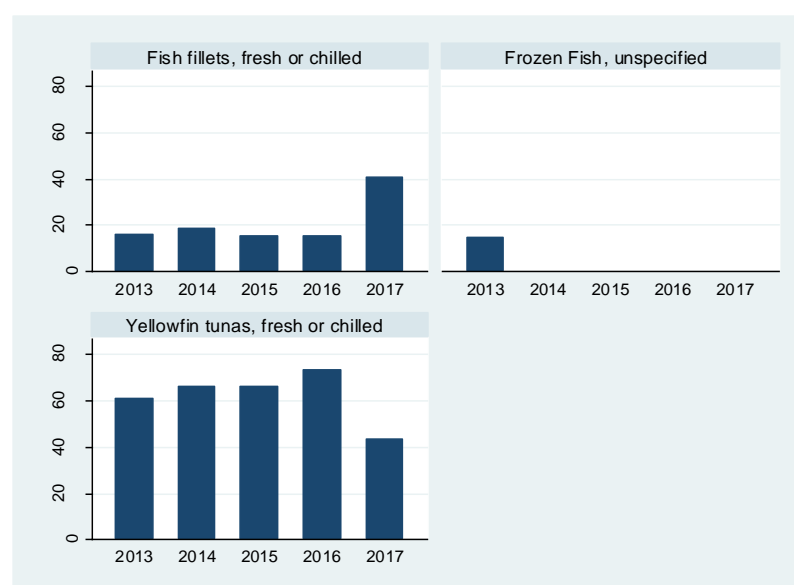
Table 6: Number of products exported by level of processing

Year	Raw / semi-processed	Preparations
2007	12	8
2013	6	5
2014	7	5
2015	7	3
2016	18	5
2017	11	8

Source: Authors' elaborations based on UN COMTRADE in WITS (Export declarations)

Value wise Yellow fin tuna has been the leading product during the last five informed years with a clear flexion in 2017. Fillets of unspecified fish but different form traditional species including tunas have been on average representing about 20 percent of fish exports between 2013 and 2017 to jump to 40 percent in 2017. The major reason for such share transfer is the collapse of Yellow fine tuna exports (from 405 thousand USD to 145 thousand USD) more than the increase in the value of fish preparations value (from 38 thousand USD to 44 thousand USD).

Figure 13: Share in total fish exports (value) of major products

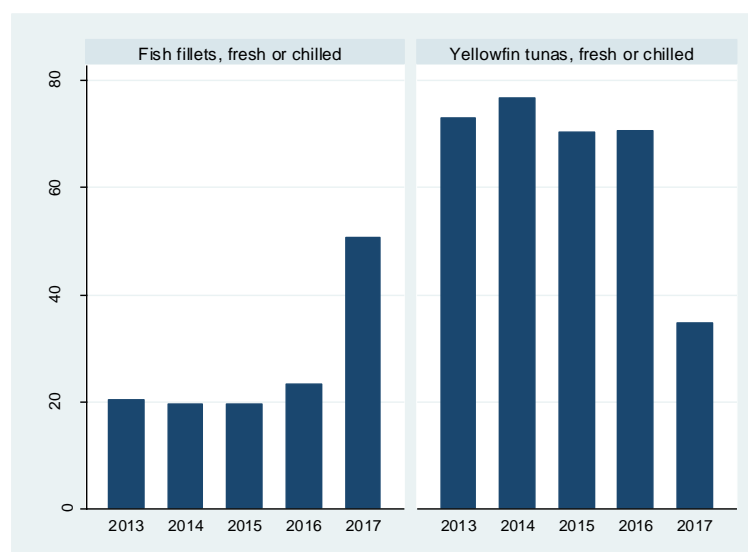


Source: Authors' elaborations based on UN COMTRADE in WITS (Export declarations)

Other products with a share varying between 1 and 10 percent during the period are Bigeye tunas (HS 30234) representing about 10 percent of total fish exports in 2017 and the group of newly exported products in 2017 Cod (HS30250), Unspecified frozen fish HS(30379), Frozen fillets of unspecified fish (HS30420) and dried Pacific Salmon (HS 30541) counting for almost 10 percent of fish exports altogether.

Weight numbers reflect to a very large extent values as shown in Figure 14. Exports of Yellow fine tunas fell from 152 metric tons in 2016 to about 53 metric tons in 2017.

Figure 14: Share in total fish exports (weight) of major products



Source: Authors' elaborations based on UN COMTRADE in WITS (Export declarations)

Other products with a share varying between 1 and 10 percent during the period are Bigeye tunas (HS30234), some non-specified fresh or chilled fish species (HS30269), some non-specified frozen fish species (HS30379) and some frozen fillets of non-specified fish species (HS30420).

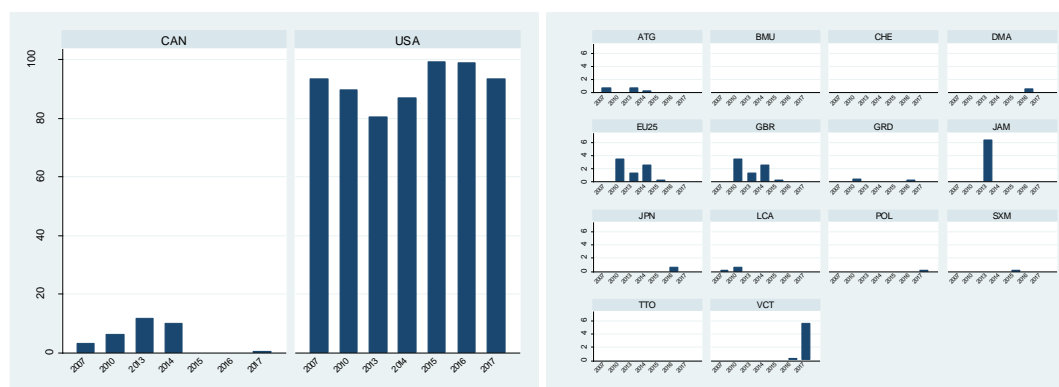
Preparations of fish (HS 160420) and shrimps/prawns (HS 160520) have also been exported on a regular basis during the last decade. In 2017 preparations of sardines, mackerel, tunas and anchovies have also been exported. Most of these products have not, most probably, been elaborated using domestic landings.

The United States have been the major destination market of Barbados exports absorbing the quasi totality of Yellow fine tuna exports. Canada has remained the second largest destination market until 2014 with a share reaching a maximum of more than 10 percent in 2013 but collapsed afterwards. Jamaica appeared as a non-insignificant destination in 2013 and Saint-Vincent and the Grenadines in 2017.

While raw fish products are principally exported to the U or Canada (Figure 15), preparations of fish and of crustaceans are sent to countries from the Caribbean region namely: St. Vincent and the Grenadines, St. Lucia, Trinidad and Tobago, Dominica, Antigua and Barbuda and the Dominican Republic. The only exports to the European Union U25, which are not exports to Great Britain, are ornamental fishes and were sent to Poland. However, considering their almost insignificant value this figure could simply refer to an operation between individuals. Some ornamental fishes are also exported to Switzerland. Exports to Great Britain collapsed in 2016 and were essentially of fillets of non-specified fish species whether fresh/chilled or frozen.

Barbadians living in the United States and the United Kingdom are big consumers of Barbadian fish exports. It is estimated that Barbados could export approximately 500 tonnes annually to the European Union.

Figure 15: Share in Fisheries and Fish products exports, by destination



Source: Authors' elaborations based on UN COMTRADE in WITS (Export declarations)

8. Trade Policy Instruments

Only Tariffs and Non-tariff (NTMs) measures are assessed in their section. However, the set of instruments policy makers can use to affect trade flows is much broader and would certainly call for some more attention at a latter stage of the project. While tariffs are usually seen as instruments used to regulate trade flows and in particular imports, Non-Tariff-Measures at least a subset of them may be used for purposes that do not necessarily relate to some protectionist objective. In all cases any trade related instrument is expected to impact trade flows even though the sign of the impact is not systematically negative.

8.1 Tariffs

Barbados

Figure 16 reports simple trade weighted averages of tariffs for several categories (4-digit in HS classification) of fish products. The latest year available is 2012. As figures would tend to suggest trade policy has remained relatively steady in the 2000's. Two types of tariffs are shown. One is the Most Favorable Nation applied tariff (denoted by MFN), which is the tariff applied to imports from WTO members. It is important to keep in mind that for fish products (except for animal feed) no WTO Bound tariff has been defined implying that the government would be in theory free to increase tariffs on imports of fish and fish products to any level. The second type of tariff is the effectively applied tariff (denoted by AHS) reflecting the possible existence of preferential trade agreements. If some reciprocal preferential trade agreement exists and is active, then the reference tariff rate with preferential trade partners would be the preferential one and it would not in principle be affected by an increase in the applied MFN rate.

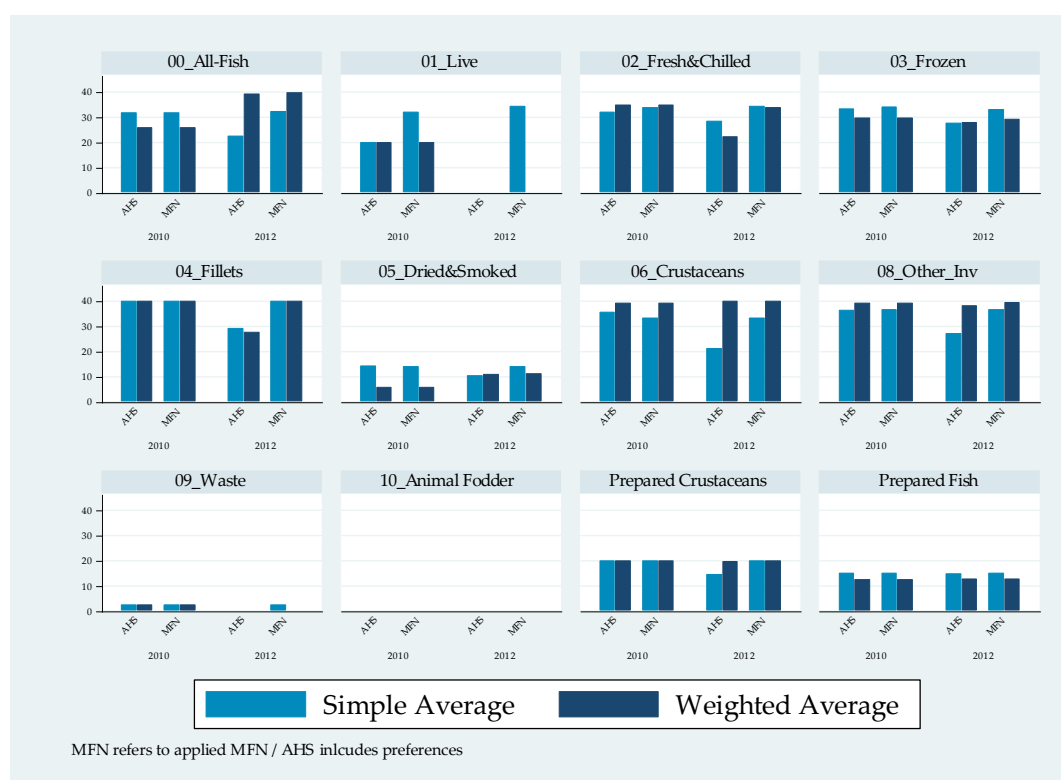
In general, the AHS tariff cannot be higher than the MFN one. However, this could be observed in the case of weighted averages. The difference between the two is sometimes referred to as the

preference margin. A larger margin can be interpreted more advantageous market access conditions at least on average granted to partners in some preferential trade agreement.

If we consider as our reference simple averages, MFN tariffs are found to vary between 30 and 40 percent for fish and fisheries products. There are zero or close to zero for fish products unfit for human consumption. Preparations of fish products face an MFN tariff of about 15 percent and preparations of crustaceans face a tariff of 20 percent. The tariff rate is set higher for some specific local species of significant importance to fisheries. For example, the tariff is set at 145 percent for flying fish and dolphinfish. Some fish imports are duty free with some of the hotels receiving tax concessions.⁹

Preference margins observed in 2012 benefit countries which are members of CARICOM. The highest preference margins are found for live fish fresh, fillets, crustaceans and molluscs.

Figure 16: Simple and Trade weighted average tariffs imposed by Barbados: Effectively applied and Applied MFN



Source: Authors' computations based on UNCTAD-TRAINS.

Note: Exceptions granted to specific types of importers (e.g. hotels) are not considered in the calculations.

⁹ Businesses which are listed under Part II- B of the Customs Tariff are exempted from customs duty. Included under this section are all manufacturers and agriculturalists (who purchase packaging materials, machinery and other equipment) which are imported for business use.

International

Tariffs applied by Barbadian authorities essentially matter for competition on the domestic market and could potentially grant some artificial relative competitiveness to domestic firms selling locally. Firms willing to export some product on international markets will have to pay tariffs when applied in the selected destination market. Figures 17 to 20 shows such conditions in some significant international markets. Figures reported are for the years 2010, 2012, 2016 and 2017 except for China for which 2012 is missing. CARICOM countries are preferential trade partners. However, preference margins Barbados exporters could enjoy are significant only for live fish and to a lesser extent for fillets and dried and smoked products. This is not necessarily surprising considering that CARICOM countries are direct competitors for several fish and fisheries products.

In the context of the European Partnership Agreement (EPA) with the European Union together with other CARICOM countries, duty free access is granted to most fish and fisheries products. However, as suggested by figure FF_3 effective preference margins are no larger than 5 percent except for dried and smoked fish products and preparations where it is about 10 percentage points. By effective preference margins we refer to the difference between the preferential rate granted to Barbados and that granted on average to other preferential trade partners, namely the AHS rate.

The analysis for the remaining two big international markets reveals two opposite situations. The US market is almost completely open at least from the view of tariffs for most products. Only preparations of fish are imposed a tariff of about 8 percent. This may imply competition from a larger number of exporters as compare to destinations with higher tariffs imposed. In the case of China, tariffs are applied to most products but are never higher than 12 percent. Moreover, preference margins granted to preferential trade partners, essentially other Asian countries are not dramatically high. This is to say than competition may not be any fiercer than in the US market for instance or even the European Union.

Some tariff escalation is observed in the European Union and the United States markets. Preparations clearly face higher tariffs than non or semi processed goods. This is also the case but to a lesser extent in China. The contrary is true for CARICOM countries. These results are not surprising and are likely to reflect respective patterns of production in the fish sector in each country.

Figure 17: Simple and Trade weighted average tariffs imposed by CARICOM countries: Effectively applied and Applied MFN



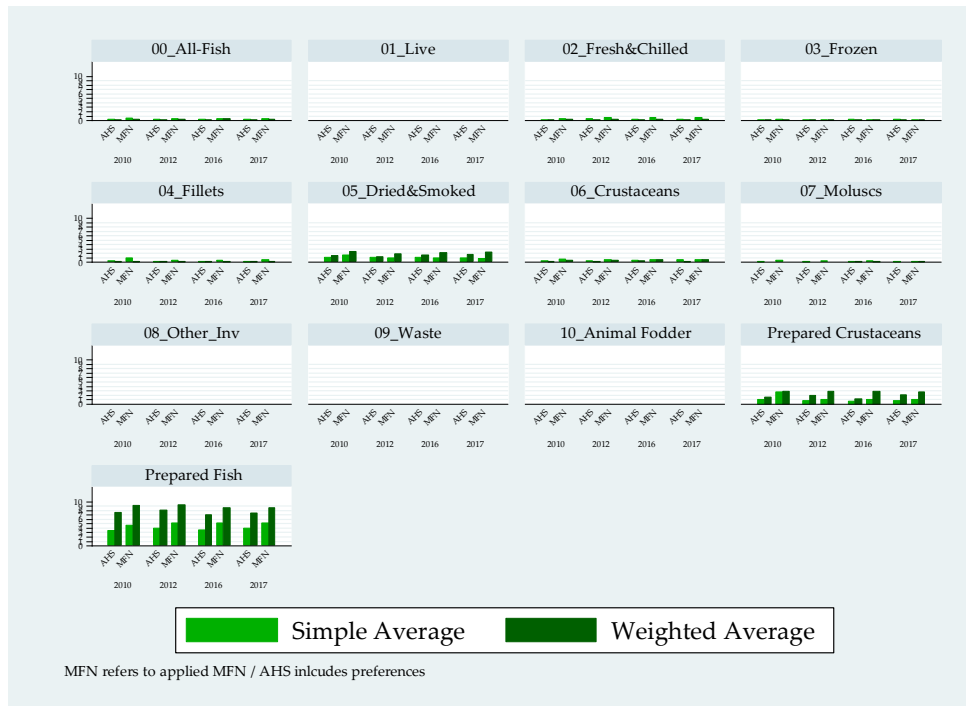
Source: Authors' computations based on UNCTAD-TRAINS

Figure 18: Simple and Trade weighted average tariffs imposed by the European Union: Effectively applied and Applied MFN



Source: Authors' computations based on UNCTAD-TRAINS

Figure 19: Simple and Trade weighted average tariffs imposed by the United States: Effectively applied and Applied MFN



Source: Authors' computations based on UNCTAD-TRAINS

Figure 20: Simple and Trade weighted average tariffs imposed by China: Effectively applied and Applied MFN



Source: Authors' computations based on UNCTAD-TRAINS

8.2 Non - tariff measures (NTMs)

Legislation on measures to improve fish handling techniques in line with Sanitary and Phytosanitary measures (SPS Agreement) is currently under revision. This is a result of Barbados' participation in the European Development Fund (EDF) Sanitary and Phytosanitary Measures (SPS) Project which aimed to strengthen the capacity of CARIFORUM States for international market access through compliance with Europe's Sanitary and Phytosanitary (SPS) measures, as well as improve capacity for developing regionally harmonized SPS measures.

The information on Barbados NTMs reported below is based on regulations in place in 2015, the year of collection, and do not necessarily reflect the new set of regulations mentioned in the previous paragraph. However, it remains the most up to date set of available and comprehensive set of information. The reference HS classification is the 2012 version with 223 products included in the analysis.

About 55 percent of them are affected by at least one NTM. Amongst these products all of them are affected by at least one TBT and at least one export measure. About 90 percent are affected by at least one SPS measure. There are 17 different types of measures according to the UNCTAD international NTM classification. Implemented measures are based on 22 distinct regulations. This is to say that some measures are of the same type. This is the case of type B700 (Product quality or performance requirement), B840 (Inspection requirement) and P690 (Export technical measures, n.e.s. – not an inspection or certification requirement). Table 7 reports the type of measures still in vigor in 2015 and their year of implementation. We observe that most TBTs and export measures have been implemented in 2006.

Table 7: NTMs types and implementation year in Barbados

NTMCod	1961-	1970-	1982-	1985-	1993-	1994-	1998-	2006-	2006-
A620					X				
B110		X							
B140								X	
B150								X	
B310									X
B410							X		
B700							X		X
B810	X								
B830								X	
B840			X	X					
B850								X	
P130								X	
P140								X	
P400								X	
P610			X						
P620			X						
P690						X		X (x2)	X

Source: Authors' elaborations based on UNCTAD-TRAINS

Table 8 reports the number of occurrences for the different types of measures, that is the number of measure-product pairs we observe for any given regulation. The counting includes cases of products affected several times by the same measure but coming from different regulatory texts. The highest figure is obtained for TBTs and the lowest for SPS measures. While the former

accounts for about 50 percent of all occurrences, the latter accounts for only 10 percent of them. The explanation mainly stays in the fact that there more TBTs than SPS measures in place. Indeed, a more detailed analysis based on Table 9 reveals that the SPS measure is the same of for all affected products. According to the official NTM classification the measure belongs to subchapter A62 of the official classification and imposes some animal-raising or -catching processes requirements because of SPS concerns (e.g. the size of the fish caught). The measure was implemented in 1993. Table 9 figures further indicate that most prevalent TBTs involve some labelling and inspection requirement. There is also an important number of occurrences corresponding to some prohibition for some TBT reasons. This prohibition relates to a regulation implemented in 1970 and applies to most products affected by some NTM regulation.

Table 8: NTMs per Chapter (All fish and fish products) in Barbados

NTMchap	Freq.	Percent
A	106	10.24
B	519	50.14
P	410	39.61

Source: Authors' computations based on UNCTAD-TRAINS

Note: The number of occurrences refers to the number of times an NTM measure applies to some product. Several NTMs of the same type can apply to the same product but they are all governed by a distinct regulatory text.

Table 9: NTMs per Sub-Chapter (All fish and fish products) in Barbados

NTMCode	Description	Number of Occurrences	Share in Total
A620	Animal raising or catching	106	10.24
B110	Prohibition for TBT reasons	119	11.5
B140	Authorization requirement for	33	3.19
B150	Registration requirement for	33	3.19
B310	Labelling requirements	122	11.79
B410	TBT regulations on production	2	0.19
B700	Product-quality or -performance	15	1.45
B810	Product registration requirement	1	0.1
B830	Certification requirement	33	3.19
B840	Inspection requirement	128	12.37
B850	Traceability information	33	3.19
P130	Licensing- or permit	33	3.19
P140	Export registration requirements	33	3.19
P400	Measures on re-export	33	3.19
P610	Inspection requirement	14	1.35
P620	Certification required by the	14	1.35
P690	Export technical measures, n.e.s.	283	27.34

Source: Authors' computations based on UNCTAD-TRAINS

Table 10 reports the prevalence of NTMs by chapter across groups of products defined at the 4-digit level of the HS classification. Except for fish fillets more than 60 percent of products in other

groups are affected by some NTM. Highest shares are found for live fish, frozen fish and prepared fish products. We also find that all products in the animal feed and flours groups are affected by some NTM but essentially because these groups include a single product only at the 6-digit level.

Table 10: NTMs per Chapter per HS 4-digit category in Barbados

Group of products (HS-4 digit)	A	B	P	Total	# of products affected	Total # of products per group	Share
Live (0301)	7	29	23	59	7	8	88
Fresh & Chilled (0302)	26	94	68	188	26	42	62
Frozen (0303)	30	10	76	212	30	40	75
Fillets (0304)	9	39	30	78	9	40	23
Dried & Smoked (0305)	12	84	72	168	12	20	60
Crustaceans (0306)	10	31	20	61	10	14	71
Molluscs (0307)	12	50	36	98	12	17	71
Other invertebrates (0308)	0	0	0	0	0	6	0
Waste (0511)	0	6	6	12	1	1	100
Prepared Fish (1604)	0	49	49	98	9	11	82
Prepared Crustaceans (1605)	0	29	29	58	5	18	28
Animal Fodder (2301)	0	2	1	3	1	1	100

Source: Authors' computations based on UNCTAD-TRAINS

Table 11 reports the average number of measures emanating from distinct regulations per product in each HS 4-digit product category. The highest incidence prevalence is found for dried and smoked products with an average of 7 TBTs and 6 export measures per (HS 6-digit) product. We also find high incidence figures for products unfit to human consumption (0511) and processed products.

Table 11: Average number of NTMs types per product per HS 4-digit category in Barbados

Group of products (HS-4 digit)	A	B	P	Share
Live (0301)	1	4.1	3.3	88
Fresh & Chilled (0302)	1	3.6	2.6	62
Frozen (0303)	1	3.5	2.5	75
Fillets (0304)	1	4.3	3.3	23
Dried & Smoked (0305)	1	7	6	60
Crustaceans (0306)	1	3.1	2	71
Molluscs (0307)	1	4.2	3	71
Other invertebrates (0308)	0	0	0	0
Waste (0511)	0	6	6	100
Prepared Fish (1604)	0	5.4	5.8	82
Prepared Crustaceans (1605)	0	5.4	5.8	28
Animal Fodder (2301)	0	2	1	100

Source: Authors' computations based on UNCTAD-TRAINS

Note that the proper content of each measure would require a detailed analysis of the text of the governing regulations and laws. This may be relevant also when considering stringency of NTMs in some destination markets.

9. Relevant International Regulatory framework

Barbados is Party to the following Agreements:

1. International/Regional Trade and Economic Integration Treaties:

- a. World Trade Organisation and Uruguay Round Agreements (1994)
- b. Caribbean Community (CARICOM) (1973)
- c. The CARIFORUM-EU Economic Partnership Agreement (EPA) (2008)

2. Law of the Sea (Introduce cross reference to legal study by Aleeza for further understanding and mutual supportiveness)

- a. Convention on the Law of the Sea (1982)
- b. The United Nations Fish Stocks Agreement (1995)

3. Fisheries:

- a. FAO's Port State Measures Agreement (2010)

4. Environment:

- a. Convention on Biological Diversity (1992)
- b. Nagoya Protocol on Access and Benefit Sharing (2010);
- c. Convention on International Trade in Endangered Species of Wild Fauna and Flora (1975)

10. Challenges

Some of the major constraints, gaps and needs of the fishery sector include international, institutional, harvest sector, post-harvest, stakeholder and environmental challenges including but not limited to:

- Weak data collection system.
- Unknown status of stocks of many of the marine fisheries resources. There is a need for further research to be conducted on fish stocks to understand current status and inform on management with regards to overfishing, especially in targeted or potentially targeted commercial species.
- Suspected overfishing and overexploitation of certain species and resources.
- Lack of legislation or updated legislation surrounding fisheries for example size limits and low enforcement capacity as well as legislation, particularly for the purposes of facilitating international trade.
- The influx of sargassum is a national issue that has affected the island for the past 7 years

- Additional constraints faced by the fishery sector include fluctuating catches of flying fish with a decline in recent years, possibly linked to an increase in sargassum.
- Imports should be substituted with local product through sector expansion, however, at present, Barbados as a SIDS lacks capacity (infrastructural, financial and technical), all of which are required to create a more sustainable fishing industry.
- Improving post-harvest procedure quality as well as reducing waste appear as a priority. At present, waste is dumped at the land fill but can instead be used to increase earnings through further processing into – Fish skin leather, can also be used to create animal feed, organs can be used for food (melts & roe), waste can be used to create biofuels & fertilisers. Suggestions have been put forward to install infrared sensors at the Bridgetown Public Market in the first instance and then in all other markets to reduce water wastage. This both conserves a scarce resource and improves the economic efficiency at the markets. A fish waste silage pilot project was announced last week. Funded by the Embassy of Argentina and the FAO, this project aims to convert the parts of the fish that typically go unutilized into safe and nutritious products for the consumption of livestock and aquaculture.
- Make use of unutilized or underutilized fishing quotas.
- Update of the version of the HS classification used to publish trade flows data.

However, with these challenges comes opportunity. There is a high demand for fish and fisheries products and thus still a need to sustainably develop the sector, investigate production of value-added products including utilization of fish waste.

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