

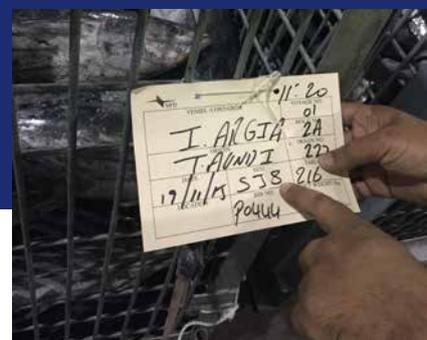
MAURITIUS

NATIONAL EXPORT STRATEGY

FISHERIES AND AQUACULTURE

SECTOR

2017-2021



Republic of Mauritius



International
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This National Export Strategy (NES) is an official document of the Government of Mauritius. The NES was developed on the basis of the process, methodology and technical assistance of the International Trade Centre (ITC) within the framework of its Trade Development Strategy programme.

ITC is the joint agency of the World Trade Organization and the United Nations. As part of the ITC mandate of fostering sustainable development through increased trade opportunities, the Export Strategy section offers a suite of trade-related strategy solutions to maximize the development payoffs from trade. ITC-facilitated trade development strategies and road maps are oriented to the trade objectives of a country or region and can be tailored to high-level economic goals, specific development targets or particular sectors, allowing policymakers to choose their preferred level of engagement.

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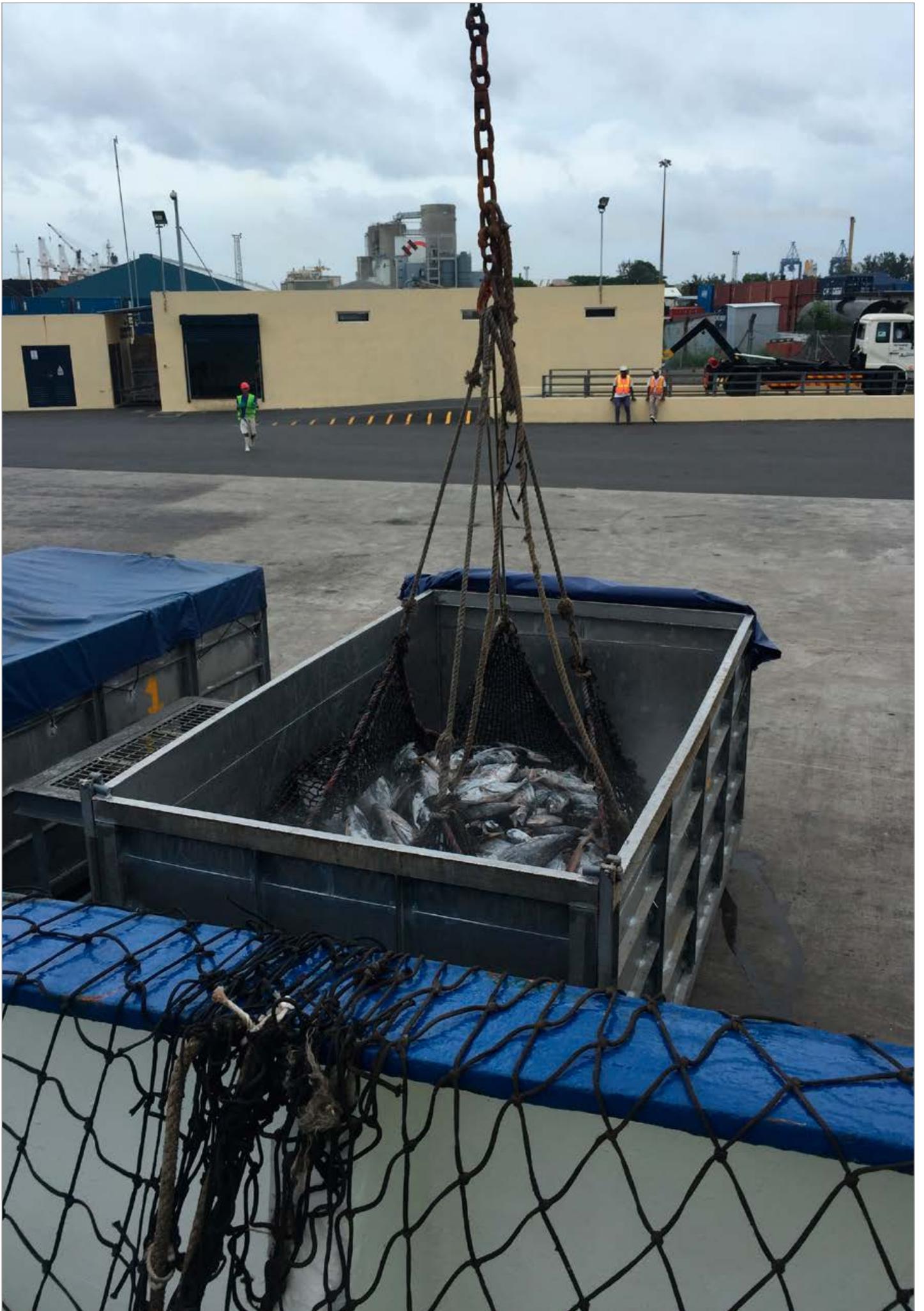


Photo: Alexandra Golovko (ITC)

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ACRONYMS

AFRC	Albion Fisheries Research Centre	ITC	International Trade Centre
AGOA	African Growth and Opportunity Act	LFL	Livestock Feed Limited
AMB	Agricultural Marketing Board	MEXA	Mauritius Export Association
ATQs	Autonomous tariff quotas	MFD	Mauritius Freeport Development Company Ltd
BOI	Board of Investment	MoOE	Ministry of Ocean Economy, Marine Resources, Fisheries, Shipping and Outer Island
CAGR	Compound annual growth rate	MSB	Mauritius Standards Bureau
EEZ	Exclusive Economic Zone	MSC	Marine Stewardship Council
EM	Enterprise Mauritius	MSME	Micro, small and medium-sized enterprise
EU	European Union	NES	National Export Strategy
FDI	Foreign Direct Investment	PoA	Plan of Action
FDM	Froid Des Mascareignes	PTM	Princes Tuna Mauritius
FMM	Mahébourg Marine Farm	R&D	Research and development
FMRA	Fisheries and Marine Resources Act of 1998	ROO	Rules of Origin
GSP	Generalized Scheme of Preferences	SADC	Southern African Development Community
HCR	Harvest Control Rules	SME	Small and medium-sized enterprise
HS	Harmonized System	SMEDA	Small and Medium Enterprises Development Authority
IMTA	Integrated multi-trophic aquaculture	TSN	Trade support network
IOC	Indian Ocean Commission	TVET	Technical and vocational education and training
IOTC	Indian Ocean Tuna Commission		

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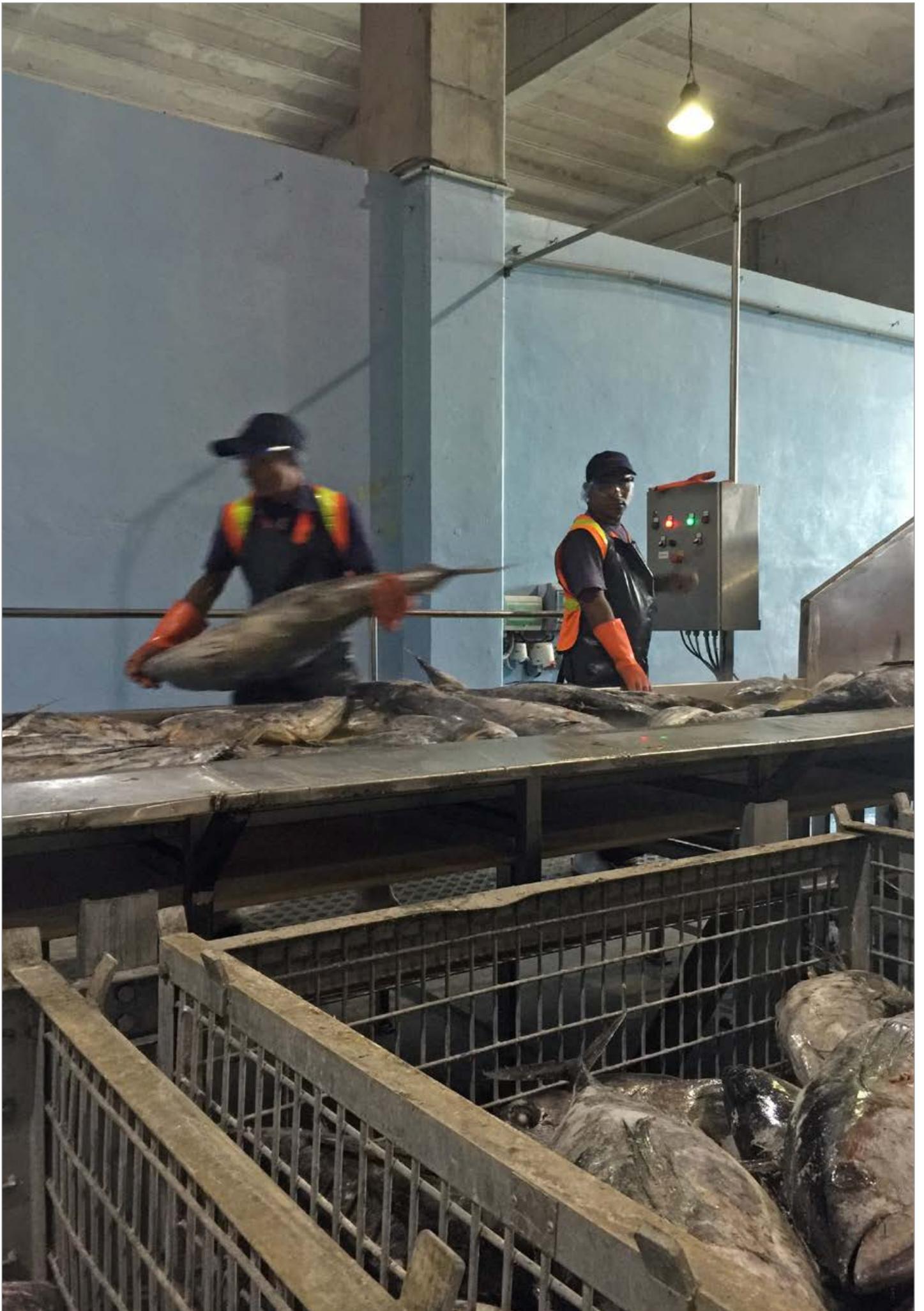


Photo: Alexandra Golovko (ITC)

EXECUTIVE SUMMARY

The goal of the Mauritius Fisheries and Aquaculture Strategy is to set the sector on the course of strategic development by addressing constraints in a comprehensive manner and defining concrete opportunities that can be realized through the specific steps detailed in its Plan of Action (PoA). The Fisheries and Aquaculture Strategy is an integral part of the NES of Mauritius.

The sector's strategic orientation should follow a consolidation approach. The strategy for the next five years will thus be built around a goal of reinforcing the acquired strengths of the sector and transitioning to a fully sustainable model while improving the business environment and knowledge transfers to small and medium-sized enterprises (SMEs). The next step will then be to look into specific ways to increase value addition and diversify the offering of Mauritian products in order to remain competitive in the traditional European Union (EU) market and diversify to emerging new ones.

The PoA responds to this vision by setting five strategic objectives to support its implementation:

Ensure sustainability in the fisheries and aquaculture sector.

1. Secure favourable conditions for current operators and pave the way for their development.
2. Improve research, skills and knowledge transfers in the sector to stimulate investment, opportunities development and innovation.
3. Increase the competitiveness of processed fish products through new sources of raw material and inputs.
4. Increase market diversification through the use of timely market intelligence.

The fisheries and aquaculture sector has been growing steadily, showing solid export performance, catering to growing demand in international markets. The investment attraction policies of the Government of Mauritius have succeeded because they have allowed large international players of the industry into the country in a wide variety of segments of the value chain, including capture, aquaculture and processing as well as logistics and by-products development. These lead firms have brought with them a wealth of expertise that was adjusted to local realities and constraints, which constitutes a unique knowledge base.

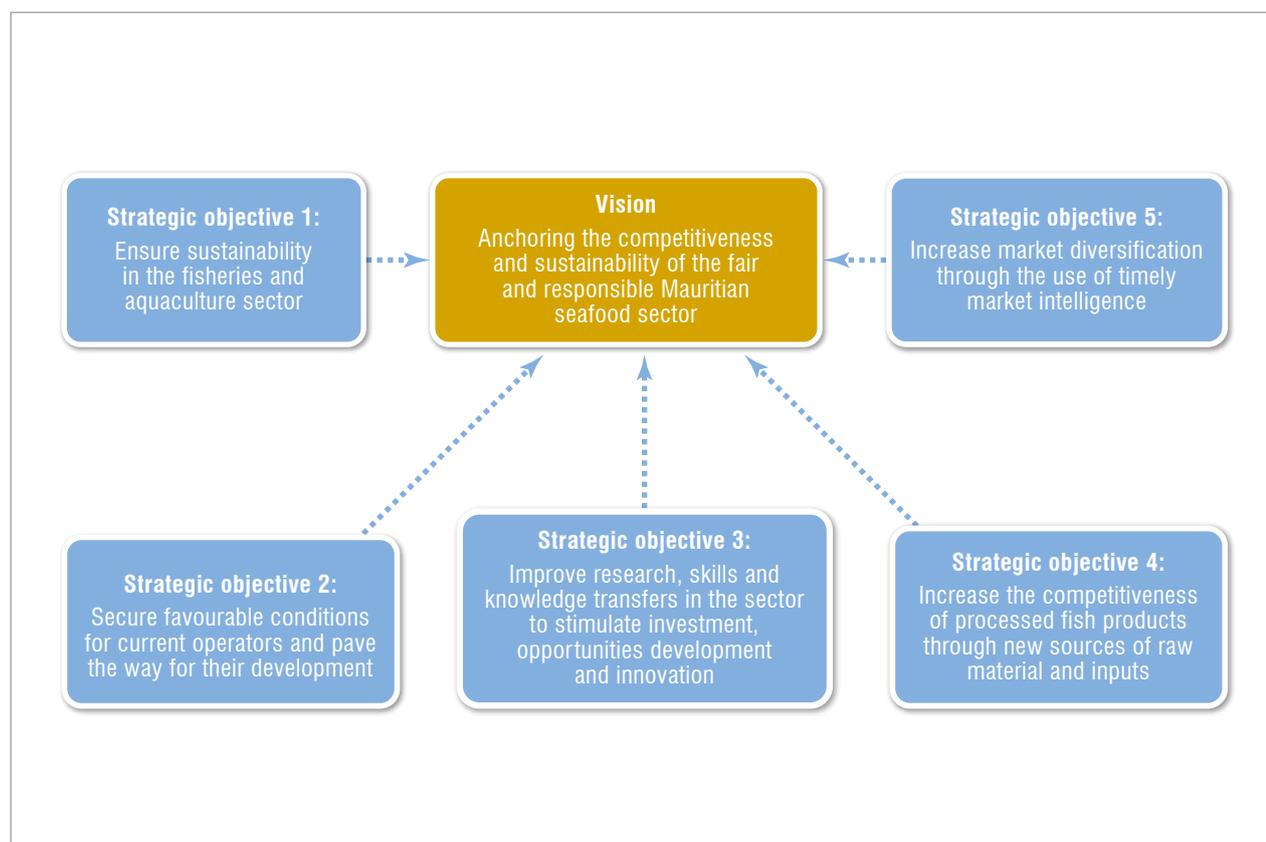
However, these achievements remain fragile. The sector is today threatened by shifting market conditions and preferences in traditional markets – such as the EU – that are predicted to extend preferential access to Mauritius' key competitors; and the loss of competitiveness of the Japanese market due to currency devaluation. Considering these upcoming shifts and adverse trends, securing new markets will be crucial for Mauritian firms to overcome the foreseen losses from existing markets. The current lack of inclusiveness in decision-making processes and the absence of a coordinated public and private approach to develop the sector add to this fragility. Another weakness is insufficient capitalization on acquired knowledge and sector expertise, with no existing transfers to SMEs.

Ensuring sustainable catch levels for the future is the next frontier. The global challenge of sustainability in the fisheries and aquaculture sector is one that Mauritius must also address in order to remain competitive and to ensure that this sector continues to flourish and mature in the long run. Ensuring sustainable exploitation of stocks is thus an absolute prerequisite for further development and must be applied to all types of activities, from tuna fishing to banks and artisanal capture. Investment in new aquaculture schemes will also be critical to diversifying the sector. Sustainability is important both for the long-term utilization of marine resources and to provide a competitive advantage in key markets such as the EU, especially with the current erosion of the preferential status of Mauritius in this particular market.

The sector's strategic orientation should thus follow a consolidation approach. The strategy for the next five years will thus be built around the goals of reinforcing the acquired strengths of the sector and transitioning to a fully sustainable model while improving the business environment and knowledge transfers to SMEs. The next step will

then be to look into specific ways to increase value addition and diversify the offering of Mauritian products in order to remain competitive in the traditional EU market and diversify to emerging new ones.

This Strategy was the result of extensive consultations with public and private sector stakeholders, leading to invaluable cooperation among sector operators. Key private sector stakeholders and leading institutions facilitated an exhaustive analysis of the sector. Market-led strategic orientations, prioritized by stakeholders and embedded into a detailed implementation plan, provide a clear road map that can be leveraged to address constraints to trade, maximize value addition and support regional integration. In addition, the inclusive approach ensured that all stakeholders were committed to the process. The Fisheries and Aquaculture Strategy provides Mauritius with a detailed PoA to achieve growth in the sector within the next five-year period. The Strategy is articulated around **a unifying vision** and **five strategic objectives**.



GLOBAL CONTEXT

SOCIOECONOMIC CONTRIBUTIONS

The fisheries sector has long been an important source of economic activity and income for populations around the world. Total employment in the sector was estimated to be 58 million people in 2012.¹ Of these, 37% were engaged full-time, 23% worked part-time and the rest were engaged occasionally. The sector provides jobs for 4.4% of the people working in the global agricultural sector, up from 2.7% in 1990.

Asia accounts for the most employment in the sector with 84% of total workers, followed by Africa (10%), Latin America and the Caribbean (3.9%), Europe (1.1%), North America (0.6%) and Oceania (0.2%). Employment growth since the turn of the century has been strongest in Africa (2.9% annual growth), Latin America and the Caribbean (2%), and Asia (1.8%). Europe and North America meanwhile lost jobs in the sector at a rate of -1.5% and -0.6% respectively between 2000 and 2012. Fish farming has become an increasingly important contributor to sector employment: today it accounts for 32% of employment, as opposed to 20% in 1995.

1. Food and Agriculture Organization (2014). The State of World Fisheries and Aquaculture: Opportunities and Challenges, p. 27.

Table 1: World fishers and fish farmers by region

	1995	2000	2005	2010	2011	2012
	<i>(Thousands)</i>					
Africa	2 392	4 175	4 430	5 027	5 250	5 885
Asia	31 296	39 646	43 926	49 345	48 926	49 040
Europe	530	779	705	662	656	647
Latin America and the Caribbean	1 503	1 774	1 907	2 185	2 231	2 251
North America	382	346	329	324	324	323
Oceania	121	126	122	124	128	127
World	36 223	46 845	51 418	57 667	57 514	58 272
Of which, fish farmers						
Africa	65	91	140	231	257	298
Asia	7 762	12 211	14 630	17 915	18 373	18 175
Europe	56	103	91	102	103	103
Latin America and the Caribbean	155	214	239	248	265	269
North America	6	6	10	9	9	9
Oceania	4	5	5	5	6	6
World	8 049	12 632	15 115	18 512	19 015	18 861

Source: Food and Agriculture Organization (2014), p. 28.

It should be noted that the ocean economy also has a significant impact on the livelihood of women. Although only 15% of fisheries workers overall are female, it has been estimated that women can account for up to 90% of the workforce in certain secondary areas such as processing.

In addition to its contribution to global employment, fish also plays a key role in food security and nutrition. The Food and Agriculture Organization of the United Nations notes that fish consumption per capita has risen to record highs as a result of rising incomes, urbanization,

expanded production and improved distribution mechanisms.² Even so, consumption growth has not been even: it has been quickest in East Asia, South-East Asia and North Africa, while declining in Japan and certain areas of sub-Saharan Africa. Asia accounts for two-thirds of total fish supply, while Africa has the lowest per capita supply. Developed countries also have a considerably higher per capita consumption than developing countries, although the gap has been narrowing in recent years.

2. *Ibid.*, p. 62.

Table 2: Total and per capita food fish supply by continent and economic grouping in 2010

	Total food supply	Per capita food supply
	(million tonnes live weight equivalent)	(kg/year)
World	130.1	18.9
World (excluding China)	85.7	15.4
Africa	9.9	9.7
North America	7.5	21.8
Latin America and the Caribbean	5.7	9.7
Asia	89.8	21.6
Europe	16.2	22.0
Oceania	0.9	25.4
Industrialized countries	26.5	27.4
Other developed countries	5.5	13.5
Least-developed countries	9.6	11.5
Other developing countries	88.5	18.9
LIFDCs ²	30.9	10.9

Source: Food and Agriculture Organization (2014), p. 63.

PRODUCTION

The global supply of fish reached a record high of 158 million tons in 2012, including 91.3 million tons attributed to capture production and 66.6 million tons attributed to aquaculture production.³

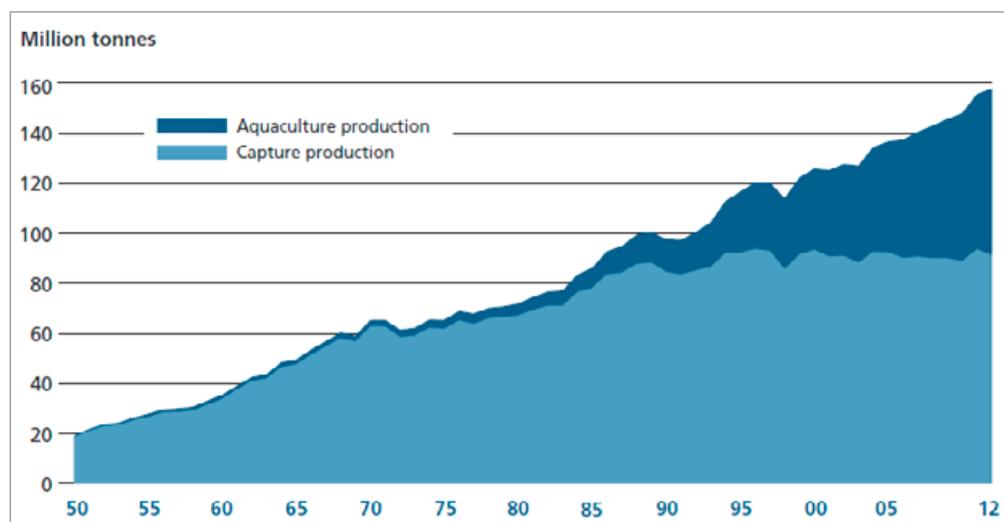
Total production growth has outpaced population growth in recent years. This is reflected in the per capita fish food supply, which increased from 17.6 kg in 2007 to 19.2 kg in 2012.⁴ Total fish supply grew by an annual rate of 2.3% between 2007 and 2012, due almost entirely to the growth in aquaculture production. Indeed, capture production was largely stagnant, its five-year annual growth rate coming in at just 0.1%. Although inland capture grew at a rate of

2.8%, the more important marine capture segment declined at a rate of 0.2% per year. Aquaculture meanwhile expanded by 5.9% per year. Both inland aquaculture (five-year compound annual growth rate (CAGR) 7.9%) and marine aquaculture (five-year CAGR 4.3%) contributed to this growth.

3. *Ibid.*, p. 4.

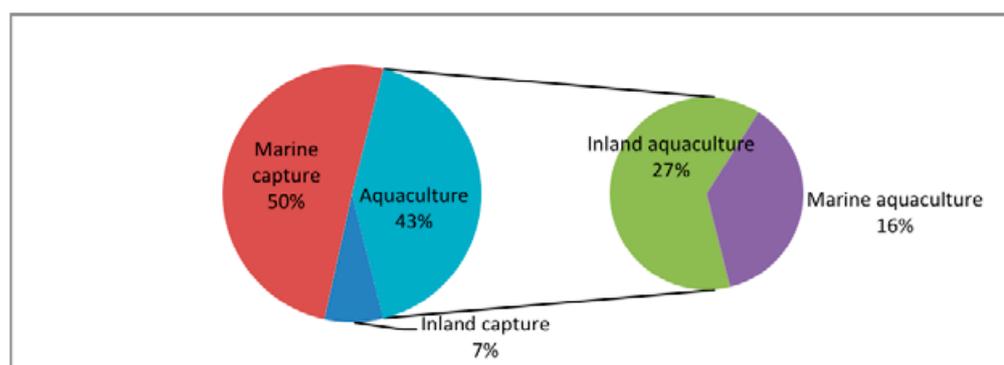
4. *Ibid.*

Figure 1: World capture fisheries and aquaculture production, 1950–2012



Source: Food and Agriculture Organization (2014), p. 3.

Figure 2: Share of global fish production by source (2012)



Source: Calculated from Food and Agriculture Organization (2014), p. 4.

Marine capture accounted for 82.6 million tons of fish in 2012.⁵ There are 18 countries that catch more than 1 million tons annually, of which 11 are in Asia. Together these countries account for 76% of total marine catches. The top five producers in 2012 were China (13.8 million tons, 13.6% growth from 2003), Indonesia (5.3 million tons, 27% growth), the United States of America (5.1 million tons, 4% growth), Peru (4.8 million tons, -20.6% growth), and the Russian Federation (4 million tons, 31.6% growth). The most widely caught species include Peruvian anchovy (4.6 million tons, -24.45% growth from 2003 to 2012), the walleye pollock (3.2 million tons, 13.3% growth), skipjack tuna (2.7 million tons, 28% growth), sardinellas nei (2.3

million tons, 14.2% growth), and Atlantic herring (1.8 million tons, -5.6% growth).⁶ It is quite notable that total marine capture had 0% growth between 2003 and 2012.

Inland capture resulted in the production of 11.6 million tons in 2012, and its growth was calculated to be 35.1% between 2003 and 2012.⁷ The top five producing countries are all in Asia: China (2.2 million tons, 7.65% growth from 2003 to 2012), India (1.4 million tons, 92.8% growth), Myanmar (1.2 million tons, 329.6% growth), Bangladesh (0.9 million tons, 34.9% growth) and Cambodia (0.4 million tons, 45.4% growth). In addition to Asia, inland

5. Ibid., p. 10.

6. Ibid., p. 16.

7. Ibid., p. 18.

capture is also particularly important in Africa, where it accounts for one-third of total capture production and is the principal form of protein for many populations living near inland lakes and rivers. Inland capture on the other continents is estimated to be 0.58 million tons in the Americas, 0.38 million tons in Europe and 18,000 tons in Oceania.

Aquaculture remains at the forefront of the expanding fish supply, its production having grown at an annual rate of 6.2% between 2000 and 2012. Whereas aquaculture accounted for just 13.4% of total fish supplies in 1990, it now accounts for 42.2%.⁸ The production of 90.4 million tons in 2012 was valued at US\$144.4 billion and included US\$137.7 billion of fish and US\$6.4 billion of aquatic algae. Asia is the most important region, accounting for 88% of aquaculture production, followed

by the Americas (4.8%), Europe (4.3%), Africa (2.2%) and Oceania (0.3%). Africa has experienced the strongest growth (11.7%), followed by Latin America and the Caribbean (10%), Asia ex-China (8.2%), Oceania (3.5%) and Europe (2.9%).⁹ The top 15 countries account for 92.7% of total aquaculture production and China is the largest producing country, accounting for 61.7% of total aquaculture production.

As illustrated in table 3, the types of fish farmed vary greatly by region. Globally, however, 66.3% of farmed fish by volume is comprised of finfish, followed by molluscs (22.8%) and crustaceans (9.7%). It should be noted that when categorized by value, crustaceans come in second at 22.4%.

8. Ibid., p. 18.

9. Ibid., p. 21.

Table 3: *Top aquaculture producers by type of fish*

Producer	Finfish		Crustaceans	Molluscs	Other species	National total	Share in world total
	Inland aquaculture	Mariculture					
	(Tonnes)						
China	23 341 134	1 028 399	3 592 588	12 343 169	803 016	41 108 306	61.7
India	3 812 420	84 164	299 926	12 905	...	4 209 415	6.3
Viet Nam	2 091 200	51 000	513 100	400 000	30 200	3 085 500	4.6
Indonesia	2 097 407	582 077	387 698	...	477	3 067 660	4.6
Bangladesh	1 525 672	63 220	137 174	1 726 066	2.6
Norway	85	1 319 033	...	2 001	...	1 321 119	2.0
Thailand	380 986	19 994	623 660	205 192	4 045	1 233 877	1.9
Chile	59 527	758 587	...	253 307	...	1 071 421	1.6
Egypt	1 016 629	...	1 109	1 017 738	1.5
Myanmar	822 589	1 868	58 981	...	1 731	885 169	1.3
Philippines	310 042	361 722	72 822	46 308	...	790 894	1.2
Brazil	611 343	...	74 415	20 699	1 005	707 461	1.1
Japan	33 957	250 472	1 596	345 914	1 108	633 047	1.0
Republic of Korea	14 099	76 307	2 838	373 488	17 672	484 404	0.7
United States of America	185 598	21 169	44 928	168 329	...	420 024	0.6
Top 15 subtotal	36 302 688	4 618 012	5 810 835	14 171 312	859 254	61 762 101	92.7
Rest of world	2 296 562	933 893	635 983	999 426	5 288	4 871 152	7.3
World	38 599 250	5 551 905	6 446 818	15 170 738	864 542	66 633 253	100

Note: The symbol "... " means the production data are not available or the production volume is regarded as negligibly low.

Source: Food and Agriculture Organization (2014), p.. 22.

Table 4: *Top fish types farmed*

	Inland aquaculture	Mariculture	Quantity subtotal		Value subtotal	
	(Million tonnes)	(Million tonnes)	(Million tonnes)	(Percentage by volume)	(US\$ million)	(Percentage by value)
Finfish	38.599	5.552	44.151	66.3	87 499	63.5
Crustaceans	2.530	3.917	6.447	9.7	30 864	22.4
Molluscs	0.287	14.884	15.171	22.8	15 857	11.5
Other species	0.530	0.335	0.865	1.3	3 512	2.5
Total	41.946	24.687	66.633	100	137 732	100

Source: Food and Agriculture Organization (2014), p. 23.

USE

Although fish can be used as ingredients in a wide variety of products, the share of fish being used for human consumption has been rising steadily since the 1990s.¹⁰ In 2012, 86% of fish supply was used for direct human consumption, as opposed to 71% in the 1980s.¹¹ Of the remainder, 75% is used for fishmeal and fish oil, while the rest is used for ornaments, culture, bait, pharmaceutical purposes, and livestock and fish feed. Of the fish that is used for food, 46% is sold live, fresh or chilled; 12% is sold dried, salted, smoked or cured in other ways; 13% is prepared or preserved; and 29% is frozen.

Use varies significantly according to geography. In developing countries, for instance, 54% of fish is sold live, fresh or chilled.¹² Live fish is particularly popular in South-East

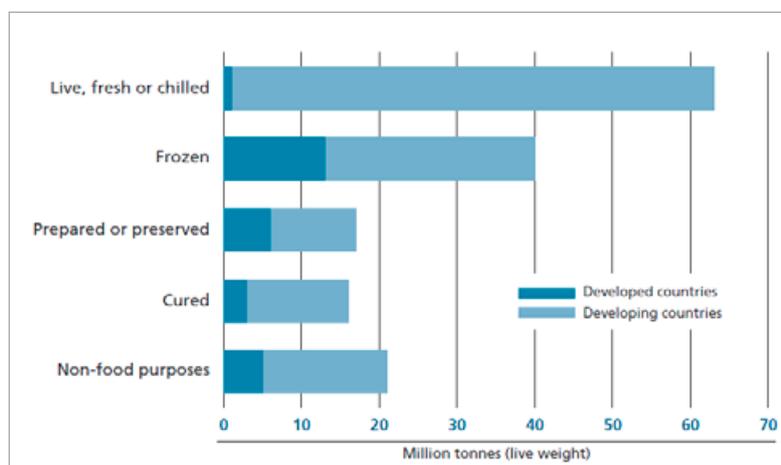
Asia, the Far East and Africa. Developing countries have in fact increased their consumption of frozen fish (24% in 2012, up from 13% in 1992). Even so, lesser developed countries often lack the infrastructure required to accommodate a frozen value chain (such as potable water, electricity and refrigeration). When combined with tropical climates, this can frequently lead to spoilage and quality deterioration. As such, the consumer preferences for fresh fish in these markets are reinforced by supply chain constraints, and fish are either sold soon after harvest or else preserved according to traditional methods such as salting, drying and smoking.

The majority of fish sold in developed markets meanwhile is frozen, prepared or preserved. Frozen fish accounts for 55% of use in developed markets today, up from 38% in 1972. This has been driven by increasing preferences among consumers for convenience and value addition, and has led to the proliferation of ready-made and/or portion-controlled meals.

10. *Ibid.*, p. 42.

11. *Ibid.*, p. 42.

12. *Ibid.*, p. 43.

Figure 3: *Use of world fisheries production (2012)*

Source: Food and Agriculture Organization (2014), p. 42.

Due consideration should also be given to important non-food uses of fish. Although the share is declining, a large portion of fish is used to make fishmeal (high protein feed) and fish oil. The latter is used both in fish farming and also for human consumption to address a variety of medical and health issues. Improvements in technology are allowing for extended shelf life and for the elimination of strong taste and odour. In total, between 9% and 12% of fish production is reduced for fish meal and oil.

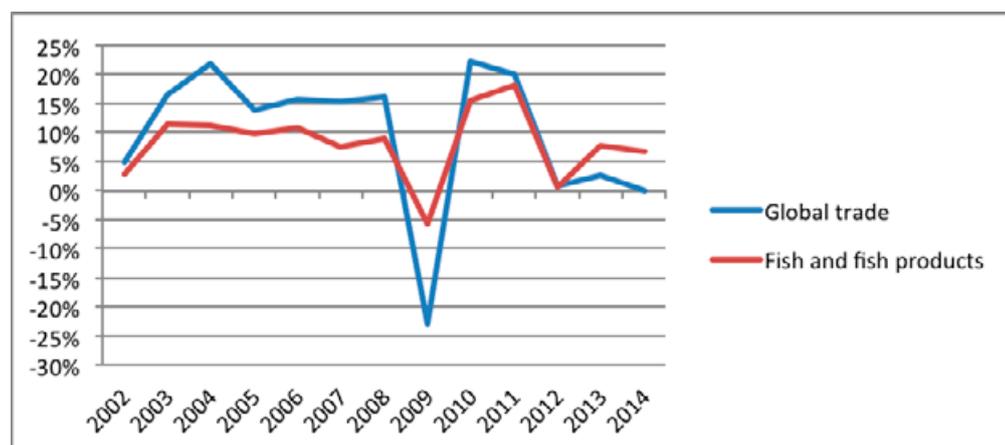
WORLD TRADE

The global trade in fish has grown at a steady pace since the turn of the century, expanding at an annual rate of 8% between 2001 and 2014. Given its resilience in the face of

global economic volatility, the sector plays an important role in ensuring income in times of difficulty. In 2009, for example, sector exports fell by just 5.8%, while total world exports fell by -22.9%.

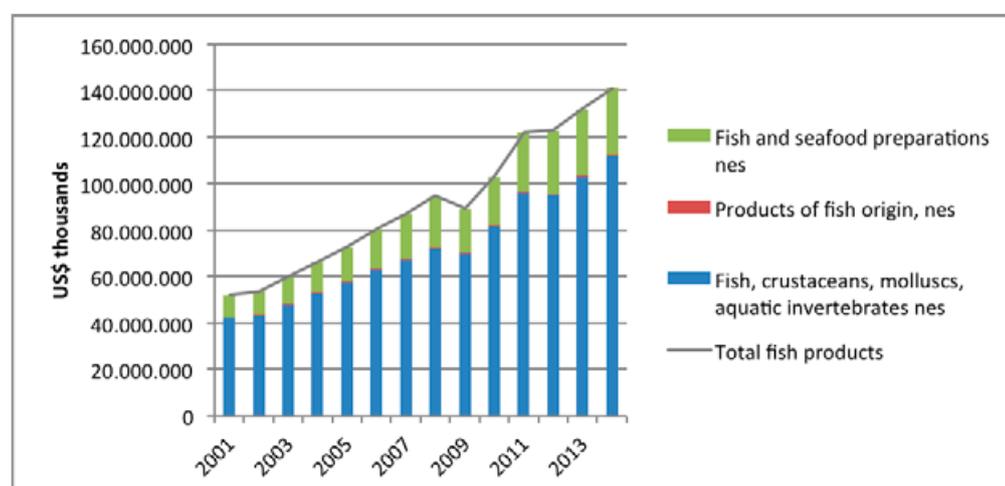
Over US\$140 billion of fish and fish products were exported in 2014, including fish, crustaceans, molluscs, aquatic invertebrates (79%), fish and seafood preparations (20%), and products of fish origin, n.e.s. (1%). Export growth for the entire sector has averaged 9.6% over the past five years. While it was particularly strong for fish, crustaceans, molluscs and aquatic invertebrates (10%), growth for the other two segments still came in at a robust 8%.

Figure 4: Resilience of fisheries exports (annual change in exports), 2002–2014



Source: ITC Trade Map.

Figure 5: World exports of fish and fish products, 2001–2013



Source: ITC Trade Map.

Fish and seafood preparations n.e.s. (Harmonized System (HS) 1603, 1604, 1605)

Fish and seafood preparation exports have expanded by 8.3% per year over the past five years, reaching US\$28 billion in 2014. The most important products are prepared tunas (25.3% of total exports) and prepared or preserved shrimp (12.6% of total exports). A number of product segments have grown at exceptional rates exceeding overall segment growth, including tunas (five-year CAGR 10.4%), and prepared or preserved crab (19.8%).

Table 5: Top 15 exported fish and seafood preparations globally

Product label	Exported value in 2014 (US\$ thousands)	Share (%)	5-year CAGR (%)	10-year CAGR (%)
Total	28 234 732	100.0	8.3	7.9
Tunas, skipjack & Atlantic bonito, prepared/preserved, whole/in pieces, excl. minced	7 129 447	25.3	10.4	11.6
Prepared or preserved shrimps and prawns: not in airtight container	3 561 646	12.6	n.a.	n.a.
Fish prepared or preserved, except whole or in pieces	2 348 719	8.3	2.7	4.8
Fish n.e.s., prepared or preserved, whole or in pieces, but not minced	2 333 152	8.3	0.7	3.0
Prepared or preserved shrimps and prawns: in airtight container	1 755 167	6.2	n.a.	n.a.
Crab, prepared or preserved	1 507 538	5.3	19.8	11.0
Sardines, sardinella & brisling or sprats prepared or preserved, whole or piece, excl. minced	1 337 355	4.7	4.7	7.9
Prepared or preserved molluscs: cuttlefish and squid	1 054 369	3.7	n.a.	n.a.
Prepared or preserved eels, whole or in pieces (excl. minced)	814 604	2.9	n.a.	n.a.
Salmon prepared or preserved, whole or in pieces, but not minced	749 260	2.7	7.0	7.2
Mackerel, prepared or preserved, whole or in pieces, but not minced	665 752	2.4	10.8	9.7
Crustaceans n.e.s., prepared or preserved	602 717	2.1	14.2	9.3
Herrings, prepared or preserved, whole or in pieces but not minced	593 430	2.1	3.3	6.4
Prepared or preserved molluscs: abalone	461 007	1.6	n.a.	n.a.
Prepared or preserved molluscs: mussels	339 396	1.2	n.a.	n.a.

Source: ITC Trade Map.

The most important exporters of fish and seafood preparations are China (24.1% of total exports), Thailand (15.2%) and Viet Nam (7.1%). Most major producing countries have experienced strong export growth, with the exception of Thailand, which suffered from recent difficulties including the controversy surrounding unethical labour practices.

Table 6: Top 15 exporters of fish and seafood preparations

Exporters	Exported value in 2014 (US\$ thousands)	Share (%)	5-year CAGR (%)	10-year CAGR (%)
World	28 234 756	100.0	8.3	7.9
China	6 812 534	24.1	14.7	10.1
Thailand	4 301 102	15.2	2.9	6.7
Viet Nam	2 002 208	7.1	25.8	25.5
Ecuador	1 262 370	4.5	14.8	14.4
Indonesia	1 135 744	4.0	16.0	16.7
Germany	1 010 915	3.6	5.7	7.4
Spain	903 753	3.2	5.8	6.3
Denmark	776 556	2.8	0.8	2.7
Morocco	731 096	2.6	2.9	7.4
Netherlands	671 188	2.4	3.9	5.7
Japan	558 821	2.0	2.4	6.7
United States	541 254	1.9	1.9	2.3
Poland	520 030	1.8	7.6	14.1
Canada	493 351	1.7	9.3	1.5
Philippines	427 219	1.5	7.4	11.6

Source: ITC Trade Map.

Developed countries make up the bulk of importing markets, led by the United States (17% of total imports), Japan (11.8%) and the United Kingdom of Great Britain and Northern Ireland (6.4%). Most major markets are growing in line with the world average.

Table 7: Top 15 importers of fish and seafood preparations

Importers	Imported value in 2014 (US\$ thousands)	Share (%)	5-year CAGR (%)	10-year CAGR (%)
World	25 334 005	100.0	6.6	6.6
United States	4 295 407	17.0	6.7	5.2
Japan	2 992 011	11.8	4.1	0.9
United Kingdom	1 611 706	6.4	4.1	5.1
Italy	1 443 188	5.7	3.3	5.7
France	1 432 761	5.7	2.6	4.8
Germany	1 235 909	4.9	6.0	6.2
Spain	931 079	3.7	4.9	10.1
Netherlands	755 696	3.0	9.4	13.7
Australia	657 265	2.6	6.6	10.3
Canada	632 203	2.5	5.7	6.5
Denmark	562 370	2.2	7.8	6.2
Republic of Korea	539 792	2.1	14.2	8.4
Belgium	500 853	2.0	1.3	5.5
Hong Kong, China	462 162	1.8	13.2	8.3
Sweden	358 226	1.4	4.4	5.0

Source: ITC Trade Map.

Products of fish origin, n.e.s. (HS 051191, 050800, 050900)

Exports of products of fish origin were comprised mainly of fish, shellfish and aquatic invertebrate products not for human consumption, as well as coral, bone and other matter.

Table 8: Exports of products of fish origin

Product label	Exported value in 2014 (US\$ thousands)	Share (%)	5-year CAGR (%)	10-year CAGR (%)
Total	717 830	100.0	8.1	7.9
Products of fish or crustaceans, molluscs or other aquatic invertebrates; dead animals of chapter 3	532 368	74.2	6.6	8.7
Coral and similar materials, unworked or simply prepared but not otherwise worked; shells of molluscs, crustaceans or echinoderms and cuttlebone, unworked or simply prepared but not cut to shape; powder and waste thereof	185 382	25.8	13.1	7.9
Sponges, natural of animal origin	80	0.0	-6.8	-41.3

Source: ITC Trade Map.

The United States, Japan, Germany and China are the biggest exporters. Export growth has been very strong for the top participants in the segment.

Table 9: Top 15 exporters of products of fish origin

Exporters	Exported value in 2014 (US\$ thousands)	Share (%)	5-year CAGR (%)	10-year CAGR (%)
World	717 830	100.0	8.1	7.9
United States	115 871	16.1	16.1	11.2
Japan	58 805	8.2	23.5	17.1
Germany	56 826	7.9	53.1	28.3
China	41 930	5.8	-11.1	12.6
Netherlands	32 993	4.6	16.7	16.5
Norway	25 793	3.6	-5.0	-3.4
Faroe Islands	24 757	3.4	24.2	6.6
Hong Kong, China	24 003	3.3	11.1	12.1
Thailand	22 091	3.1	17.8	1.6
United Kingdom	21 757	3.0	17.4	3.5
Republic of Korea	21 413	3.0	22.9	19.0
Canada	16 448	2.3	8.3	3.4
Indonesia	15 097	2.1	31.3	23.2
Viet Nam	15 095	2.1	9.7	11.1
Mauritius	14 184	2.0	35.9	63.5

Source: ITC Trade Map.

Imports meanwhile are dominated by Denmark (17.2%), Japan (10.6%), Chinese Taipei (7.1%) and the United States (5.9%).

Table 10: Top 15 importers of products of fish origin

Importers	Imported value in 2014 (US\$ thousands)	Share (%)	5-year CAGR (%)	10-year CAGR (%)
World	890 730	100.0	9.2	6.7
Denmark	152 822	17.2	16.7	8.4
Japan	93 979	10.6	10.5	8.4
Chinese Taipei	63 379	7.1	28.3	26.5
United States	52 563	5.9	9.2	2.8
Thailand	49 152	5.5	16.9	12.2
China	41 505	4.7	8.8	10.2
Germany	38 734	4.3	15.3	12.4
France	26 942	3.0	6.4	4.0
Viet Nam	26 697	3.0	16.8	18.7
Canada	24 565	2.8	4.8	2.4
Australia	23 779	2.7	1.9	0.3
Spain	22 986	2.6	27.0	20.3
Italy	18 868	2.1	12.0	3.9
Norway	16 410	1.8	8.4	2.8
Ecuador	16 053	1.8	16.5	15.8

Source: ITC Trade Map.

Fish, crustaceans, molluscs, aquatic invertebrates n.e.s. (HS 03)

Exports of fish products were valued at US\$111.9 billion in 2014, having grown by an annual rate of 7% between 2010 and 2014. The most exported products were crustaceans (24.5% of fish exports); frozen whole fish (21%); and fish fillets and pieces, fresh, chilled or frozen (19.8%). Growth has been particularly strong for crustaceans, molluscs, fresh whole fish, and frozen whole fish.

Frozen shrimp and prawns is the most important individual product category at the 6-digit HS level and it accounts for 15% of global fishery exports. It is farmed mostly in developing regions and domestic consumption is expected to rise in line with incomes.¹³ When this happens, it will likely put pressure on shrimp exports. Salmon accounts for 14% of the fishery trade. Its share has increased as a result of increased farming in Europe and the Americas. Ground fish meanwhile accounted for 10% of trade, tuna accounted for 8% and cephalopods accounted for 3%.

China was the most important exporter of fish products, accounting for 12.6% of global exports, followed by Norway (9.4%), Viet Nam (5.1%), India (4.8%) and the United States (4.7%). Export growth has been particularly strong for a number of countries in Asia including China (11% annual growth between 2010 and 2014), India (24%) and Indonesia (11%). In South America, Chile and Ecuador also exhibited impressive growth of 16% and 26% respectively.

13. Ibid., pp. 58–61.



Photo: Giorgio Minguzzi (CC BY-SA 2.0), Fisherman's boats @ Ile aux Cocos, Rodrigues Isl.

Table 11: World fish exports

Product label	Trade indicators				
	Exported value 2014 (US\$ thousands)	Share (%)	Annual growth in value between 2010 and 2014 (% p.a.)	Annual growth in quantity between 2010 and 2014 (% p.a.)	Annual growth in value between 2013 and 2014 (% p.a.)
Total	111 998 901	100.0	7	n.a.	8
Crustaceans	27 434 293	24.5	12	3	18
Fish, frozen, whole	23 484 136	21.0	6	3	2
Fish fillets and pieces, fresh, chilled or frozen	22 161 774	19.8	5	1	8
Fish, fresh, whole	18 307 931	16.3	7	3	5
Molluscs	12 729 869	11.4	8	5	10
Fish, cured or smoked and fish meal fit for human consumption	5 939 398	5.3	4	1	6
Live fish	1 941 476	1.7	3	4	-2

Source: ITC Trade Map.

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China was the most important exporter of fish products, accounting for 12.6% of global exports, followed by Norway (9.4%), Viet Nam (5.1%), India (4.8%) and the United States (4.7%). Export growth has been particularly strong for a number of countries in Asia including China (11% annual growth between 2010 and 2014), India (24%) and Indonesia (11%). In South America, Chile and Ecuador also exhibited impressive growth of 16% and 26% respectively.

14. Ibid., pp. 58–61.

Table 12: Top 15 exporters of fish products

Exporters	Trade indicators					
	Value exported in 2014 (US\$ thousands)	Annual growth in value between 2010 and 2014 (%)	Annual growth in value between 2013 and 2014 (%)	Share in world exports (%)	Average distance of importing countries (km)	Concentration of importing countries
World	111 998 901	7	8	100.0	5 273	0.05
China	14 074 296	11	12	12.6	5 137	0.08
Norway	10 545 402	5	4	9.4	3 210	0.05
Viet Nam	5 762 642	7	14	5.1	7 750	0.08
India	5 358 639	24	16	4.8	7 238	0.13
United States	5 256 621	6	2	4.7	8 089	0.12
Chile	4 954 011	16	21	4.4	11 585	0.16
Canada	3 987 773	4	4	3.6	4 334	0.39
Sweden	3 703 219	11	9	3.3	1 336	0.12
Netherlands	3 127 082	7	11	2.8	1 808	0.09
Indonesia	3 111 926	11	9	2.8	9 554	0.22
Spain	2 995 902	3	4	2.7	2 789	0.15
Ecuador	2 877 896	26	38	2.6	9 839	0.18
Russian Federation	2 868 303	8	2	2.6	4 583	0.27
Denmark	2 591 019	6	6	2.3	2 333	0.08
United Kingdom	2 365 124	4	13	2.1	3 005	0.12

Source: ITC Trade Map.

The United States, Japan, and China are the three largest importers, accounting for 14.8%, 10.7% and 6.1% of fish imports respectively. Imports to both the United States and China have continued to grow at robust rates in recent years, whereas imports into Japan have been declining by 2% annually.

Table 13: Top 15 importers of fish products

Importers	Trade indicators					Average tariff (estimated) applied by the country (%)
	Value imported in 2014 (US\$ thousands)	Annual growth in value between 2010 and 2014 (%)	Annual growth in value between 2013 and 2014 (%)	Share in world imports (%)	Concentration of supplying countries	
World	107 291 878	5	7	100	0.04	
United States	15 826 802	8	14	14.8	0.08	0.1
Japan	11 450 350	-2	-3	10.7	0.06	4
China	6 583 728	9	10	6.1	0.09	13.1
Spain	5 903 509	-1	11	5.5	0.04	3.1
France	5 080 256	1	1	4.7	0.06	3.1
Germany	4 639 156	4	10	4.3	0.09	3.1
Italy	4 557 324	0	8	4.2	0.06	3.1
Sweden	4 380 427	11	7	4.1	0.80	3.1
Republic of Korea	3 635 880	5	16	3.4	0.14	11.9
Hong Kong, China	3 200 768	4	-1	3	0.12	0
United Kingdom	2 903 919	5	9	2.7	0.06	3.1
Russian Federation	2 566 070	7	-10	2.4	0.11	4.6
Thailand	2 530 348	6	-14	2.4	0.06	4
Netherlands	2 388 752	5	9	2.2	0.06	3.1
Canada	2 167 110	7	6	2	0.17	0.3

Source: ITC Trade Map.

As illustrated in table 13, the majority of fish products are imported to developed countries (73% of value and 55% of live weight in 2012).¹⁵ However, despite a continued increase in consumption, production has stagnated. This has made room for increased exports from developing countries to developed markets. Developing countries now account for 49% of developed country fish imports. It is important to note that 80% of fish products exported from developed countries are exported to other developed countries. Even so, trade between developed and developing nations has grown over recent years due to increased outsourcing. Trade is also growing among developing countries. Today, 33% of developing market fish exports are imported by another developing country.

TRENDS AND OUTLOOK

The development of the fisheries sector has been shaped by a number of trends over recent years. These trends, which are presented below, are expected to play an important role in determining the future dynamics of the industry.

Globalization: The dynamics of globalization have facilitated structural changes in the value chain.¹⁶ Big buyers such as supermarkets are becoming more active in setting product requirements and developing distribution channels. Producers and processors meanwhile are improving their coordination in order to enhance product mixes, improve yields and respond to changing market demands more efficiently. The processing segment is becoming more intensive and linked to foreign value chains. As this happens, it is presenting increased opportunities for regional and global outsourcing of processing activities. Indeed, more and more countries are leveraging local competitive advantages to engage in processing. An example of this trend is the practice of Western countries, whose frozen fish are exported to Asia in order to be processed and re-exported.

Technological advancements in chilling and cold chain management: Technological advancements are facilitating changes in consumption patterns. In particular, major innovations in packing, refrigeration and transportation have improved the ability of stakeholders to transport live, chilled and frozen fish to market while minimizing quality degradation and wastage.¹⁷

15. Ibid., p. 52.

16. Ibid., p. 46.

17. Ibid., p. 43.

Increased processing in developing markets: Although developing markets are still dominated by the sale of fresh fish, there has been a trend towards greater processing.¹⁸ The processing that does exist continues to consist mainly of traditional techniques including filleting, salting, canning, drying and fermentation. Even so, there has been a marked increase in more value added processing activity including breasting, cooking and individual quick freezing. These advancements are being driven both by changing preferences in the local retail market and increasing participation as outsource destinations in global value chains.

Health and safety: Traceability has become a requirement in many importing countries. Not only can it help guarantee health and safety, it can also be used to ensure that fish was caught legally and ethically. It should be noted that outsourcing of processing activities to developing countries may be constrained by deficiencies in their ability to meet the sanitary and hygiene requirements of developed countries.¹⁹

Western food preferences: Advancements in processing capacities are allowing for greater value addition and enhanced product mixes.²⁰ This, in conjunction with increasing preferences for convenience, have stimulated a boom in the sale and consumption of prepared and/or pre-portioned foods.

Fish meal and fish oil: The most commonly used species for fish meal and oil are oil fish, and in particular anchoveta.²¹ Anchoveta catches however have been quite volatile, fluctuating between peaks and troughs in line with El Niño. In the face of declining catches, and in response to rising demand and prices, the industry has increasingly turned to producing fishmeal from fish by-products, despite the lower quality that results. It is estimated that in 2012, 35% of fishmeal was produced from by-products. Given the supply squeeze, rising prices and potential for declining quality, efforts to find suitable replacements are ongoing. Even so, it is likely that fishmeal and oil will continue to be used strategically in the near-to-medium term, either at lower levels or in order to support particular stages of growth.

Residual by-products: As producers create more value added goods for human consumption, the industry is creating more by-products.²² These products have traditionally not been brought to market due to sanitary regulations and low acceptance by consumers. Even so, there is a growing awareness among stakeholders that this waste does not lend itself to the efficient use of ocean resources. As such, there are increased efforts to reduce waste

in the post-harvest and processing stage. In addition, by-products are being used more and more for a variety of purposes in order to capitalize on their useful content. They are being used for fish meal, feed, for human consumption (in products such as fish sausages, cakes, gelatine, sauces, snacks, etc.), bioenergy, pharmaceutical products, dietetic products, cosmetics, pigments and fertilizer, among other uses.

Ethical labour practices: Recent years have borne witness to increasing attention on ethical labour practices, particularly in the West. Consumers are putting pressure on companies to ensure fair and ethical practices, and large buyers have begun to scrutinize their value chain in order to verify compliance with principles of corporate social responsibility. Although these concerns are not exclusive to the ocean economy, industry stakeholders are finding it increasingly necessary to be attentive to best practices, as lapses can have a significant detrimental impact on a company's, a country's, or even a region's reputation. In 2015, for example, the United States and EU supply chain was rocked by news that large retailers and supermarkets were stocking shrimp from Thailand that was effectively being processed by slave labour.²³ This prompted a number of buyers to launch investigations into their supply chains and the EU to consider banning seafood imports from Thailand. Two big retailers in the United States meanwhile (Costco and CP Foods) are facing lawsuits related to the matter.²⁴ While this may be an extreme example of misconduct, it should serve to highlight the growing attention to issues of corporate social responsibility and the potential repercussions of lax compliance.

Sustainability: Similar to the above, there is increasing awareness of the need to carefully manage fish stocks in order to ensure long-term sustainability and avoid over-fishing.²⁵ While perhaps the greatest threat to marine resources is illegal, unreported and unregulated fishing, inappropriate handling of by-catch and discards can also degrade ocean resources.

Increasing consumption: The consumption of fish products continues to expand due to four main factors: (i) population growth; (ii) rising incomes and urbanization; (iii) expansion of fish production and the rise of aquaculture; and (iv) the growing efficiency of distribution channels. It should also be noted that strong production growth in China has led to a significantly increased availability of fish in the market.

18. Ibid., p. 43.

19. Ibid., p. 46.

20. Ibid., p. 43.

21. Ibid., p. 44.

22. Ibid., p. 45.

23. Margie Mason et al (2015). Global supermarkets selling shrimp peeled by slaves. AP, December 14. Available from <http://bigstory.ap.org/article/8f64fb25931242a985bc30e3f5a9a0b2/ap-global-supermarkets-selling-shrimp-peeled-slaves>.

24. Michal Addady (2015). Costco faces a lawsuit alleging it knew about slavery practices in supply chain. Fortune, 19 August. Available from <http://fortune.com/2015/08/19/costco-lawsuit-slavery/>.

25. Food and Agriculture Organization (2014). The State of World Fisheries and Aquaculture: Opportunities and Challenges, p. 9.

VALUE CHAIN ANALYSIS AND SECTOR DIAGNOSTICS

HISTORICAL PERSPECTIVE

A remote, island economy, Mauritius has long depended on fishing as an important source of both income and nutrition. It is therefore no surprise that the sector has been identified as a priority sector for support by the Government.

This support has been manifested through a series of development and master plans spanning more than 30 years.²⁶ The Fisheries Development Plan of 1985 was the first of these initiatives. It evaluated the potential of establishing a National Fisheries Corporation and it raised concerns over the sustainability of in-shore artisanal fishing. It suggested the development of the offshore sector through the uptake of new equipment and fish aggregating devices.

1998 saw the introduction of a Ten Year Development Plan for the Fisheries Sector that continues to be the basis of Government policy towards the sector. The plan sought to promote a strategic framework for sectoral development that focused on the comprehensive enhancement of the business environment, production capacities and monitoring. Even so, it concluded that the potential for expansion was limited and that efforts should instead focus on sustainable management of resources and value addition. In 2006, a draft sector policy was introduced for the period 2007 to 2012. Its goal was to integrate a more comprehensive approach to economic, social and environmental issues associated with the sector and shift away from reactive policy. Nonetheless, the policy was never formally adopted and as a result its goals were achieved only in part.

Finally, a new Master Plan was developed to cover the period from 2011 to 2020. Its goal is to provide a framework for sectoral development, to be supported by six strategic objectives:²⁷

- i. Implement management to achieve sustainable domestic fish resources in accordance with ecologically sustainable development principles including, where appropriate, ecosystem-based fisheries management;
- ii. Support private sector growth at all stages of the value chain, including fish production, value adding and in supporting industries;
- iii. Ensure safe, adequate, good quality seafood for domestic consumption;
- iv. Reduce the medium–long term risk exposure of the Mauritius seafood export sector;
- v. Transition to a more participatory, co-management approach to fisheries management and development that (a) involves all key stakeholders; and (b) recognizes the private sector benefits that accrue from exploitation of Mauritian fisheries resources in funding services to support management;
- vi. Support the international obligations of Mauritius in fisheries and marine resource management.

This plan contained a detailed set of activities that were to be implemented in support of the plan's goals over the next five years (2011–2016).

26. Morgan, G., Shotton, R. and Russell, D. (2011). Draft Fisheries Master Plan for Mauritius, p. 81. Pescares Italia SRL.

27. *Ibid.*, pp. 89 & 90.

CURRENT CONTEXT

Mauritius boasts a largely untapped Exclusive Economic Zone (EEZ) of 2.3 million square kilometres and is located close to some of the world's best non-EEZ tuna fishing areas. As such, the ocean economy is one of the country's most promising areas of economic activity and the sector has attracted increasing investment through the value chain in areas such as fishing, aquaculture, and fish and fish waste processing. Indeed, the sector now accounts for some 17.6%²⁸ of export earnings and 1.5% of gross domestic product, and it employs roughly 12,000 people directly.²⁹

28. International Trade Centre (2016). Trade Map. Accessed 27 June 2015. Available from <http://www.trademap.org/>.

29. Board of Investment (2015). Improving the Seafood Supply Chain.

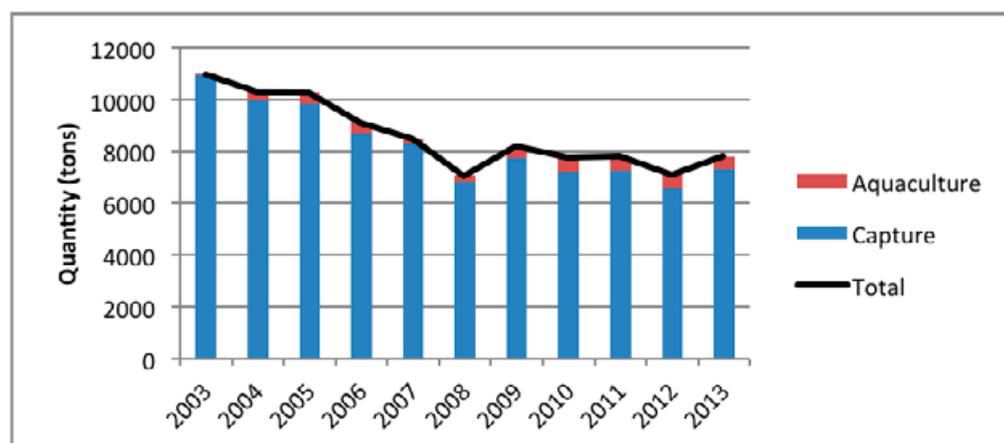
Mauritius engages in two forms of fish production: marine capture and aquaculture. Total production was valued at 7,794 tons in 2013 and has been steadily declining since 2003.³⁰ As illustrated in figure 6, capture fishing is responsible for the vast majority (92.8%) of production. Even so, aquaculture has been slowly beginning to gain ground: Between 2009 and 2013 aquaculture production grew by a total of 11%, whereas capture production fell by 6%.

Mauritius continues to be a minor player within the region, accounting for just 3.7% of total Indian Ocean Commission (IOC) fishery production.³¹

30. Food and Agriculture Organization (2016). FishStatJ. Accessed 15 July 2016. Available from <http://www.fao.org/fishery/statistics/software/fishstatj/en>.

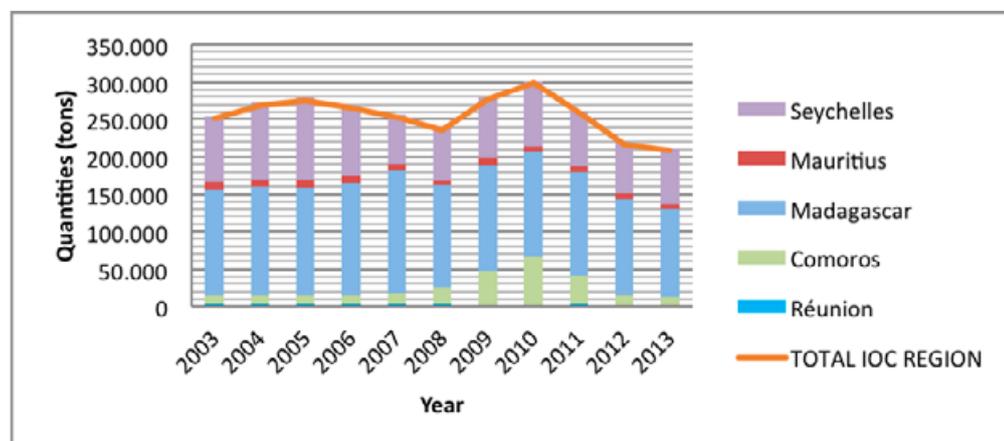
31. Indian Ocean Commission (2016). Website. Available from: http://eeas.europa.eu/delegations/mauritius/regional_integration/indian_ocean_commission/index_en.htm.

Figure 6: Total fish production in Mauritius, 2003–2013



Source: Food and Agriculture Organization (2016).

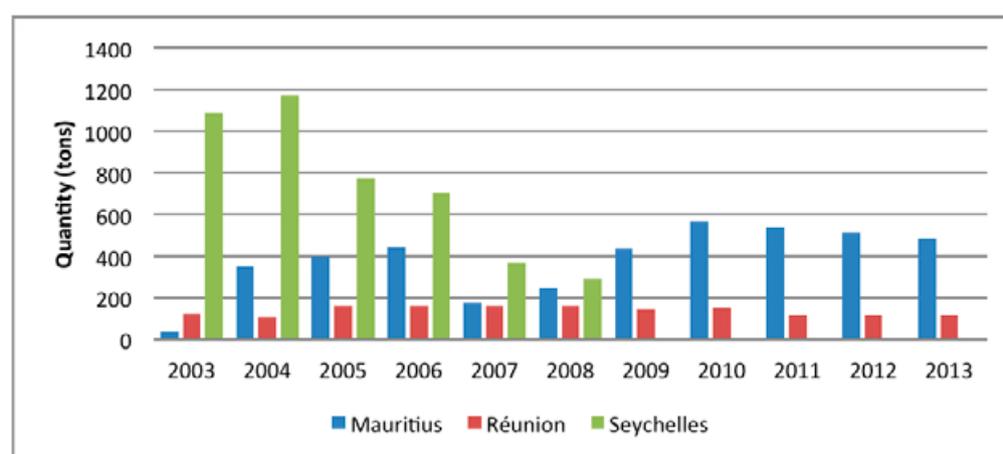
Figure 7: Indian Ocean Commission fisheries production, 2003–2013



Source: Indian Ocean Commission.

Even so, Mauritius far outpaces its small island neighbours when it comes to aquaculture. While Madagascar dominates aquaculture production in the region, Mauritian output significantly exceeds that of Réunion and Seychelles.

Figure 8: Aquaculture production in the Indian Ocean Commission region, 2003–2013



Source: Indian Ocean Commission.

Aquaculture

Fish farmers produced 485 tons of farmed fish in 2013, consisting mainly of red drum and, to a lesser extent, tilapias.

Table 14: Aquaculture production

Species (ASFIS species)	2009	2010	2011	2012	2013	CAGR (%)
Total quantity (tons)	437.4	567.5	537.3	514	485	2
Red drum	330.1	498.4	456.0	432	400	4
Tilapias nei	98.6	62.1	71.1	72	75	-5
Hooded oyster	2.5	2.0	3.0	3	3	4
Giant river prawn	4.0	3.0	3.0	3	3	-6
European seabass	0.0	0.0	2.0	2	2	
Indo-Pacific swamp crab	1.2	1.0	1.2	1	1	-4
Marine fishes nei	1.0	1.0	1.0	1	1	0

Source: Food and Agriculture Organization (2016).

Mauritius has two types of aquaculture operations: large-scale industrial farming and small-scale artisanal farming.³² There is only one large farm, the Mahébourg Marine Farm (FMM). FMM farms red drum and Mediterranean sea bass in two sites in the Mahébourg lagoon, using

high-density polyethylene cages that range in diameter from 16 to 20 metres. The cages are now assembled locally, rearing nets are imported from Europe, and feed is both imported from Europe (BioMar) and produced domestically (Livestock Feed Limited (LFL)). FMM has its own processing plant that operates according to European standards, allowing it to export products to a wide range of advanced markets. FMM has focused

32. Board of Investment (2015). Accelerating the Development of Sustainable Aquaculture Industry in Mauritius.

on selling high-value products, placing emphasis on fish health and environmental and social issues. To this end it has obtained the 'Friend of the Sea' and 'Blue Carbon' certifications, and it is looking to pursue other certifications in the future in line with evolving consumer demand.

FMM is expected to produce 850 tons of fish in 2015. While this continues to be below the break-even level of 1,300 tons per year, production is forecast to reach 3,000 tons per year by 2018/2020 (2,000 tons of red drum and 1,000 tons of sea bass), generating 12 million euros in turnover. In support of this goal, the company has made a number of recent investments, including a feed storage depot, facilities for broodstock and a new hatchery. There are also plans to increase the number of farming sites from two to five. FMM currently employs 120 people but employment is expected to reach 250 following the planned expansion.

The FMM hatchery is the only industrial hatchery in Mauritius. It is capable of producing 6 million fingerlings

per year, enough to cover short- and medium-term projected needs. The hatchery meets European standards and it has a broodstock depot as well as several larvae rearing and nursing rooms. While FMM has its own breeding stock for red drum, it imports sea bass spawn from European hatcheries. Although supplies of red drum may be inadequate, additional spawn can be imported from Réunion (Association Réunionnaise de Développement de l'Aquaculture). Of particular note, the hatchery has a special unit for experimenting with new species.

In addition to FMM, there are a number of fishers operating artisanal fisheries. These fishers are organized in roughly 30 cooperatives. In contrast to the success achieved by FMM, the catch of artisanal fishers has been declining for some time now. While Government efforts to support this segment have met with some success in replenishing natural stocks and helping fishers acquire new cage systems, sustainable growth models for artisanal aquaculture must be re-evaluated.

Table 15: Mauritian capture production, 2009–2013

Species (ASFIS species)	2009	2010	2011	2012	2013	CAGR (%)
Total quantity (tons)	7 740	7 226	7 266	6 604	7 309	-1
Marine fishes nei	6	16	2 413	1 938	2 352	230
Emperors (= scavengers) nei	3 454	3 032	2 183	1 933	2 169	-9
Marlins, sailfishes, etc. nei	649	650	650	650	652	0
Octopuses, etc. nei	89	93	461	626	605	47
Snappers, jobfishes nei	430	739	307	359	390	-2
Yellowfin tuna	57	55	97	56	363	45
Groupers, seabasses nei	1 033	860	207	201	238	-25
Spinefoot (= rabbitfishes) nei	274	372	247	201	191	-7
Goatfishes	497	268	99	96	120	-25
Bluespine unicorn fish	210	201	161	141	83	-17
Carangids nei	29	19	80	51	48	11
Bigeye tuna	1	6	11	3	44	113
Swordfish	93	212	44	17	28	-21
Albacore	200	100	155	168	6	-50
Tropical spiny lobsters nei	6	8	5	6	5	-4
Mulletts nei	36	23	9	12	5	-33
Indo-Pacific swamp crab	5	3	2	2	3	-10
Tuna-like fishes nei	378	330	17	8	3	-62
Nylon shrimps nei	0	0	6	5	2	
Sharks, rays, skates, etc. nei	40	28	3	6	1	-52
Skipjack tuna	13	9	19	10	1	-40
Rest of production	240	202	90	115	0	-0.898

Source: Food and Agriculture Organization (2016).

Capture

Mauritius captured 7,309 tons of fish in 2013.³³ The most important fish is tuna, followed by emperors, marlins, sail-fishes, octopuses and snappers. While table 15 provides an indication of the catch levels for various species, it should be interpreted with caution: it includes only those catches made within the Mauritian EEZ, even though much of the sector's catches come from outside the EEZ. The data can nonetheless be used to understand the relatively low catch levels within the EEZ when compared with regional neighbours.

Mauritius has seven purse seine operators in the IOC area, 1,660 registered artisanal fishers and 540 fishers operating in Rodrigues. Artisanal catches of tuna are estimated to range from 200 to 250 tons per year.³⁴ These artisanal catches are generally sold in the domestic market.

Many of the supplies for the processing industry are shipped from Seychelles via reefers. Mauritius has

33. Food and Agriculture Organization (2016), FishStatJ. Accessed 15 July 2016. Available from <http://www.fao.org/fishery/statistics/software/fishstatj/en>.

34. Board of Investment (2015). Improving the Seafood Supply Chain.

developed a competitive advantage for transshipments and processing due to its relatively efficient logistics infrastructure and systems:

- About 100,000 tons of purse seine catches in the IOC are brought to Mauritius for processing (namely canning).
- A small portion of albacore caught by longliners is transhipped in Mauritius.
- Small portions of pole and line skipjack caught by artisanal and semi-industrial fishers from the Maldives are canned in Mauritius.

While only 6% of regional purse seine transshipments are landed in Mauritius, the presence of both canning plants as well as the Chantier Naval de l'Océan Indien shipyard for repairs offer a strong competitive advantage that is found nowhere else in the south-western Indian Ocean. Arrivals have also increased since Sapmer turned Mauritius into the core of its processing activity, unloading and processing fish from its -40° purse seiners before exporting it abroad. However, Sapmer is now looking to improve its logistical efficiency by moving its unloading operations to Seychelles and using Mauritius only for processing.

Box 1: Fish processing

Fish processing is an important part of the sector. The following are the main products that the sector produces:

Tuna cans: produced mostly by Princes Tuna Mauritius (PTM) Riche Terre. Tuna cans are finished products ready for sale to EU consumers. Princes cans are distributed by the Princes Group, which has large market shares in the United Kingdom and Germany.

Tuna loins: manufactured by PTM. Tuna loins are semi-finished products used by European canneries in Spain, Italy and France to manufacture tuna cans under different European brands.

Niche value added tuna products: including tuna in glass jars, tuna meat in pouch (PTM).

By-products from tuna canning: such as fish meal that can be used to produce feed mix as well as fish oil (Marine Biotechnology Products, Cervonic, LFL).

Table 16: *Transhipments and landings from purse seiners by ports in weight (tons), 2009–2012*

Port	2009	2010	2011	2012	Average tonnes	Average %
Diego Suarez	34 157	27 370	21 753	19 412	25 673	10%
Maurice	11 214	11 339	21 311	19 126	15 747	6%
Mombasa	3 327	4 832	1 959	3 283	3 350	1%
Seychelles	211 594	235 206	213 338	189 656	212 448	82%
Others	2 426	498			731	0%
TOTAL	262 718	279 245	258 361	231 477	257 950	100%

Source: Board of Investment (2015). Improving the Seafood Supply Chain, p. 16.

VALUE CHAIN MAPPING

Mauritius has taken great strides in recent years to expand its coverage of the entire fisheries value chain. Today, local companies are involved in all aspects of the sector's value chain, from the production of inputs to production and landing of fish, transportation and warehousing, processing and export.

Production factors

The most important production factor is the access to natural marine resources that Mauritius has. This includes access to 2.3 million square kilometres of EEZ (of which 17% is shared with Seychelles), as well as access to the Indian Ocean EEZ, high seas fishing areas and fish supply of foreign fleets (EU and Seychelles). While research and development (R&D) is performed within Mauritius and cages for aquaculture are locally assembled, other production factors leverage a mix of both domestic and foreign inputs.

The labour force for capture comes from Mauritius, France, Seychelles and French-speaking African countries. The processing segment makes use of workers from Mauritius, India, Bangladesh, Sri Lanka and Madagascar. There are both domestic and foreign vessels, although fishing gear and equipment are imported. Fish feed for aquaculture is secured internationally as well as locally from domestic firm LFL. Fish spawn may also be both local and foreign; FMM produces red drum spawn in its hatchery but sea bass spawn is imported from France and Réunion. Even the regulatory framework is a mix of both domestic and foreign; it includes national, regional and international regulations; economic partnership agreements; and fisheries partnership agreements (EU, Japan, Seychelles, the African Growth and Opportunity Act (AGOA), the Southern African Development Community (SADC) and the Common Market for Eastern and Southern Africa). Lastly, stock status and Regional Fishery Management Organizations management measures are implemented by foreign entities.

Production/landing

The production/landing segment of the value chain can be considered according to four main types of activities: international capture, domestic capture, aquaculture and Rodrigues capture. International capture focuses on fishing for tuna species (albacore, yellowfin, bigeye and skipjack), swordfish, sharks, ice fish, alfonsino, oil fish, tooth fish, orange roughy and by-catch. International fishing operations make use of a wide array of vessels and fishing techniques including longliners (-60°); trawlers (-20°); purse seiners (-20°, -40°, -60°); and containers (-20°/-40°/-60°).

Domestic capture meanwhile involves banks fishing, industrial tuna fishing and fully artisanal fishing. Banks fishing, which is practised from Saint Brandon to Saya de Malha, captures sky emperor, spangled emperor, blacktip grouper, spotcheek emperor, blue-green snapper, yellow-edged lyretail and coral trout. There are five boats and 25 semi-industrial fishing vessels engaged in banks fishing. One company, Sapmer, operates -20° and -40° purse seiners in the domestic industrial tuna fishing segment. Lastly, the domestic capture segment includes around 1,660 registered artisanal fishers.

Aquaculture is dominated by FMM, a large-scale industrial farmer that produces red drum and Mediterranean sea bass. Growfish, another industrial farming operation, is currently being established. The majority of industrially farmed fish is exported immediately without undergoing processing. The segment also includes small-scale marine aquaculture that produces goldlined seabream, rabbitfish/white spotted rabbitfish and cobia.

Lastly, fishers in Rodrigues capture pelagic and demersal fish, cephalopods and crustaceans. Active fishers include JLR Fisheries and artisanal fishers' cooperatives that group about 540 fishers.

Transportation/warehousing

After being farmed or caught, the fish may either be transported to market or sent to processing establishments. The fish caught by international longliners are transported to the Agricultural Marketing Board (AMB) and cooperatives (by catch), or else unloaded, sorted and placed in cold storage by Mauritius Freeport Development Company Ltd (MFD) or Froid Des Mascareignes (FDM). All of the catch from international trawlers is unloaded, sorted and placed in cold storage by MFD or FDM. The by-catch from longliners is sold on the local market, while some of it is sent for further processing. Much of both longliner and trawler catches is exported unprocessed.

The international capture from purse seiners is brought to Mauritius either by reefer through traders/graders or directly. It is transported via -20°/-40°/-60° containers. Once in Mauritius it joins the domestic capture and aquaculture production in being unloaded, sorted and placed in cold storage by MFD and FDM. Although some of the non-imported fish is exported, much of it is sent from MFD and FDM for further processing. The unprocessed fish that is exported is shipped via -20° and -40° containers to Spain (26.7%), Chinese Taipei (16.8%), Thailand (11.8%), Japan (8.4%), Italy (6.4%) and Portugal (5.1%).

Processing

While some producers send their fish directly to fish fillet processors, the majority of fish is sent to the processors through FDM and MFD after sorting and chilling. The main types of processing include tuna canning (PTM Riche Terre), Jars (Indico Canning Ltd), pre-cooked loins preparation (for canning) and pouch (PTM Marine Road (ex. Thon des Mascareignes – TDM), -40° deep frozen loins for sushi and sashimi (Mer des Mascareignes, Tuna Processing Services Indian Ocean – TPSIO), tunas steaks/reconstituted/tuna mince (TPSIO), salted seafood (Seskel) and fish fillets (FMM, Bella Amigo, Aurifla, Pelagic Process).

Fish by-product is either processed into fish meal by Marine Biotechnology Products or turned into fish oil preparation by Cervonics. The fish meal is used for pharmaceutical research or to make feed mix (LFL). These goods are used in the local market and exported.

Fish captured in Rodrigues is sent directly to fish processing plants located in Rodrigues (JLR Fisheries), where it is processed into steaks, loins, fillets, whole and half fish, and cleaned/cut cephalopods and crustaceans. In addition to JLR, local cooperatives and community kitchens engage in smallholder seafood processing. They prepare piment-ourite, piment-poisson, and dried octopus and fish. It should be noted that some unprocessed fish enters the value chain from foreign countries, including Spain (42.8%), Seychelles (11.8%), France (11.8%) and Chinese Taipei (8%).

Processed seafood exports are shipped via -20° and -40° containers and dry containers, after which they are sold to distributors and wholesalers. The top markets are the United Kingdom (28% of processed fish exports in 2014), Spain (15.6%), Italy (12.8%), the Netherlands (9.6%), France (8.7%) and Japan (6.8%).

Primary support services

The value chain is supported by a wide array Government and private sector support institutions. These institutions fall within three broad categories.

Policy support network: These institutions represent ministries and competent authorities responsible for influencing or implementing policies at the national level. Within the scope of the ocean economy, these include the Ministry of Foreign Affairs, Regional Integration and International Trade, as well as the Ministry of Ocean Economy, Marine Resources, Fisheries, Shipping and Outer Island (MoOE). The latter includes the Mauritius Oceanography Institute and the Albion Fisheries Research Centre (AFRC), which provide the Government with research and policy advice. The Fisheries Training and Extension Centre of the Ministry of Education and Human Resources, Tertiary Education and Scientific Research meanwhile provides various research and training services in support of sectoral development.

Trade services network: These institutions or agencies should ideally provide a wide range of trade-related services to both Government and enterprises. In this role, they would support and promote the sector through the delivery of trade and export solutions. The five main such organizations influencing the ocean economy are the Mauritian Port Authority, the Board of Investment (BOI), Enterprise Mauritius (EM), the Mauritius Export Association (MEXA) and the Mauritian Revenue Authority.

The Mauritian Port Authority regulates and controls the port sector. In this role it is also responsible for port infrastructure and superstructure. The BOI is the national investment promotion agency. It serves as a one-stop shop for investors and is tasked with engaging in a wide range of promotional and marketing activities. EM, the country's trade promotion organization, provides myriad services to exporters in its effort to help Mauritian businesses expand into regional and international markets. MEXA provides intelligence networking, facilitation, advocacy, representation and strategy services to its members. It also helps companies engage in training and capacity-building, access credit and form working relationships with Government bodies. The Mauritian Revenue Authority meanwhile is the national tax collection agency.

Business services network: These institutions include associations and commercial service providers that support the growth and development of sector businesses



through their offerings. Chief among these organizations are the Fishermen's Investment Trust and the various fishers' cooperatives, of which there are about 30. The Fishermen's Investment Trust invests in fishing and related activities, helps investors set up businesses in Mauritius, and generally seeks to promote development and diversification in the sector. The cooperatives meanwhile help artisanal fishermen organize, access services and get their products to market.

The private sector business support network includes companies that repair and assemble fishing equipment and ships. To this end, Chantier Naval de l'Océan Indien specializes in the construction, repair and maintenance of ships in Port Louis. The sector is also supported by ship agency and logistics services providers and port operators. The port operators include BPML Freeport Services Ltd, Freeport Operations (Mauritius) Ltd, FDM, Mauritius MFD and Mauritius Free Zone Logistics Ltd.

International support

The sector's sustainable development is also supported by a number of foreign institutions, including the Indian Ocean Tuna Commission (IOTC), the IOC, and the Indian

Ocean Tuna Operator Association: The IOTC is the intergovernmental group that is responsible for managing tuna and tuna-like species in the Indian Ocean.³⁵ The IOC is an intergovernmental organization that has five members: the Union of the Comoros, France/Réunion Island, Madagascar, Mauritius and Seychelles. Its goal is to strengthen regional ties by working on four pillars:

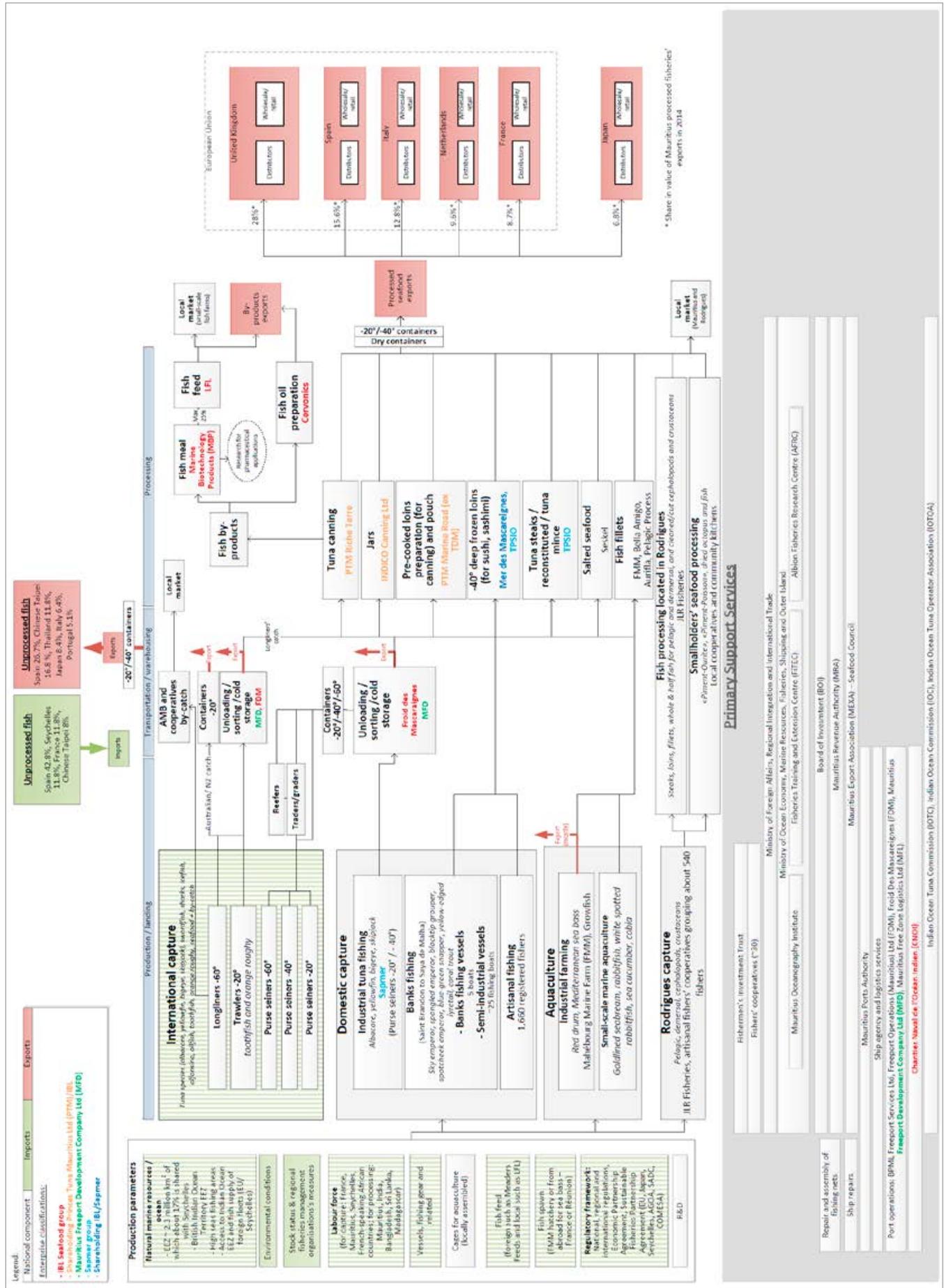
- i. Political and diplomatic cooperation;
- ii. Economic and commercial cooperation;
- iii. Sustainable development in a globalization context; and
- iv. Strengthening of the regional cultural identity.³⁶

Lastly, the Indian Ocean Tuna Operator Association was established in 2011 with the goal of organizing stakeholders and promoting a sustainable fishing sector in the region.

35. <http://www.iotc.org/>.

36. http://eeas.europa.eu/delegations/mauritius/regional_integration/indian_ocean_commission/index_en.htm.

Figure 9 : Mauritius fisheries and aquaculture value chain



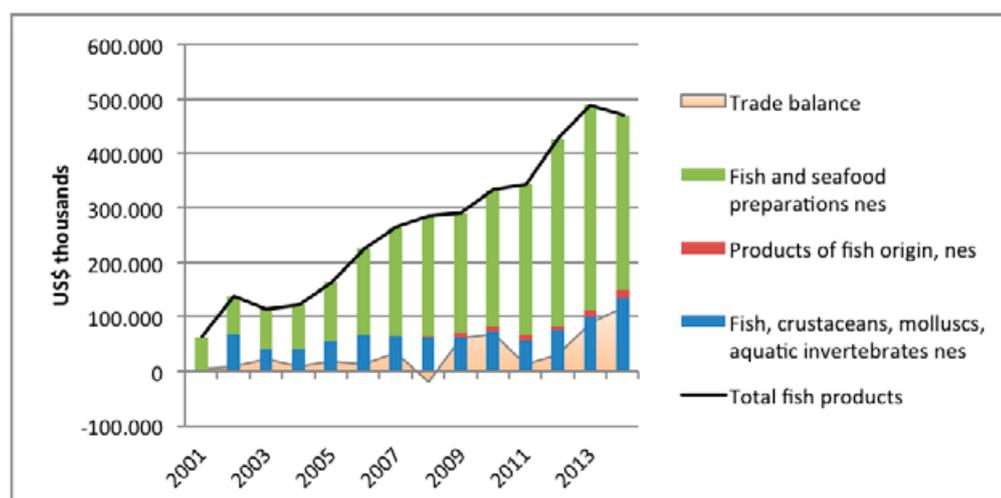
TRADE ANALYSIS

Mauritian exports of fish products reached an all-time high of US\$469.7 million in 2014.³⁷ The sector currently accounts for 17.6% of total Mauritian exports, 6.1% of

37. International Trade Centre (2016). Trade Map. Accessed 27 June 2015. Available from <http://www.trademap.org/>

African fish exports and 0.3% of global fish exports. Fish and seafood preparations accounted for 68.2% of the sector's exports, followed by fish, crustaceans, molluscs and aquatic invertebrates n.e.s. (28.8%), and products of fish origin (3%). Sectoral growth was impressive, with a five-year CAGR of roughly 10%, and growth was strong across all three subsegments.

Figure 10: Mauritian fish exports (Mauritius fish exports, HS 0301, 0302, 0303, 0304, 0305, 0306, 0307, 0308, 0508, 0509, 0511, 1603, 1604, 1605), 2001–2013

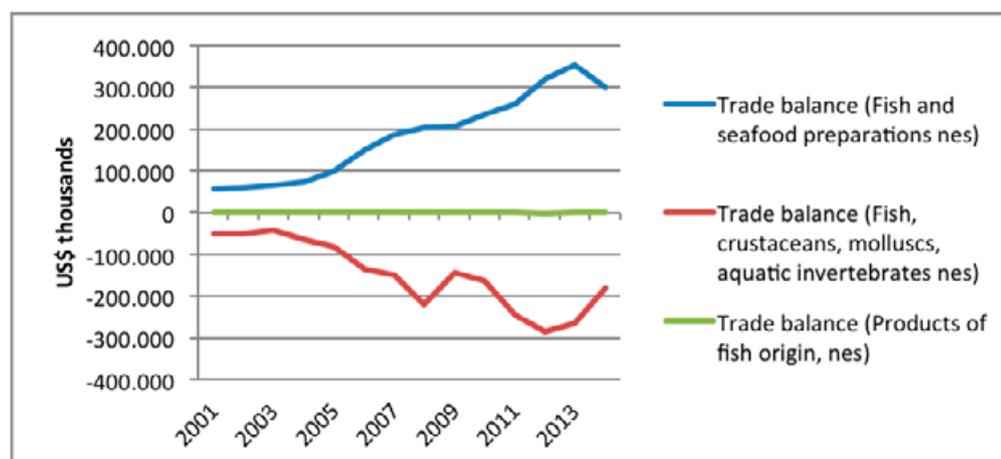


Source: ITC Trade Map.

As illustrated in figure 11, Mauritius enjoys a significant trade surplus for the fish and seafood preparations subsegment. Even so, the trade deficit for fish, crustaceans,

molluscs and aquatic invertebrates highlights the continued reliance on foreign raw materials in the domestic value chain.

Figure 11: Mauritian trade balance by subsegment, 2001–2013



Source: ITC Trade Map.

Figure 12 provides a high-level view of the sector’s export performance between 2010 and 2014 by plotting each product category according to the annual increase in Mauritian share of world exports (x-axis) and the annual growth of world imports (y-axis). It shows that Mauritius has been gaining ground and increasing its market share in most product segments.

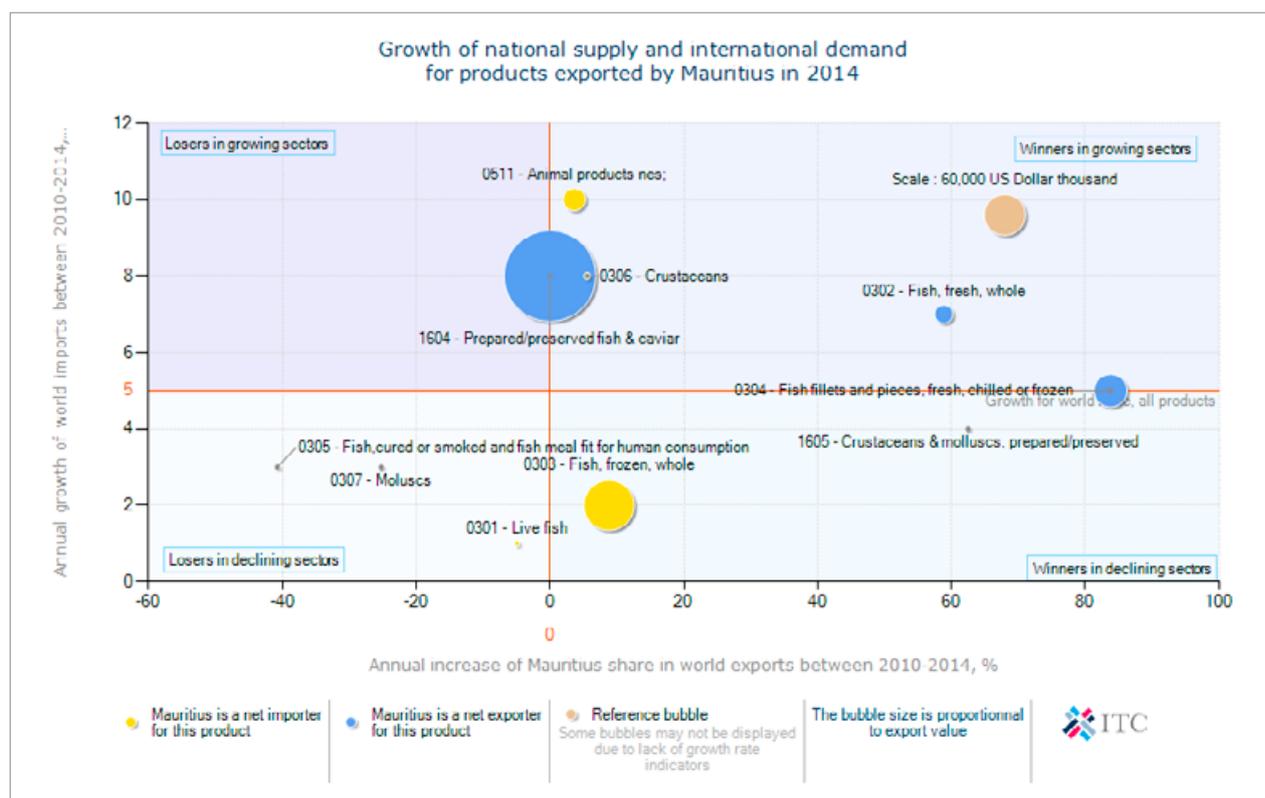
The largest markets for Mauritian fish products are the United Kingdom (22.16% of total exports), Spain (17.7%), Italy (11.54%), the Netherlands (7.65%) and France (7.09%).

The EU is the largest regional market for Mauritian fish products (77%), followed by the Asia–Pacific region (19%). Ten-year annual growth rates for Europe and the Asia–Pacific region are roughly the same (14.6% and 14.7% respectively). However, Asia–Pacific has been expanding at a much faster pace over the past few years, its five-year CAGR coming in at 20% as opposed to 8.7% in Europe. In addition, there was double-digit 10-year export growth from Mauritius to the Americas (39.4%), Africa (15.6%) and the Middle East (10.6%), albeit from a low baseline.



Photo: Giorgio Minguzzi (CC BY-SA 2.0), Rodrigues Isl.

Figure 12: Growth of national supply and international demand for fisheries exports by Mauritius in 2014



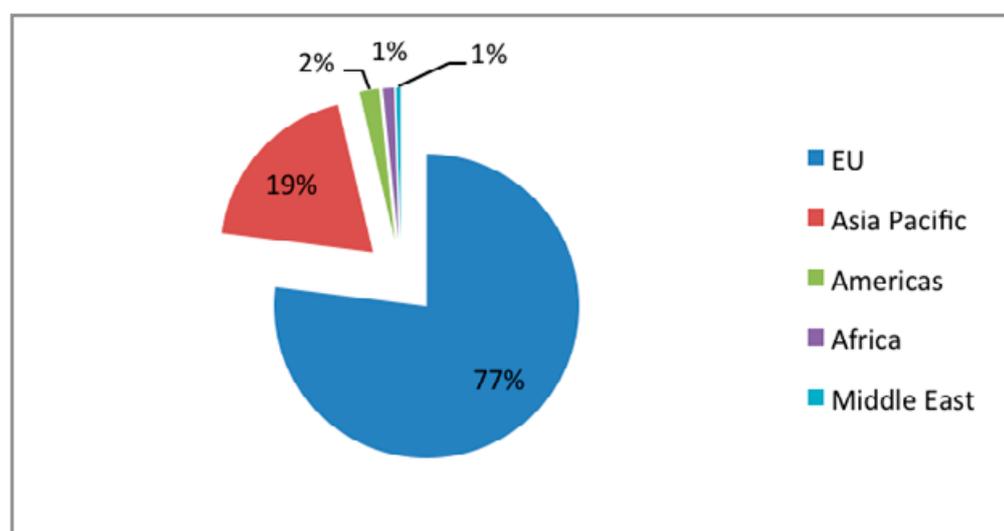
Source: ITC Trade Map.

Table 17: Top 15 importers of Mauritian fish products

Importers	Exported value in 2014 (US\$ thousands)	Share (%)	Growth year-on-year (%)	5-year CAGR (%)	10-year CAGR (%)
World	469 702	100.00	-3.88	10.09	14.45
United Kingdom	104 066	22.16	-17.46	2.37	4.57
Spain	83 483	17.77	-5.91	8.43	23.20
Italy	54 182	11.54	-24.05	-0.69	74.67
Netherlands	35 954	7.65	12.50	48.01	22.84
France	33 305	7.09	2.54	24.14	24.96
Japan	31 611	6.73	40.29	30.67	11.78
Chinese Taipei	27 782	5.91	18.27	35.14	30.26
Belgium	17 995	3.83	61.43	40.47	34.13
Thailand	11 521	2.45	28.70	13.34	19.57
Finland	9 587	2.04	23.18	48.90	43.78
United States	8 923	1.90	15.19	3.84	38.28
Portugal	7 693	1.64	-35.24	-1.02	n.a.
Sweden	4 936	1.05	34.90	65.13	n.a.
Germany	4 385	0.93	32.40	5.02	0.14

Source: ITC Trade Map.

Figure 13: Mauritius fish exports by region



Source: ITC Trade Map.

Fish and seafood preparations

Prepared and preserved tuna accounts for just under 94% of fish and seafood preparation exports and 64% of the sector's total exports. Exports of this product have been growing at a robust rate over the past five and 10 years (7.3% and 14.1% respectively).

The most important markets for Mauritian fish and seafood preparations are the United Kingdom (32% of exports), Spain (17%), Italy (14%), the Netherlands (11%) and France (8%). Growth has been particularly strong to the Netherlands (48% five-year CAGR), France (27.9%), Belgium (41.2%), Finland (48.9%) and Sweden (65.1%).

Fish, crustaceans, molluscs and aquatic invertebrates n.e.s.

Frozen whole fish account for 66% of the subsegment's exports, followed by fish fillets and pieces, fresh, chilled or frozen (28%); and fresh whole fish (6%). Growth stagnated during the first part of this century but expansion picked up significantly between 2011 and 2014; total exports grew by 137% in those three years alone. Growth has been driven by strong demand for fish fillets and pieces, fresh, chilled or frozen (five-year CAGR 66%) and fresh whole fish (86%).

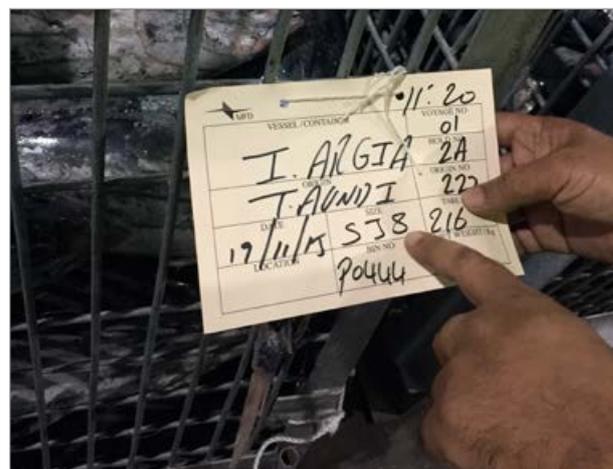


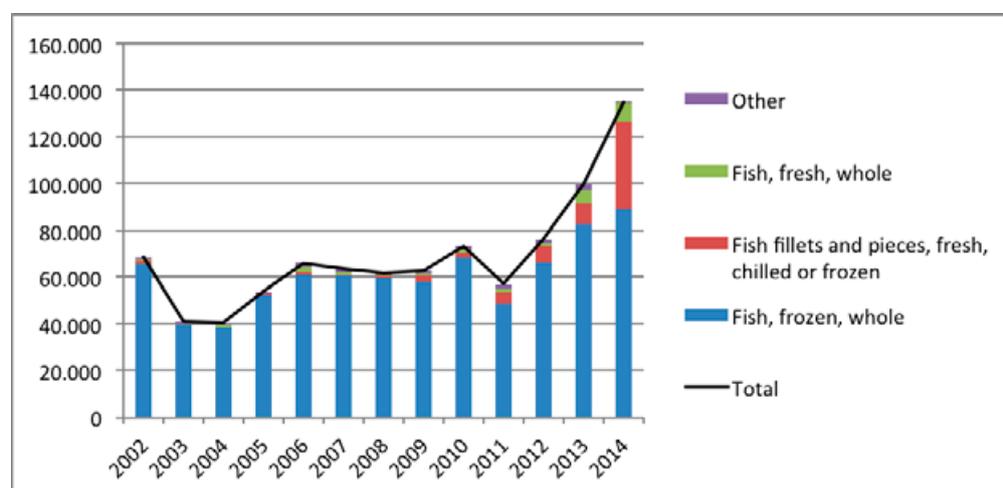
Photo: Alexandra Golovko (ITC),

Table 18: Mauritius exports of fish and seafood preparations (HS 1604, 1605)

HS code	Product label	Exported value in 2014	Share (%)	5-year CAGR (%)	10-year CAGR (%)
Total	Total	320 347	100.0	7.7	14.7
'160414	Tunas, skipjack & Atlantic bonito, prepared/preserved, whole/in pieces, excl. minced	300 770	93.9	7.3	14.1
'160420	Fish prepared or preserved, except whole or in pieces	15 708	4.9	12.7	n.a.
'160413	Sardines, sardinella & brisling or sprats prepared or preserved, whole or piece excl. minced	3 755	1.2	31.2	16.0
'160431	Caviar	42	0.0	n.a.	n.a.
'160415	Mackerel, prepared or preserved, whole or in pieces, but not minced	32	0.0	-14.7	n.a.
'160419	Fish n.e.s., prepared or preserved, whole or in pieces, but not minced	27	0.0	n.a.	n.a.
'160540	Crustaceans n.e.s., prepared or preserved	9	0.0	n.a.	n.a.

Source: ITC Trade Map.

Figure 14: Mauritius exports of fish and seafood preparations (HS 03), 2002–2014



Source: ITC Trade Map.



Photo: Miwok (CC0 1.0)

Table 19: Top 10 markets for Mauritian products (HS 03)

Importers	Exported value in 2014 (US\$ thousands)	Share (%)	5-year CAGR (%)
World	135 077	100.0	16.6
Japan	31 610	23.4	30.9
Spain	29 099	21.5	9.5
Chinese Taipei	16 477	12.2	30.5
Thailand	11 521	8.5	13.3
Italy	8 673	6.4	66.4
France	6 866	5.1	13.6
Portugal	5 005	3.7	30.2
Viet Nam	3 917	2.9	14.9
China	3 880	2.9	7.3
Singapore	3 668	2.7	43.5

Source: ITC Trade Map.

The segment's most important products are frozen fish n.e.s. (55% of segment exports); frozen fillets of tunas, skipjack or stripe bellied bonito (26.3%); tunas, yellow-fin, frozen (7%); and fresh or chilled toothfish (4%). The recent turnaround in trade dynamics is further highlighted by trends in the subsegment's trade balance. Although Mauritius experienced a deteriorating trade deficit since the turn of the century as it began to rely on an increasing share of imported fish, the deficit began to contract in 2013. In just two years, the trade balance has recovered 37% from its low in 2012.

As opposed to the prepared foods segment, which is dominated by European buyers, Asian countries are the most important markets for fish, crustaceans, molluscs and aquatic invertebrates from Mauritius. Strong demand growth has been witnessed from many of the most important buyers.

Products of fish origin

Mauritian exports in this category are almost entirely comprised of inedible products of fish/crustaceans/molluscs, etc. In 2014, US\$14 million of such products were exported, representing a five-year CAGR of 35.9%. Of this category, 80% was exported to Chinese Taipei and 7% was exported to Spain.

PRODUCT AND MARKET CROSS SECTION

The following analysis highlights some key features for each of the main export markets of Mauritian fish products.

European Union

Main products exported	Use and application of products	Main type of buyers in target markets	Top critical success factors	Comparison with competitors
1. Prepared / preserved fish (cooked loins)	Cooked loins for canning	Wholesalers	<ul style="list-style-type: none"> » Price » Resource » Sustainability » Sanitary safety and quality standards » Traceability » Quality (general and Intrinsic) » Freight cost » Delivery reliability 	<p>Main competitors: Thailand, China, Viet Nam, Republic of Korea and Philippines</p> <p>Critical factors:</p> <ul style="list-style-type: none"> » Resource » Price » Autonomous tariff quotas (ATQs) related to trade agreements » Traceability » Certification
	Canning	Wholesalers		<p>Worldwide can-producing countries: Thailand, Philippines, Papua New Guinea, EU, South America, African, Caribbean and Pacific countries, etc.</p> <p>Critical factors:</p> <ul style="list-style-type: none"> » Resources » Price » Trade agreements » Traceability » Certification
2. Flour etc. of meat, meat offal, fish, crust, etc. unfit for human consumption	Aquaculture	Wholesalers	<ul style="list-style-type: none"> » Price » Nutritive quality » Volumes » Traceability » Certification of incomes (Aquaculture Stewardship Council certification with Marine Conservation Society fisheries) 	<ul style="list-style-type: none"> » Flow and quality of raw material from industrial fishing (by-catch) and processing facilities (by-products)
	Agriculture	Wholesalers		
3. Fish fillets and pieces, fresh, chilled or frozen	Fresh: retail, food service, further processing and wholesale	Wholesalers	<ul style="list-style-type: none"> » Resource » Sanitary safety » Traceability » Quality (general and Intrinsic) » Freight or air transport cost » (+ Rules of Origin (ROO)) » Sanitary safety » Traceability 	<ul style="list-style-type: none"> » Main competitor: Greece » Viet Nam, Republic of Korea and China
	Frozen: retail, food service, further processing and wholesale	Wholesalers		
4. Fish, frozen, whole	Seychelles / Mauritius containers / reefers of brine tuna-for-canning	Wholesalers	<ul style="list-style-type: none"> » Freight transport cost (+ROO for market access) 	<p>Critical factors:</p> <ul style="list-style-type: none"> » Resources » Price » Trade agreements » Certification
	Seychelles / Mauritius containers at -40° for sashimi, food service	Wholesalers		
5. Fish, fresh, whole	Aquaculture	Wholesalers	<ul style="list-style-type: none"> » Freight or air transport cost (+ROO for market access) 	
	Pelagic Process	Wholesalers		

China

Main products exported	Use and application of products	Main type of buyers in target markets	Top critical success factors	Comparison with competitors
1. Flour etc. of meat, meat offal, fish, crust, etc. unfit for human consumption	Aquaculture	Wholesalers	» Specifics quality standards in China, » Quality(general and Intrinsic)	-
2. Fish, cured or smoked, and fish meal fit for human consumption	Fish oil	Wholesalers	» Quality and quantity	-
3. Fish, frozen, whole	Processing/retail	Reprocessors Distributors/wholesalers	Specific quality standards in China to be met	

Japan

Main products exported	Use and application of products	Main type of buyers in target markets	Top critical success factors	Comparison with competitors
1. Fish fillets and pieces, fresh, chilled or frozen	Raw tuna loins for reprocessing plants (sushi/sashimi)	Wholesalers	» Price » Quality (general and Intrinsic) » Traceability	

Thailand

Main products exported	Use and application of products	Main type of buyers in target markets	Top critical success factors	Comparison with competitors
1. Fish, frozen, whole	Canners	Transfer/re-export	Price, traceability	

BUSINESS ENVIRONMENT AND DEVELOPMENT SUPPORT

The Government of Mauritius has long sought to promote an enabling business environment. These efforts have paid off, as evidenced by the fact that Mauritius ranks 32 in the World Bank's *Doing Business Report* (2016).³⁸ The creation of a robust Freeport segment has been particularly helpful for the development of an ocean economy that involves significant levels of transshipment and minor processing. The Mauritius Freeport allows for duty-free entry of all machinery, equipment and materials imported into a Freeport zone for exclusive use in the Freeport. In addition, there are a number of benefits for goods destined for re-export, including duty-free import of said goods as well as a 50% reduction in port handling charges. The Freeport also offers the opportunity to sell up to 20% of annual turnover (in value terms) on the local market. Fees for fish licensing and registration are competitive.

The business environment is further improved by robust infrastructure. Logistics platforms are aligned with EU standards and the Hazard Analysis and Critical Control Point system for transshipment, warehousing, handling, processing and re-export of seafood products.

Lastly, Mauritius benefits from preferential market access to a number of countries, including the EU (duty-free, quota-free Cotonou), the United States and Japan, as well as Southern and Eastern African countries. The Government has also expanded the fishing grounds of the domestic fleets by signing fish agreements with the EU, Japan and Seychelles.

38. World Bank Group (2016). Ease of doing business in Mauritius. Available from <http://www.doingbusiness.org/data/exploreeconomies/mauritius/>.

DEVELOPMENT POLICIES

The Mauritian Government has provided strong policy-level support to the sector over the years through initiatives such as the Fisheries Development Plan of 1985, the Ten Year Development Plan for the Fisheries Sector of 1998 and the Fisheries Master Plan for 2011–2020. The sector was also identified as one of seven priorities in the Ocean Economy Road Map of 2013, given the potential for growth in the transshipment, seaport-related, aquaculture and seafood processing segments.

Both the Government and the international community continue to support the sector's development through a number of recent and ongoing initiatives. MoOE has taken steps in recent years to develop the aquaculture segment, a subsector which is still in its initial stages of growth. To this end, the AFRC has implemented several projects, including one that sought to replenish natural stocks in brackish waters in order to revive seasonal fishing, and one that provided cages and technical assistance to artisanal fishers in order to spur diversification in the aquaculture segment (in partnership with SmartFish). SmartFish is the most comprehensive development initiative in the sector. It is funded by the EU and implemented by a host of regional and national partners. Mauritius is one of the programme's 20 beneficiaries. SmartFish seeks to promote the sustainable exploitation of fish resources in the Eastern and Southern Africa and Indian Ocean region. A chief focus is to support the development and promotion of the regional fish trade

COMPETITIVE CONSTRAINTS AFFECTING THE VALUE CHAIN

Traditionally, the scope of trade strategies has been defined in terms of market entry, such as market access, trade promotion and export development. This ignores several important factors in a country's competitiveness. For an export strategy to be effective it must address a wider set of constraints, including any factor that limits the ability of firms to supply export goods and services, the quality of the business environment and the development impact of the country's trade, which is important to its sustainability. This integrated approach is illustrated by the four gears framework schematic on the right.

Supply-side constraints

Supply-side issues impact production capacity and include challenges in areas such as availability of appropriate skills and competencies, diversification capacity, technology and low value addition in the sector's products.

Business environment constraints

Business environment constraints are those that influence transaction costs, such as regulatory environment, administrative procedures and documentation, infrastructure bottlenecks, certification costs, Internet access and cost of support services.

Market access constraints

Market entry constraints include issues such as market access, market development, market diversification and export promotion.

Social and environmental constraints

Social constraints include issues related to poverty reduction, gender equity, youth development, environmental sustainability and regional integration.



SUPPLY-SIDE CONSTRAINTS

Box 3: Supply-side constraints

- High pressure on resources does not allow for catch increases
- Limited landings and catch flows
- Difficulties in getting an adequate supply of fish for processing, in terms of both fish type and quantity, leading to suboptimal utilization of processing plants
- Marine Stewardship Council (MSC) certification is challenging to get, preventing greater penetration of target markets
- The fish feed supply situation is suboptimal for the aquaculture industry
- Fragile and limited supply of juveniles and spawn for aquaculture activities
- Insufficient equipment renewal within SMEs
- Market and product diversification initiatives are limited by the absence of mutual recognition of standards in specific markets
- Lack of appropriate labour supply for the tuna processing industry
- Diversification into niche activities has been initiated but has not yet achieved critical mass

SME integration

- Limited involvement of artisanal fishermen in aquaculture activity
- Insufficient labour supply for SMEs
- Certifications for the EU market are not achievable

Innovation

- The aquaculture sector lacks an innovative approach for its development

High pressure on resources does not allow for catch increases

- Tuna

The resource itself is the key supply constraint because its availability and sustainability are fundamental to the durability of the industry. The Mauritian industry is highly dependent on tuna resources within the IOTC area of competency since most production, landing, warehousing and processing activities are linked to purse seine and longline catches. Purse seine fishing is mainly located in the equatorial region between 10°N and 10°S, with seasonal catch available in the Mozambique Channel farther south when the right environmental conditions are present. Longline fisheries extend widely over the whole ocean, with fleets targeting albacore in the southern latitudes; however, the main catches are made (as per purse seine) in the equatorial region for the same environmental reasons. The four major tuna targeted species are yellowfin, bigeye, skipjack and albacore.

Total catches in the IOTC area of competency reached 1,004,006 tons in 2014, with purse seine catches accounting for 30% and longline catches for 18%. After recovering from the impact of piracy in the western Indian Ocean

(longline and purse seine 2010–2011) and a low skipjack catch in 2012 due to the combined effects of the IOTC closure area and the low Mozambique Channel fishing event (purse seine), there was an increase of 17.4% in five years and the highest catch levels since 2002–2006, which was an exceptional catch period with an average of 1,145,482 tons per year. This high level of catch cannot be exceeded because it would undermine stocks.

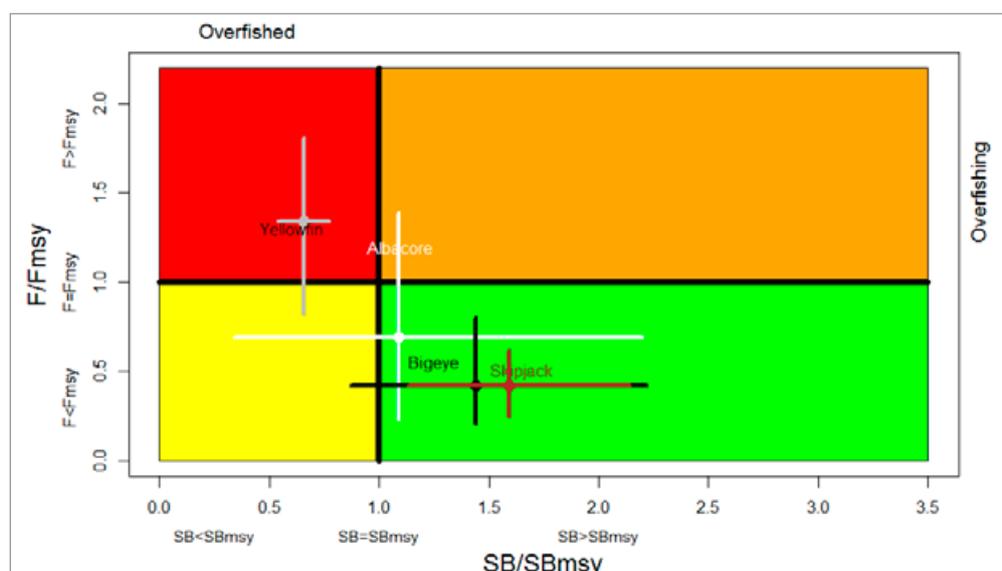
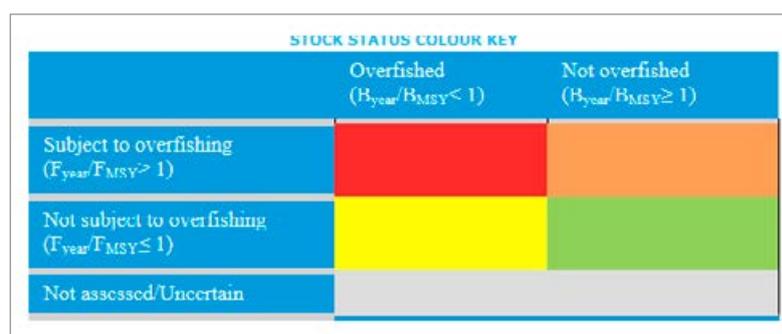
This is confirmed by the summary stocks status for tuna and tuna-like species under the IOTC mandate updated in December 2015. The latest assessment of yellowfin tuna estimates that the stock biomass is below the level that will support the maximum sustainable yield and that fishing mortality is 34% (2%–67%) higher than the fishing mortality rate that would produce the maximum sustainable yield. Thus, on the weight of evidence available in 2015, the yellowfin tuna stock is determined to be **overfished** and **subject to overfishing**.

Summary: Any measure that would increase the tuna fishing capacity in the Indian Ocean and hence put more pressure on the stocks should definitely not be encouraged if Mauritius wants to keep its prime level of certification and sustainability.

Table 15: Estimated tuna stocks status in the Indian Ocean

Species	Assessment	Stock status
Albacore (<i>Thunnus alalunga</i>)	2014	
Bigeye tuna (<i>Thunnus obesus</i>)	2013	
Skipjack tuna (<i>Katsuwonus pelamis</i>)	2014	
Yellowfin tuna (<i>Thunnus albacares</i>)	2015	94%*

*Estimated probability that the stock is in the respective quadrant of the Kobe plot, derived from the confidence intervals associated with the current stock status (SS3 stock assessment model).



Source: Board of Investment (2015). *Improving the Seafood Supply Chain*.

■ Other species

Open ocean resources such as toothfish and orange roughly are important for Mauritius but their limited availability and high catch regulations do not offer an opportunity to increase catch incomes. Banks fisheries and anchored fish aggregating device fisheries development also limits the potential supply source.

Summary: *There are possibilities for value addition but not for catch income development.*

■ By-catch

There is only a limited amount of utilization and valorization of by-catch products. Purse seiners are not under obligation to keep their by-catch. Longliners licensed in the Mauritius EEZ are required to unload in Mauritius by-catch captured in the Mauritius EEZ. There is therefore the possibility to extend the current regional and IOTC regulations to a global obligation of by-catch retention. Investment in and the attractiveness of by-catch treatment and processing would then require the development of

necessary infrastructures (unloading, sorting, storing) together with an open by-catch market and interesting transfer offers from main landing ports.

Summary: *The development of the by-catch opportunity within a regional regulatory framework is an opportunity to bring value without adding pressure on stocks.*

Table 20: Longliner catches unloaded in Port Louis in 2014

2014 longliner catches unloaded in Port Louis		42 367
Major tuna species	% of unloading	Tonnage
	62.99	26 689
	% of targeted catches	Tonnage
Albacore	57.71	15 402
Yellowfin tuna	21.63	5 773
Bigeye tuna	19.05	5 085
Skipjack tuna	0.64	170
Southern bluefin tuna	0.97	259
By-catch species	% of unloading	Tonnage
	37.01	15 678
	% of targeted catches	
	58.74	
Billfishes	27.31	7 289
Sharks	11.60	3 097
Other fishes	19.83	5 292

Table 21: Evaluation of potential by-catch of longline fleets in the Indian Ocean

2014 longline total tuna catches in IOTC area of competence		177,700
By-catch evaluation	%	Tonnage
Billfishes	8.66	15 386
Sharks	7.07	12 557
Other fishes	16.35	29 050
	Total	56 993

Table 22: Evaluation of potential by-catch of purse seine fleets in the Indian Ocean

2014 purse seine total tuna catches in IOTC area of competence		310 064
By-catch evaluation	%	Tonnage
Billfishes	0.17	538
Sharks	0.34	1 040
Rays	0.13	409
Other fishes	1.24	3 847
Tunas	1.67	5 164
	Total	10 998

Source: Mauritius Export Association.

- **Severity:** ●●●●●
- **Value chain segment(s):** Capture
- **PoA reference:** Activities 1.2.1. to 1.2.3. (by-catch) and 2.3.1. and 2.4.3.

Limited landings and catch flows

Landings and catch flows are another constraint. Due to its geographical position near major fishing grounds, Port Victoria in Seychelles remains the most attractive landing port of the region for tuna species. For purse seiners, up to 80% of the catches are landed in Port Victoria. For Mauritian purse seiners, tuna catch-related supplies have to be shipped from Seychelles to Mauritius through reefers or containers (-20° or -40°), with an additional transportation cost.

For longliners allowed to tranship their catches at sea, vessels can stay at sea for several months before calling in at a port. Port Louis already attracts some Asian fleets – notably the Taiwanese one – exploiting albacore in the southern latitudes. However, only a few of these catches are processed in Mauritius, most of them being exported directly in containers.

Summary: Capturing the first processing steps of existing raw fish flows in Mauritius would bring value without adding pressure on the stocks.

- **Severity:** ●●●●●
- **Value chain segment(s):** Capture
- **PoA reference:** Activities 4.1.1. to 4.1.4.

Difficulties in getting an adequate supply of fish for processing, in terms of both fish type and quantity, leading to suboptimal utilization of processing plants

A major part of the fish processing industry in Mauritius is working with tropical tuna species landed by international and national flag vessels. However, the supply of fish to these industries is fragile and will not suffice if the industry expands or the resource decreases, particularly when considering the stringent ROO required by specific markets. For some, such as the Common Market for Eastern and Southern Africa and SADC, there are already a limited number of fishing vessels that meet the requirements, resulting in insufficient supply.

One major problem is the diminishing yellowfin tuna stocks in the Indian Ocean, as already highlighted. It is of utmost importance that Indian Ocean states, through IOTC, coordinate for the recovery of this stock (and to some extent the sustainability of all tuna species) through agreed management procedures, including harvest control rules (HCR) and target reference points.

The adequate management measures and associated monitoring and control procedures will allow the recovery of the stock, as was the case in 2008 when the yellowfin stock was initially red-rated and recovered to yellow (stock overfished but overfishing is not occurring) in 2010, and green (stock not overfished nor overfishing occurring) from 2011 to 2014. Increasing fish supply hence remains difficult and the use of non-originating fish as a complementary supply source should be studied, integrating sustainability, ROO and associated cost issues to maintain competitiveness and the high standards of the Mauritian industry.

- **Severity:** ●●●●●
- **Value chain segment(s):** Processing enterprises
- **PoA reference:** Activities 1.1.1. to 1.1.4.

MSC certification is challenging to get, preventing greater penetration of target markets

The tuna industry in Mauritius mostly targets very demanding markets such as the EU and has traditionally invested in certification for mandatory and all relevant voluntary standards, particularly related to corporate social responsibility and environmental requirements. A very important and recognized standard that the industry is aiming for is MSC certification. However, this certification remains challenging to obtain for structural reasons which Mauritian enterprises have limited capacity to influence.

First of all, the lack of HCR and target reference points that should be set by IOTC make it difficult for Mauritian enterprises to source qualified frozen tuna in the Indian Ocean to fulfil certification requirements. A mechanism is yet to be agreed and spurring that process is essential. The current yellowfin tuna stocks situation (**overfished** and **subject to overfishing**) prevents fulfilment of one of the key requirements of MSC certification. Unless a recovery plan and HCR are settled by IOTC, no progress on MSC certification will be reached.

- **Severity:** ●●●●●
- **Value chain segment(s):** Capture (tropical tuna and tuna-like species)
- **PoA reference:** Activities 1.3.1. to 1.3.2.

Fragile and limited supply of juveniles and spawn for aquaculture activities

FMM is the only hatchery in the south-western Indian Ocean to produce red drum juveniles (the main species for aquaculture in Mauritius). This poses a threat to biosecurity: however, conscious FMM might be on the issue of hygiene and health, there is always a risk of accidental

contamination, which could have a severe impact on production.³⁹

The juveniles supply problem also occurs in the nascent small-scale aquaculture industry. For both species that are cultivated (*Signatus sutor* and *Rhabdosargus sarba*), the supply of juveniles is not consistent and the juveniles provided to farmers are not well sorted. This last point poses a threat in the form of diminishing zootechnical performance, as the species could with time become less prone to being cultivated and productivity may diminish. Considering the fragile economic situation of small-scale fish farmers, this is an important threat to the long-term viability of their businesses.⁴⁰

- **Severity:** ●●●●●
- **Value chain segment(s):** Aquaculture (both FMM and small-scale)
- **PoA reference:** Activities 1.6.1., 3.1.2. to 3.1.3.

The fish feed supply situation is suboptimal for the aquaculture industry⁴¹

Currently there is one company in Mauritius –LFL– producing fish feed that could partially be used by fish farmers. LFL has progressively reoriented to enable itself to supply the local aquaculture market by drastically increasing the proportion of its production aimed at marine fish such as red drum (as opposed to tiger shrimps and freshwater fish). However, the fish feed types it produces are not yet aligned to the requirements of Mauritian fish farms.

On the side of small-scale aquaculture, most farmers get their feed from LFL but the produce is not always most suitable to the fish species they breed. For instance, producers of white spotted rabbitfish, an herbivorous species, currently use LFL's red drum extruded feed, intended for carnivorous fish and thus more expensive. Small-scale farmers usually are unable to import fish feed due to the higher costs compared to their low quantity requirements and the cumbersome procedures required for its import.

On the industrial side, FMM imports most of its fish feed requirements from European animal feed suppliers, i.e. about 90%. This is due to the high importance the company places on the quality and certification of fish feed. FMM uses imported fish feed especially for early stages of breeding. It purchases from LFL only for red drum pre-growth and growth feed. Although for now FMM is slightly overspending by importing fish feed, especially since feed ranks highest in the cost structure, the company gives greater priority to quality and traceability than cost. In this

context, LFL would gain by specializing further to meet the requirements of local aquaculture companies.

- **Severity:** ●●●○
- **Value chain segment(s):** Aquaculture
- **PoA reference:** Activities 3.1.2. to 3.1.3.

Insufficient equipment renewal within SMEs

Equipment upgrade, innovation and re-engineering are occurring faster than previously within the sector and more frequent investments need to be accounted for. Lead firms in Mauritius tend to invest frequently in machinery upgrades to ensure a competitive productivity level and high quality products, and to integrate product diversification possibilities. However, smaller enterprises are less inclined to factor these upgrades into their budgeting and concentrate on maintenance of existing machinery. The very capital-intensive equipment in the fish processing industry requires detailed analysis of financial capacity and potential results achieved through new machinery, and SMEs often lack the capacity for such analysis.

- **Severity:** ●●●●○
- **Value chain segment(s):** Processing SMEs
- **PoA reference:** Activities 3.2.1. to 3.2.2.

Market and product diversification initiatives are limited by the absence of mutual recognition of standards in specific markets

Most Mauritian fish processing enterprises have accumulated a number of certifications over time to comply with international markets' rules (of the EU and the United States mainly). However, the supply to potential new markets of existing or new products is limited by the absence of mutual recognition of standards and of accreditation and certification bodies. The entry to promising new markets such as China, the Russian Federation or Brazil requires these recognitions. The process has been begun within the competent authority but support is needed to reach the recognitions required to offer new market and product development opportunities.

- **Severity:** ●●●●○
- **Value chain segment(s):** Processing enterprises
- **PoA reference:** Activities 2.2.1. to 2.2.2.

Lack of appropriate labour supply for the tuna processing industry

The tuna processing industry is not attracting sufficient numbers of Mauritians to work at different stages of the value chain, whether it is transportation, unloading, cold storage, different processing types or by-products development.

39. Board of Investment (2015). Accelerating the Development of Sustainable Aquaculture Industry in Mauritius, p. 143.

40. Ibid, p. 145.

41. Ibid, p. 151.



Photo: Miwok (CC0 1.0)

The difficult factory work environment does not encourage new local workers to integrate into the industry. The processing is done in a cold work environment and is very physical, and sometimes very demanding in terms of the rigour required to handle the product. This creates an unattractive image for Mauritian workers and companies cannot therefore retain enough local workers. Another reason why there is a lack of local labour in the industry is that local young people are mostly too qualified to be attracted by fishing or fish processing.

This leads to a demand for foreign labour in the processing industry, especially for the most physical part of the processing (operators) and for night shift. The manual skills required in most of the value chain segments can only be learned on the job and there is usually no need for any special training from external organizations. This accessibility of the work could be further promoted among local workers in order to attract them.

Enterprises usually provide internal training to fill the gap in the technical and vocational education and training (TVET) infrastructure. About one month is required for a new worker. However, when the required workers are found, their level of turnover is high due to the scarcity of the skill set and the high demand among competing enterprises for it.

- **Severity:** ●●●●●
- **Value chain segment(s):** Fish processing
- **PoA reference:** Activities 3.3.1. to 3.3.2.

Diversification into niche activities has been initiated but has not yet achieved critical mass

Product diversification in the capture, aquaculture and the fish processing subsectors is a particularly difficult endeavour because several considerations must be weighed before any decision is made, potentially more than in any other food industry.

On the capture side, before starting the exploitation of new species, the levels of stock and the impact of any potential capture on them in order to ensure sustainability must be assessed. Although tropical tuna species stocks and other pelagic fish species are relatively well known in the Indian Ocean as well as in the Mauritius EEZ, the status and the presence of other potential fish in the EEZ have not been assessed in detail. Some companies in Mauritius, and especially in Rodrigues, exploit species such as demersal fish, cephalopods and crustaceans. If more Mauritian firms want to diversify to these species, a more detailed assessment of stocks is required. If stocks are sufficient, this could lead to the development of new processed products.

On the processing side, new product introduction is a lengthy process which requires finding clients, developing connections, ensuring product recognition, product development (which product for which market), etc. Product diversification possibilities using the same fish species have been undertaken by some companies. The processing industry in Mauritius has developed niche products such as tuna loins in jars and tuna burgers, which have potential for the EU market. Companies are reluctant to engage in drastic changes because they involve investment and studies as well as risks.

In this regard, Mauritian companies do not receive sufficient support on R&D from external institutions. Trial runs or new equipment for testing new products are not easily available in Mauritius. Trade and investment support institutions do not assist in developing connections with potential regional or international partners experienced in the field.

- **Severity:** ●●●○
- **Value chain segment(s):** Fish processing
- **PoA reference:** Activity 4.2.1.

SME INTEGRATION

Limited involvement of artisanal fishermen in aquaculture activity

Banks fishing and artisanal fishing is a common occupation in Mauritius, including Rodrigues. However, it has an impact on the coral reef's rare fish species and the Government of Mauritius has for several years supported the switch from artisanal fishing to small-scale aquaculture by injecting substantial funding into the transition (helping new farmers procure cages).

This support is limited to procurement, however, and sometimes the context is not analysed properly before the support is initiated. An example of this is the provision of cages for small farmers. The recent extensive BOI study has demonstrated that the cages provided are too voluminous to ensure break-even for small fish farmers. There is also still a lack of accompaniment through the transition to this activity, which is completely new for many fishermen. There is an obvious lack of competencies and a certain isolation reported by stakeholders.⁴²

- **Severity:** ●●●○
- **Value chain segment(s):** Aquaculture MSMEs
- **PoA reference:** Activity 3.1.3.

Insufficient labour supply for SMEs

As mentioned in a previous constraint, the fisheries and aquaculture sectors do not attract sufficient workers due to the difficult work conditions and lack of some specific skills locally. However, large enterprises are able to solve this problem by hiring foreign workers. The same solution cannot be envisaged by SMEs due to the higher costs incurred. There is therefore a definite lack of promotion of the fisheries and aquaculture industry as a profession.

- **Severity:** ●●●○
- **Value chain segment(s):** SMEs from the entire value chain
- **PoA reference:** Activity 3.3.2.

Certifications for the EU market are not achievable

The limited margin of SMEs makes it difficult for them to invest in the certification of their production. The tests, infrastructure certification costs and hiring of experts for the assessment are very expensive. This creates a situation where some companies achieve compliance to standards but are unable to certify due to the high costs involved. This limits the access of SMEs to foreign markets such as the EU.

- **Severity:** ●●●○
- **Value chain segment(s):** SMEs from the entire value chain
- **PoA reference:** Activities 2.2.3. and 4.3.2.

INNOVATION

The aquaculture sector lacks an innovative approach for its development

Although a new course on aquaculture was just launched at the University of Mauritius, the innovation levels and thought leadership in this sector in Mauritius remain low. The aquaculture sector is developing very rapidly in some parts of the world, such as South-East Asia, and generates new approaches and thinking. However, Mauritius until now has been unable to tap into this current.

- **Severity:** ●●●○
- **Value chain segment(s):** Aquaculture
- **PoA reference:** Activities 1.7.1 to 1.7.2 and 3.4.1 to 3.4.2.

42. Board of Investment (2015). Accelerating the Development of Sustainable Aquaculture Industry in Mauritius, p.39.

BUSINESS ENVIRONMENT CONSTRAINTS

Box 3: Business environment constraints

- Even if advantageous entry conditions exist for foreign direct investment (FDI), support for and integration of foreign investors in the country is limited
- Freight costs for import and export (maritime and air) are too high to ensure competitiveness of products
- Electricity costs remain high for Mauritian companies and no rebate schemes exist
- Ship registry procedures and operations are cumbersome
- Insufficient bilateral fish agreements with the region
- No forward-looking and complete regulation exists for fish farming
- Lack of a common regulatory framework on Indian Ocean pelagic fish stock management
- It takes too long to establish a concession agreement to initiate aquaculture
- Lack of targeted institutional support to aquaculture firms
- Port Louis has not yet reached its full potential as a transshipment hub or to attract fishing fleets in the region

Skills development

- Limited external technical and scientific support to the aquaculture sector (R&D, TVET and university level)

SME integration

- The Small and Medium Enterprises Development Authority (SMEDA) does not focus on small-scale aquaculture farmers

Institutional alignment

- Lack of synergies between institutions and departments of the MoOE and lack of use of existing tools (AFRC)

Even if advantageous entry conditions exist for FDI, support for and integration of foreign investors in the country is limited

FDI conditions in the sector are favourable and a number of schemes were supported by the Mauritian Government to stimulate newcomers in the industry. Important investors such as Sapmer have come to Mauritius due to this favourable framework. However, beyond the structural advantages to initiate investment, foreign companies are not well integrated into local frameworks once they are settled. They lack support from the Government and their interests are sometimes neglected in important decision-making processes. Investors do not receive guidance or financial contributions while developing the infrastructure required for their activities (port infrastructure, unloading facilities, etc.) and are thus left to their own devices in filling possible gaps.

Institutional frameworks essential to these companies' functioning, such as the certification infrastructure, are sometimes fragile. In 2007, the certification body did not achieve international accreditation because its testing technology did not meet requirements, so Mauritian companies could not export that year. This type of essential service needs to be ensured in order to stabilize foreign companies in Mauritius. The Government's focus should therefore not only be on the attraction of new investors through advantages on setup but also on capitalizing on existing investors by integrating them further into the sector, involving them in the decision-making process and supporting their needs.

- **Severity:** ●●●●●
- **Value chain segment(s):** FDI companies
- **PoA reference:** Activities 2.1.1. to 2.1.4., and 2.4.1. to 2.4.2.

Freight costs for import and export (maritime and air) are too high to ensure competitiveness of products

The geographical isolation of Mauritius impacts the freight costs incurred by firms, for both imports and exports. This applies to both maritime transportation and air transport. The limited size of the Mauritius international airport and the absence of free competition among airlines have a bearing on companies' costs.

As mentioned earlier, fishing zones for tuna species are located (for purse seine fishing) in the equatorial region between 10°N and 10°S. As the fish processing industry mostly depends on tuna, there are additional costs incurred in the transportation of the fish landed in Seychelles to Mauritius. This issue particularly affects SMEs in Mauritius as the freight costs become non-competitive for medium to small volumes.

- **Severity:** ●●●●●
- **Value chain segment(s):** Fish processing industry
- **PoA reference:** Activity 2.5.2.

Electricity costs remain high for Mauritian companies and no rebate scheme exists

Fish capture and processing is an energy-intensive industry due to high electricity consumption for refrigeration. Therefore the cost of electricity is particularly decisive for companies' competitiveness. In Mauritius, the cost of electricity for the fisheries and aquaculture sector is very high. There are three categories of pricing in Mauritius: for domestic users, commercial users and industry. For commercial users, the prices are as high as US\$0.20 per KWh on the main island and US\$0.24 in Rodrigues.

For industry, the cost is rebated to about US\$0.10 per KWh and about US\$0.13 in Rodrigues.⁴³ The main issue is that the fisheries sector is not classified under the 'industrial' category (as the textiles sector is, for example) and thus receives a very high price. As a comparison, China and Viet Nam respectively offer US\$0.09 and US\$0.08 per KWh. In addition, the use of alternative energies remains limited, although the Mauritius Long Term Energy Strategy 2009–2025 plans for a transition to a 35% contribution of renewable energy in 2025.

- **Severity:** ●●●●●
- **Value chain segment(s):** Fish processing industry
- **PoA reference:** Activity 2.5.1.

Ship registry procedures and operations are cumbersome

The procedure to flag a vessel under the Mauritian fleet requires a number of documents for permanent registration and these need to be constantly updated. At the first registration, the ship owner must provide valid certificates evidencing compliance with the 17 international maritime conventions to which Mauritius is a party. In addition to the owner's or corporation's Mauritian nationality, registration requires multiple documents related to the declaration of ownership, an evidence title of ownership, a certified extract of the register of the foreign registry pertaining to that ship, a survey to be done on the ship, and some nine other documents.

There is an alternative and lighter procedure for the provisional registration of a ship but it is not applicable for the fishing industry as it only covers a period of three months. A uniform and clear system for ship registration and follow-up is lacking. The current system actually discourages companies from registering their ships in Mauritius. An additional problem is the shortage of marine surveyors to ensure conformity.

- **Severity:** ●●●●●
- **Value chain segment(s):** Fish processing industry
- **PoA reference:** Activities 2.6.1. to 2.6.2.

Insufficient bilateral fish agreements with the region

In addition to procedural issues, another aspect that limits the registration of ships under the Mauritian flag is the limited access to other EEZs by Mauritius due to the absence of bilateral fish agreements, other than with Seychelles. In the absence of bilateral agreements with other countries, ship owners must have private licensing to access fishing grounds, which is not an incentive for registering under the Mauritian flag with regard to associated costs, risks and constraints. As an example to illustrate this, the EU processes agreements with all the countries of its region and thus EU-flagged ships have access to all their fishing zones.

- **Severity:** ●●●●○
- **Value chain segment(s):** Capture
- **PoA reference:** Activity 2.7.1.

43. Statistics of Mauritius (2014). Digest of Energy and Water Statistics. Available from: <http://statsmauritius.govmu.org/English/Publications/Documents/Regular%20Reports/energy%20and%20water/Digest%20of%20Energy%20and%20Water%20Statistics%202014.pdf>.

No forward-looking and complete regulation exists for fish farming⁴⁴

Although the development of aquaculture in Mauritius has been prioritized by the Government in multiple national development policies, there are some additions and adjustments that need to be made in the national regulations covering the sector. The current regulatory framework (mostly the Fisheries and Marine Resource Act – 2007, currently being revised) poses some limitations to the future development of aquaculture activity. It fails to describe some specific aspects that are crucial for proper functioning and lacks a visionary perspective of the sector. For instance, there is no clear distinction between 'fisheries' and 'aquaculture', although these two activities carry very specific issues and cannot be considered in the same manner. Other areas that require attention are:

- **Security at sea within concessions:** Aspects such as the risk of contamination, trespassing or fishing in aquaculture basins are not accounted for in the current regulations.
- **Demarcation of sites:** There is no clear definition of buoys for demarcating aquaculture areas. There is also no clear distinction between lagoon sites (in the Mahébourg lagoon) or off-lagoon (west coast potential development areas, according to the BOI study), which should have different demarcations and also represent a difference in investment size.
- **Health aspects:** The current regulation does not cover the question in detail – no description and characteristics of currently farmed species and their typology, no references to the rules under the World Organization for Animal Health, no lists of medication required, etc. There are also insufficient provisions for clear protocols in case of epizootics and no rules are described on the reporting of pathologies.
- **Farm monitoring protocols:** There is no clear provision on regular health monitoring in farms.
- **Small-scale aquaculture:** No specific provisions exist for small fish farmers facing specific issues due to their low operation scales (involving all the above points as well as capacity-building issues).
- **Integrated multi-trophic aquaculture (IMTA):** The potential development of this production scheme should be encouraged in the regulatory framework and some provisions could be included as an incentive.

During the update of relevant regulatory instruments, it is essential that high-level experts be involved to ensure all missing points are clarified. FMM's experience in this regard could be a valuable asset.

- **Severity:** ●●●●○
- **Value chain segment(s):** Aquaculture
- **PoA reference:** Activities 2.7.2. to 2.7.4.

44. Board of Investment (2015). Accelerating the Development of Sustainable Aquaculture Industry in Mauritius, p.34.

Lack of a common regulatory framework on Indian Ocean pelagic fish stock management

As mentioned in the supply-side constraints, the situation with pelagic fish stocks is currently imposing some key production constraints to all fisheries in the Indian Ocean as well as on the fish processors that are dependent on tuna for their products. This urges management of fish stocks in a regional and coordinated manner. Presently there is no regionally agreed legal framework to ensure sustainable use of pelagic fish in the Indian Ocean. This would call for a collective effort among countries fishing in the Indian Ocean to agree on clear HCR and target reference points.

- **Severity:** ●●●●○
- **Value chain segment(s):** Pelagic fish capture and processing
- **PoA reference:** Activities 1.3.1. and 2.1.1.

It takes too long to establishing a concession agreement to initiate aquaculture activity⁴⁵

As indicated by the 2015 BOI study, there are two main areas for further development of aquaculture: namely the Mahébourg lagoon and the western off-lagoon areas. However, in both these areas there is no existing land reserve policy on the coastline, which would help in setting up all on-land logistics needed in the proximity of each aquaculture sea site as well as the required hatcheries. Land-inventory studies have been carried out by the Mauritian Government in other sectors such as tourism or textiles. However, for aquaculture, studies usually focus on the sea zones rather than the land required for investment, which is equally important in this sector. The current lack of a framework renders the establishment of new investors much more lengthy and disorganized, as each investor is handled on a case-by-case basis without a holistic land-management approach.

An additional difficulty for newcomers are the lengthy and discouraging procedures for getting a concession agreement. Responsibility for the approval of a concession agreement is shared among many different agencies, such as MoOE and the Prime Ministers' Office, and under multiple application steps. For illustration purposes, the following are key phases of the process:

- An application to the technical committee chaired by BOI for authorization to carry out fish farming at sea (the committee is composed of representatives from the Prime Minister's Office; the Ministry of Finance and Economic Development; MoOE; the Mauritius Oceanography Institute; the Ministry of Environment

45. Board of Investment (2015). Accelerating the Development of Sustainable Aquaculture Industry in Mauritius, p.36.

Sustainable Development, and Disaster and Beach Management; the Competent Authority Seafood; and the National Coast Guard).

- An application to the Prime Minister's Office for acquisition of immovable property.
- An application to the Prime Minister's Office to get a sea concession: the length of a concession is 20 years, renewable once for 10 years.
- An application to the Municipal or District Council for a Building and Land Use Permit: this is required in case the aquaculture activity foresees on-land infrastructure. Since it is preferable for fish farming (logistics, hatcheries, etc.), the requirement is usually there.

There is also a key procedural constraint for aquaculture development which is related to the construction permit required for building a dock that would link land- and sea-based activities of the farm. The difficulty in obtaining such as permit currently prevents further development of the sector.

This lengthy process could be streamlined and performed by a single entity, such as the technical committee taking applications for aquaculture in the first place. However, this must be done together with a land inventory for land-based infrastructure.

- **Severity:** ●●●●●
- **Value chain segment(s):** Aquaculture
- **PoA reference:** Activities 2.6.3. to 2.6.4.

Lack of targeted institutional support to aquaculture firms⁴⁶

As pointed out by the recent BOI study, the relationship between aquaculture firms and their supporting institutions could be improved. It is reported that fish farmers, both industrial and small-scale, feel isolated when planning to expand their capacity or to diversify to new activities. They also feel that there is insufficient recognition

46. Ibid, p. 39.

and use of their efforts to develop aquaculture, especially with the sector being completely new in Mauritius. The dynamism demonstrated by these companies could indeed be used to support newcomers in the industry and ensure knowledge transfer and cross-fertilization. In the very specific insular context, companies face a number of problems such as isolation and lack of local competencies due to the nascent stage of the sector, requiring them to collaborate in order to strengthen their position rather than to compete. Therefore more targeted support and a regular dialogue framework would enable better transfer of information from the private to the public sector.

- **Severity:** ●●●●○
- **Value chain segment(s):** Aquaculture
- **PoA reference:** Activities 2.1.1. and 3.1.1.

Port Louis has not yet reached its full potential as a transshipment hub or to attract fishing fleets in the region

One of the objectives of Mauritius is to turn Port Louis into a transshipment hub in order for local processors to benefit from a part of these captures for supply. As mentioned earlier, Port Louis is not used for landing by purse seiners due to its geographic position vis-à-vis fishing grounds located in the equatorial areas. The port does not have the potential to attract this type of vessel. However, longliners are a potential target. This type of vessel is allowed to tranship their catch at sea and thus stay at sea for much longer periods without landing. The fishing grounds targeted are located on all areas of the Indian Ocean. Some specific fleets, such as the Japanese and Korean, could be of interest due to their occasional fishing in the areas east of the South African coast and south of Seychelles.

Port Louis could be attractive to these fleets because of the favourable conditions it offers. Table 23 summarizes a benchmarking of Port Louis and its main regional competitors in terms of main criteria for selection, and illustrates that Port Louis would be the best choice.

Table 23: Port Louis comparison versus other ports in the region regarding longliners

From * (low) to **** (high); ('-' : nonexistent)	Port Louis	Diego Suarez	Mahé
Entrance to the port	****	**	****
Signs, buoys and lights	****	-	****
Mooring	**	**	***
Safety	**	*	***
Logistics and services	****	*	**
Customs clearance, sanitary inspection, etc.	****	*	**
Repair and maintenance facilities	****	*	**
Bunkering	****	*	***

Source: Board of Investment (2015). Improving the Seafood Supply Chain.

There would need to be more promotional activities to advertise Port Louis as the best choice for at least a part of those fleets.

- **Severity:** ● ● ○ ○ ○
- **Value chain segment(s):** Capture, transshipment
- **PoA reference:** Activities 4.1.1. to 4.1.4.

SKILLS DEVELOPMENT

Limited external technical and scientific support to the aquaculture sector (R&D, TVET and university level)

The aquaculture sector is relatively nascent in Mauritius and thus requires a solid skills development infrastructure to ensure a proper human capital supply to the industry. This especially concerns small-scale fish farmers as the labour supply usually comes from previous smallholder artisanal fishers, with low revenues and absence of any training. Their knowledge of the aquaculture sector is usually very limited. For industrial aquaculture, FMM mostly provides on-the-job training to new employees.

In view of the future development of the sector, institutional support will be needed to train workers in required skills and best practices to ensure alignment between labour supply and demand. The present provision of training and courses is limited in Mauritius. The Mauritius Research Council is not directly responsible for aquaculture and is rather a coordination body among the TVET and R&D national network.

The main institution responsible for aquaculture is AFRC. However, as indicated by the recent BOI study, AFRC suffers from an increasing lack of capacity and frequent staff changes, disabling it from ensuring transfer of acquired techniques and the high-level support required to the industry. This shift is mostly due to a reduced funding allocation. For instance, AFRC does not conduct sufficient research on possible local species (groupers) which would be very useful for small-scale fish farmers.

In terms of high-level education, there are only two indirect university modules on aquaculture in Mauritius, both provided by the Faculty of Agriculture at the University of Mauritius. A Bachelor of Science in aquaculture is also going to start in 2016. However, there is limited scientific collaboration at the international level as well as among industries on this matter, which will be critical if Mauritius intends to position itself as a quality hub for aquaculture. The entire infrastructure will need to be adapted, especially AFRC, through a reformulation of responsibilities and new curricula adapted to the sector's needs.

- **Severity:** ● ● ● ● ●
- **Value chain segment(s):** Aquaculture
- **PoA reference:** Activities 1.4.1. to 1.4.3., 1.5.1. to 1.5.3., 3.1.1. and 3.3.3.

SME INTEGRATION

SMEDA does not focus on small-scale aquaculture farmers

The long-term goal of the Government is to change artisanal fishers into small-scale fish farmers to release pressure on the coral reef's endangered fish species. However, this plan requires a close accompanying of fishers into their new activity as it is completely unknown to them and moreover entails very important and complex considerations such as fish health risk management, etc. A number of projects led by AFRC as well as the SmartFish programme have piloted the transition from fisheries to aquaculture with a selection of producers. However, most of these projects have ended.

At present, small-scale fishers clearly lack accompanying structure for them to establish a new activity in aquaculture. SMEDA does not provide specific support because it lacks expertise in the field. Existing services come from MoOE, which provides new fish farmers with free 10-metre diameter high-density polyethylene cages. However, the low success rate of these cages has led to examination of the situation. The BOI study states that this type of cage is too large for farmers to break even as it comes with high operating costs, which are out of reach for producers at their current low scale of revenue, demonstrating an insufficient level of R&D during the conceptualization of the initiative. Another problem with this approach is the lack of a hand-holding process once the cages are acquired by producers.

It is therefore clear that a specific scheme should be put in place to facilitate this transition if it is to remain on the Government agenda. This scheme could involve the leader of the industry, FMM, whose acquired best practices could be of interest to the sector.

- **Severity:** ● ● ● ● ●
- **Value chain segment(s):** Aquaculture
- **PoA reference:** Activity 3.1.3.

INSTITUTIONAL ALIGNMENT

Lack of synergies between institutions and departments of MoOE and lack of use of existing tools (AFRC)

There is a lack of synergies reported between a number of key institutions responsible for the fisheries and aquaculture sectors. This is the case between the MoOE and AFRC, which is affiliated to MoOE.

- **Severity:** ● ● ● ● ○
- **Value chain segment(s):** Fisheries and aquaculture
- **PoA reference:** Activities 2.3.1. and 3.1.1.

MARKET ACCESS CONSTRAINTS

Box 4: Market access constraints

- There are limitations to achieving compliance with ROO to export to SADC
- Erosion of EU Customs tariffs undermines the competitive position of Mauritius for tuna loins and tuna cans
- National market demand remains untapped
- AGOA advantages are not used by Mauritian firms
- Limited information on trade and market opportunities granted by preferential trade agreements

Branding

- There is a clear lack of promotional activities to communicate the high quality and compliance levels of Mauritian fisheries and aquaculture operators

There are limitations to achieving compliance with ROO to export to SADC

In the current state of affairs, Mauritius' pelagic fish products cannot comply with the SADC ROO, preventing access to this important regional market. The specific ROO requirements that are difficult to achieve are related to:

- a. The crew's nationality: a minimum of 15% of the vessel's crew must be from an SADC country.
- b. Vessel ownership: if the first criteria is not met then the vessel must be owned by an SADC national.
- c. The equity of the vessel: it must be held by a national of an SADC Member State.

With a substantial part of the tuna fish processing industry in Mauritius coming from foreign investments, these criteria are often difficult to meet.

- **Severity:** ●●●●●
- **Value chain segment(s):** Capture and processing
- **PoA reference:** Activities 5.1.1. and 5.1.3.

Erosion of EU Customs tariffs undermines the competitive position of Mauritius for tuna loins and tuna cans

The EU market is the main export destination for tuna and processed tuna products for Mauritian operators. Mauritius still enjoys duty-free access to the EU under an interim Economic Partnership Agreement. However, this trade preference is eroding as additional countries progressively receive a tariff-free import scheme in the EU. As shown in table 24, Papua New Guinea and Fiji are granted a global sourcing derogation, waiving the

ROO for processed tuna products. The Philippines is also now granted a Generalized Scheme of Preferences (GSP) GSP+ status, which decreased their import tariff rates from 20.5% to 0%.

However, Mauritius is in principle protected from Thailand, the main global exporter of tuna and processed tuna products, due to the most favoured nation status for the EU market. However, under the ATQs scheme there is a quota fixed on tuna loins which allows any country to export a quantity under the quota with a 0% tariff. The scheme was put in place to spur the development of the fish processing industry in the EU and thus does not concern processed fish products such as cans. The ATQ for tuna loins was until December 2015 fixed to 22,000 tons but with its renewal, the quota levels were discussed and were increased to 25,000 tons.⁴⁷

The increase of the ATQ harms the Mauritius tuna loins industry because it increases competition not only from Thailand but also from all other loins exporting countries. In addition, Thailand has restarted bilateral negotiations with the EU on tariff duties and it can be expected that, in the long run, the country will be granted a more competitive tariff scheme.⁴⁸

- **Severity:** ●●●●●
- **Value chain segment(s):** Tuna processing industry
- **PoA reference:** Activity 5.1.2.

47. European Union (2015). Council Regulation 2015/2265 of 7 December 2015. Available from : <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32015R2265>.

48. Board of Investment (2015) (a). Improving the Seafood Supply Chain, p.31.

Table 24: EU tariff duty applied on tuna products (HS 1604) imported from the main supplying countries

Region Countries	Tariff duty for HS 1604 products in 2015	Comment
Central America Ecuador (c, l), Colombia (l), El Salvador (l), Guatemala (l)	0%	Free Trade Agreements + transitory regime for Ecuador (before joining existing Free Trade Agreement)
Pacific States Papua New Guinea (c, l), Solomon Islands (l)	0%	Interim Economic Partnership Agreement for Papua New Guinea and Fiji with global sourcing derogation from 2008. GSP Everything But Arms (EBA) for Solomon Islands
West Africa Côte d'Ivoire (c), Ghana (c, l)	0%	Interim Economic Partnership Agreement
Asia Philippines (c, l) Indonesia (c, l) China (l) Thailand (c, l)	0% 20.5% 24% 24%	In January 2015 the Philippines obtained GSP + status. Before, Philippines was granted GSP status (20.5% tariff) GSP Most favoured nation status since 2015 (lost GSP in 2014) Most favoured nation status since 2015 (lost GSP in 2014)

Source: Board of Investment (2015) (a).

Note: c = can exporter; l = loin exporter, c, l = both products.

National market demand remains untapped

The national market for fish and processed fish products remains largely untapped by companies in Mauritius. Mauritius currently produces about 10,000 tons of fish while demand is valued at 29,400 tons. The major reason is the products produced by Mauritian firms are not aligned with national market needs. The national market could be of interest for medium-size enterprises in Mauritius and Rodrigues, given the adjustment of the production to local demand.

- **Severity:** ●●●○
- **Value chain segment(s):** SMEs in fishery and aquaculture
- **PoA reference:** No specific activities.

AGOA advantages are not used by Mauritian firms

Mauritius is eligible in principle to export to the United States market through AGOA but the ROO conditions under the agreement are difficult for the Mauritian tuna industry to achieve. The value addition criterion under AGOA states that there should be a minimum of 40% value addition happening in Mauritius. The tuna cans industry is unable to achieve this percentage regarding yield, and even less so for tuna loins.

The import tariffs to the United States currently in force for Mauritius tuna cans are 35% *erga omnes* which makes it very difficult for Mauritian firms to compete in this market. The situation is a bit better for tuna loins, for which the *erga omnes* tariff is much lower and does not hamper Mauritian producers much.

- **Severity:** ●●●●○
- **Value chain segment(s):** SMEs in fishery and aquaculture
- **PoA reference:** Activity 5.1.3.

Limited information on trade and market opportunities granted by preferential trade agreements

The availability of timely and up-to-date trade information related to the seafood sector is sometimes limited, especially for SMEs, which adds to the existing difficulties enterprises experience in planning to export to new markets. The insufficient interconnection and coordination between the Ministry of Foreign Affairs, Regional Integration and International Trade and the Mauritius Chamber of Commerce and Industry for the dissemination of this information is one cause. In addition, www.mauritiustrade.mu is not sufficiently disseminated to the private sector. Operators are also not familiar with online tools available to calculate market attractiveness, such as Trade Map and other tools.

A tailored solution could involve learning from the Egyptian best practice in setting up the Foreign Trade Training Centre, which was set up with the support of ITC and the Japan International Cooperation Agency.

- **Severity:** ●●●●○
- **Value chain segment(s):** Full chain
- **PoA reference:** Activities 5.1.4. to 5.1.5.



Photo: Alexandra Golovko (ITC)

BRANDING

There is a clear lack of promotional activities to communicate the high quality and compliance levels of Mauritian fisheries and aquaculture operators

A coordinated approach to promote Mauritian fish products is not in place, although it could greatly benefit the industry. There are a number of reasons for this. For instance, it is quite difficult to ensure common promotion of seafood products in a specific market since in most cases buyers are multinationals that already have a specific brand with which the product is then labelled. The consumer is difficult to reach in this case.

Another means to increase the visibility of Mauritian fish products is presence in international fairs. However, here again, the industry in Mauritius is small and it is challenging to find enough participants for trade fairs other than Seafood Expo Global. In addition, there are currently only eight economic representatives based in permanent missions abroad and these eight countries do not correspond to the markets targeted by the fisheries and aquaculture sector. Mauritius does organize business-to-business meetings in some target countries but inward buying missions of key buyers – which would allow potential buyers to visit plants and see the levels of quality of the production for themselves – are not organized.

- **Severity:** ●●●●○
- **Value chain segment(s):** Full chain
- **PoA reference:** Activities 5.2.1. to 5.2.2.

SOCIAL AND ENVIRONMENTAL CONSTRAINTS

Box 5: Social and environmental constraints

- Attractiveness of the fisheries sector for young people is limited
- Limited amount of women in the small-scale fisheries sector in Mauritius
- All aquaculture initiatives need to have a favourable social impact plan in their project to improve the livelihood of the community (ISO 26000)

Note: Since Mauritius' fleet is modest, it does not have a significant impact on the natural environment and is not responsible for the high pressures on the fish stocks in the Indian Ocean. Most Mauritian companies are compliant with all regional and international regulations and management measures related to the environment and sustainability. As stated already, the fish processing sector is certified to a number of high-level standards.



Attractiveness of the fisheries sector for young people is limited

The level of youth employment in the fisheries sector is limited. In addition to the discouraging factors mentioned before (the difficulty of the work environment in fish capture and processing), some specific factors particularly discourage young people to enter the industry. The requirement to leave the family for long periods and the risky work conditions on small and medium-scale fisheries are some of these reasons. Promotion of the sector at the early stages of education and raising interest in sea-related activities could help alleviate this perception.

- **Severity:** ●●●○○
- **Value chain segment(s):** Full chain
- **PoA reference:** Activity 3.2.2.

Limited amount of women in the small-scale fisheries sector in Mauritius

For the same reasons as stated above, the presence of women in the fisheries and aquaculture sector is very limited in Mauritius. The opposite is true on Rodrigues Island, where women are a large majority of the fishing community as well as the processing industry.

- **Severity:** ●●●○○
- **Value chain segment(s):** Full chain (except Rodrigues)
- **PoA reference:** Activity 3.2.2.

All aquaculture initiatives need to have a favourable social impact plan in their project to improve the livelihood of the community (ISO 26000)

The aquaculture sector has a strong focus on minimizing its impact on the environment and developing a sustainable activity. However, there needs to be more focus on the social aspects through training and inclusion of artisanal fishermen in the industry. The inclusion of a social impact plan in every aquaculture activity will not only improve the reputation of the sector among Mauritians but will also help improve the workforce supply to the sector.

- **Severity:** ●●●●○
- **Value chain segment(s):** Aquaculture
- **PoA reference:** Activity 2.2.3.



Photo: Aqua Culture & Fish processing, Thai Mayo Product Shot.jpg

THE WAY FORWARD

The fisheries and aquaculture sector overall has shown solid export performance, catering to growing demand in international markets. The investment attraction policies of the Government of Mauritius have succeeded, as they have allowed large international players of the industry into the country in a wide variety of segments of the value chain including capture, aquaculture and processing as well as logistics and by-products development. These lead firms have brought with them a wealth of expertise that was further adjusted to local realities and constraints and thus constitutes a unique knowledge base. The sector is also a necessary step towards the development of an ocean economy, in line with Mauritian ambitions. However, the sector remains fragile due to shifting market conditions, lack of inclusiveness in decision-making process and a coordinated approach, as well as a lack of capitalization on the acquired knowledge, still failing to benefit SMEs.

The strategy for the next five years will thus be built around a goal of reinforcing the acquired strengths of the sector and transitioning to a fully sustainable model while improving the business environment and knowledge transfers to SMEs. The next step will then be to look into specific ways to increase value addition and diversify the offering of Mauritian products in order to remain competitive in the traditional EU market and diversify to emerging new ones.

VISION

The fisheries and aquaculture sector has demonstrated its potential to impart socioeconomic contributions to the Mauritian economy through export-led growth. In order to reinforce this contribution, competitive constraints and structural deficiencies along the four export development gears (supply side, business environment, market entry and development side) will be addressed and identified opportunities will be leveraged. The following is a delineation of the proposed vision and strategic approach in this direction, agreed with all stakeholders of the fisheries and aquaculture value chain.

“ Anchoring the competitiveness and sustainability
of the fair and responsible Mauritian seafood sector ”

STRATEGIC OBJECTIVES

The vision set up for the Strategy is delineated in five strategic objectives built around the key areas where action is required over the next five years.

STRATEGIC OBJECTIVE 1: ENSURE SUSTAINABILITY IN THE FISHERIES AND AQUACULTURE SECTOR

The fisheries and aquaculture sector globally faces the challenge of sustainability and Mauritius has to address this in order to remain competitive and to ensure that this sector continues to flourish and mature in the long run. Ensuring sustainable exploitation of stocks is thus an absolute prerequisite for further development and must be applied to all types of activities, from tuna fishing to banks and artisanal capture. Investment in new aquaculture schemes will also be a critical path to follow to diversify the sector. In addition to the importance of sustainability for the long-term use of marine resources, it is also a competitive advantage in key markets such as the EU, especially with the current erosion of the preferential status of Mauritius in this particular market.

To operationalize this, a first step will be to refine the understanding of local fish stocks in the Mauritius EEZ, to transition to an informed and monitored use of all exploitable stocks, especially for non-pelagic fish. By-catch is a global problem and another focus area. Mauritius could take the lead in addressing it and leverage this to further improve its image in global markets. The same leadership could be gained in regional frameworks such as IOTC, to increase Mauritius' influence on discussions related to stocks management regulations. As mentioned, aquaculture is a key path to reinforce the sustainability of the sector but it needs to be better backed up with scientific data such as bathymetry, waves, etc. Biosecurity and supply of juveniles are also key aspects that need to be secured before developing aquaculture activities any further. Finally, development and connection of renewable energy with the sector will help make it a champion in the region.

STRATEGIC OBJECTIVE 2: SECURE FAVOURABLE CONDITIONS FOR CURRENT OPERATORS AND PAVE THE WAY FOR THEIR DEVELOPMENT

The second strategic objective is aimed at securing sector firms in Mauritius through a more integrative business environment. Mauritius has attracted investors in the sector but it cannot continue the same approach because more large operators would put too much pressure on the stocks and would not necessarily guarantee more inputs for fish processing. Mauritius thus needs to shift to a more selective investment attraction policy as

well as providing more support and inclusion to existing investors, inter alia through public–private dialogue frameworks. The Government also needs to put in place frameworks to facilitate integration of SMEs in the sector.

The operationalization of this objective needs to start with stronger sector coordination and thus the establishment of a public–private platform. Certification being crucial for sector operators, an adequate level of quality certification infrastructure needs to be ensured, also geared at micro, small and medium-sized enterprises (MSMEs) and their needs. Lead firms established in Mauritius also need to be consulted by decision makers when weighing decisions that will have a significant impact on their day-to-day functioning – consultation mechanisms will be established to ensure this dialogue takes place. Cross-fertilization between lead firms and SMEs is also an important component of this objective, as it will help minimize the two-tier development of the sector. Quick fixes for reduction of costs for enterprises, such as electricity and freight, are recommended as well. Finally, the objective also aims at the streamlining of key procedures such as ship registration and establishment of concession agreements, and the development of a more forward-looking regulatory framework.

STRATEGIC OBJECTIVE 3: IMPROVE RESEARCH, SKILLS AND KNOWLEDGE TRANSFERS IN THE SECTOR TO STIMULATE INVESTMENT, OPPORTUNITIES DEVELOPMENT AND INNOVATION

To increase viability of potential product diversification and to support the sector's transition to a higher sustainability model, a big emphasis will need to be put on building knowledge and generating necessary research. These aspects will be fundamental to back up any step forward, i.e. exploitation of new fish stock, development of new processed products, breeding of new species, development of integrated aquaculture models, etc. The sector's attractiveness to the Mauritian population also needs to be rebuilt, as early as at secondary school, in order to increase local labour supply for firms. Skills desperately need to be built among small-scale fishers that envisage transitioning to aquaculture.

Operationally, this translates into a restructuring of some research bodies such as AFRC and an adjustment of their mandate and functions. New specific areas of focus are put forward. SMEs need to be accompanied for equipment upgrades in order to be able to comply with higher standards and increase profitability. The local workforce supply needs to be ensured and aligned with the needs of the industry. Innovative solutions for the sector need to be further researched to pave the way for the next five years.

STRATEGIC OBJECTIVE 4: INCREASE THE COMPETITIVENESS OF PROCESSED FISH PRODUCTS THROUGH NEW SOURCES OF RAW MATERIAL AND INPUTS

Without putting any additional pressure on stocks, there are still ways to increase supply of raw materials and inputs for processing firms, allowing them to cater to diversified markets and to reinforce their position. The objective is also to spur connections between the fisheries and aquaculture sector and other sectors in Mauritius, reinforcing its integration into the local economy.

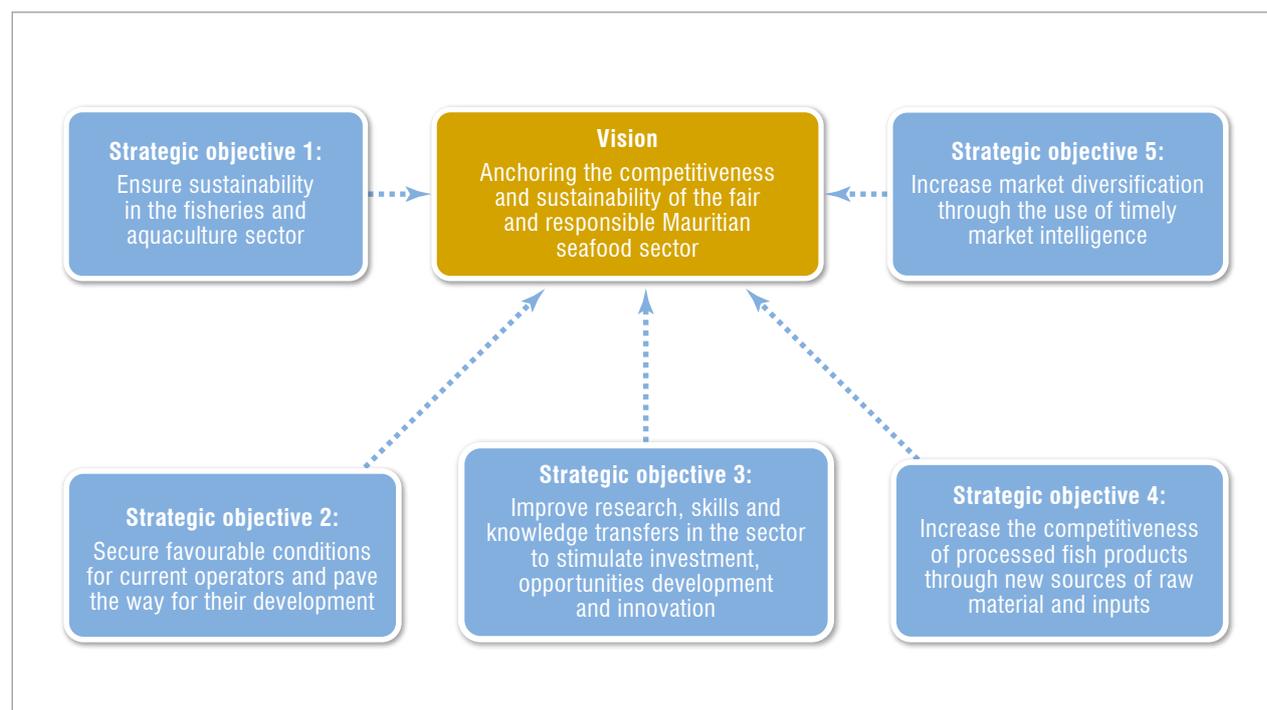
In operational terms, this objective will be reached through the attraction of specific existing longliner fleets in close seasonal transition paths from Mauritius to Port Louis in order to tap into their captures for local processing. Product diversification possibilities will also be supported for firms willing to initiate new production lines. Non-originating fish supply will also be explored to complement raw material supply, given its compliance with the required sustainability and quality standards for export to the EU and other markets. Connections between existing products and services in Mauritius and the fisheries and aquaculture sector will also be promoted. Finally, local fish feed manufacturing will be adjusted to satisfy the local small-scale aquaculture market.

STRATEGIC OBJECTIVE 5: INCREASE MARKET DIVERSIFICATION THROUGH THE USE OF TIMELY MARKET INTELLIGENCE

Market intelligence is a necessary complement to R&D that will accompany product and market diversification, especially in a context where preferential access to main markets such as the EU is progressively eroding, and this trend is expected to continue. Trade intelligence will also contribute to filling the gap of knowledge about preferential trade agreements, particularly among institutions that are as yet unable to initiate a proactive approach to promoting Mauritian fisheries and aquaculture products within markets where Mauritius has preferential access.

Operational efforts to complete this objective will first concentrate on the expansion of market access for Mauritian products, including SADC and the United States through AGOA. Ensuring a steady source of market intelligence relevant to Mauritian firms will be a second necessary step. There are also opportunities to increase visibility of Mauritian production through the development of labels and brands for seafood made in Mauritius, especially by promoting the efforts made towards full sustainability. Finally, the local market is not to be neglected considering the current negative trade balance for fish and processed fish products. Catering to the local market could not only secure an additional market share but also improve the reputation of the sector among Mauritians.

Figure 16: *The strategic scope*



LEVERAGING MARKET OPPORTUNITIES

Even though Mauritius has experienced growth in its main markets in recent years, its markets remain fairly concentrated for each exported product type. The main regional market for fish and seafood preparations is the EU, and Asian markets prevail for whole fish products (frozen or chilled). In the future, it is foreseen that Mauritian fish and seafood preparation products (mostly tuna-based processed products) will progressively lose competitive advantage in the EU market. This will occur through various processes such as the growth of ATQs, the progressive accession to similar duty-free treatment by key competitors, and especially the restarted bilateral negotiations between Thailand – the lead competitor on tuna products – and the EU with a view to attaining duty-free access. Japan, the main export market for whole frozen fish, is currently facing challenges in its economy overall. This affects the currency exchange rates and thus prices offered for Mauritian products become unprofitable for Mauritian firms.

Considering these upcoming shifts and adverse trends, securing new markets will be very important for Mauritian firms to overcome the losses foreseen from existing markets. In the fisheries sector, however, market diversification possibilities need to be tempered with careful examination of the product preferences and taste adaptation required for new markets, and thus will certainly require adjustments of existing products or development of new ones. In this context timely market intelligence, especially regarding taste preferences in new markets, will be required by companies for their diversification initiatives.

The following key orientations are recommended for the sector.

EXPORTING EXISTING PRODUCTS, WITH SLIGHT ADJUSTMENTS, TO NEW PROMISING MARKETS

The main products exported to the EU and Asia, namely processed tuna such as tuna cans and frozen or chilled loins and frozen whole fish, could be offered to new markets such as the distributors' segment in **China, the Russian Federation, South Korea** and **Brazil**. The strong competition with Viet Nam and Thailand in those markets will require adjusting production in order to stand out and ensure adaptation to local buyers' preferences.

Given that the ROO issues are solved, SADC could become a particularly interesting regional market for these products due to the growing consumption of processed fish products in the region.

LEVERAGE EXISTING MARKET LINKAGES TO BUILD CAPACITIES FOR MORE VALUE ADDED PRODUCTS

In order to secure a longer-term penetration of the EU market for Mauritian exporters, it is strongly advised that new products are developed in line with different buyers' preferences in different EU markets. This effort should be accompanied with promotional initiatives such as the development of Mauritius quality and sustainability labels, given the high importance that this aspect has in most EU markets.

The following product diversification leads could be considered for the EU and Asian markets:

- **-40°C skipjack:** To be used as -40°C high value product instead of raw material for tuna canning. Shipbuilding firm Chantier Naval de l'Océan Indien has to be invited to bid;
- **Steaks/fish burgers:** Based on fish offal, create new products such as tuna steaks for fish burgers;
- **Delicacies:** Increase production of local delicacies;
- **Bait:** For trap fishing/standardized bait sausage from rejected fish;
- **Ornamental fish:** Due to appropriate climate conditions, there is potential to develop new aquaculture areas for ornamental fish in the lagoons;
- **Cartilaginous fish discards:** cartilaginous fish discards are landed at Mauritius and could be processed for the pharmaceutical market.

In addition to product diversification, Mauritian firms, as well as the Government, need to lead IOTC negotiations to establish the conditions required to obtain the **MSC certification**. This certification will not only secure high recognition in traditional markets but is also a key to unlock any market diversification initiative.

DEVELOPING NEW PRODUCTS FOR UNTAPPED MARKETS

This market development is an inherently riskier approach because Mauritian exporters will need to enter markets in which they have little or no experience. Before doing so, not only do they have to adjust their current offering but they must have a clear idea about possible gains and risks, market characteristics and customers' requirements. In this context provision of trade intelligence will be vital.

During their discussions to design this Strategy, stakeholders identified a number of diversification leads, which will need to be further analysed for feasibility and inherent risks:

- **Farmed sea cucumber** to China
- **Tiger shrimp** to Asian markets
- **Madagascar eels** processed in Mauritius to the Japanese market
- **Farmed spirulina** (algae) to the Japanese market.

Box 6: Product and market opportunities

	Existing products	New products
Existing markets	<p>Market penetration MSC certification</p> <ul style="list-style-type: none"> • Risk of competitiveness loss in the long term due to market access of major competitors 	<p>Product development</p> <ul style="list-style-type: none"> • -40°C skipjack • Steaks/fish burgers • Delicacies • Baits • Ornamental fish • Cartilaginous fish discards
New markets	<p>Market development Distributors in:</p> <ul style="list-style-type: none"> • China • Russian Federation • South Korea • Brazil 	<p>Diversification</p> <ul style="list-style-type: none"> • Farmed sea cucumber to China • Tiger shrimp to Asian markets • Madagascar eels processed in Mauritius to the Japanese market • Farmed spirulina (algae) to the Japanese market

TOWARDS A NEW APPROACH FOR INVESTMENT ATTRACTION IN FISHERIES AND AQUACULTURE

Through the investment attraction policies and favourable schemes that Mauritius has implemented, the country has managed to attract large investors in the fisheries and aquaculture sector, covering most of the segments of the value chain.

Lead investors include the IBL Seafood Group that is directly active in logistics and seafood by-products, and has shared investments in tuna canning, jars and loins. IBL shares these investments with the British-based company Princes Group, which has also been long involved in the canning and tuna jars sector with its holdings Princes Tuna (Riche Terre and Marine Road) and Indico. The French group Sapmer is active in tuna capture (although it plans to transfer this activity to Seychelles) and deep

frozen tuna whole fish or loins (some of these activities are also shared with IBL). Finally, FMM is an investment in aquaculture initiated in 2000 which has a well-established position on the EU market for its processed products, demonstrating its high quality commitment.

With a solid base of investment attracted so far, it will be key for Mauritius to capitalize on the acquired knowledge and expertise of these companies. Knowledge transfer schemes will play a key role in this regard. In addition, the new approach to investment attraction in the sector will need to be more targeted and selective. Most of the current investments in fish processing and capture are targeted at tuna species. Considering the strong issue with the stocks levels of species such as yellowfin, there is a need to refocus future investment attraction initiatives very carefully and discourage or block investments in certain areas. In particular, any new investments in tuna capture and increase of tuna processing capacity should be strongly discouraged. This is motivated not only by the concern to preserve tuna stocks but also to ensure continued competitiveness of existing investments through sustainability certifications.



Photo: Alexandra Golovko (ITC)

VALUE CHAIN SEGMENTS STILL REQUIRING INVESTMENT

The sector still gives scope for investment attraction in some very specific areas, such as:

- Aquaculture and IMTA;
- Marine resources and sustainability research – in view of an ocean economy development;
- Skills development in connection with the fisheries and aquaculture sector – especially low and middle-level specifications;
- Processing of new fish species which could be sustainably exploited in the Mauritius EEZ;
- Product diversification-related research and capacity.

VALUING EXISTING INVESTORS

In developed economies, reinvestment from existing investors is recognized as the largest source of new FDI. Moreover, significant reinvestment is the only path to large-scale sectoral development and economic diversification. Reinvestments represent growing commitments from foreign investors to doing business in a country,

often increasing production volume or moving the company into new value chain segments. This can bring levels of local sourcing, exports, technology, worker skills and general value added, which first-time investors might not. Also, from the perspective of an investment-promoting body, it is much less expensive to court the community of existing investors than to find new investors among the scattered global pool of companies with no demonstrated interest in the promoter's country.

In Mauritius, Government relationships with investors have tended to be developed very little beyond the provision of entry advantages and the issuance of permits and certificates. The Mauritian Government, the MoOE and BOI should commit themselves to implementing a coordinated programme of investor aftercare to maximize benefits from existing investors. This programme of investor aftercare could involve a range of investor services and business environment advocacy.

The long-established base of existing investors in Mauritius will be at the core of any growth. Many of these investors are from the United Kingdom and France, which will be good candidate countries from which to seek additional investors.

STRUCTURAL ADJUSTMENTS TO THE VALUE CHAIN – VALUE OPTIONS AND FUTURE VALUE CHAIN

Unlocking the latent potential of the fisheries and aquaculture sector will require transformations throughout the value chain. These adjustments will allow the sector to offer competitive levels of quality and type of produce. To this end, the following options for value retention, addition, and creation have been identified.



Photo: Aqua Culture & Fish processing, G31 Kitchen Counter FMM

Table 25: Value options for the fisheries and aquaculture sector

Value retention: Possibilities for local production inputs or services sourcing		
Value option	How to implement	Time frame
<ul style="list-style-type: none"> Retain local non-product input materials for fish processing 	Secure a supply of local non-product inputs such as cans, packaging and cartons for all the fish processing plants and develop other required inputs such as oil for canning locally. This could be done through attraction of new investments, FDI or possible local investors (especially in agro-processing).	Long term
<ul style="list-style-type: none"> Local manufacturing of baits for banks fishing or for longliners 	The production of baits could be initiated from local processing firms' fish waste.	Medium term
<ul style="list-style-type: none"> Local manufacturing of cages and nets for aquaculture 	Nets could be produced locally (technical textile companies?) and production of cages could be diversified to adjust to industrial aquaculture as well as small-scale.	Medium term
<ul style="list-style-type: none"> Local manufacturing of spare parts for fish processing machinery 	Attract machinery manufacturers in Mauritius.	Long term
<ul style="list-style-type: none"> Local manufacturing of fish feed for aquaculture 	Diversify fish feed products (for instance, develop feed for spinefoot – an herbivorous species).	Short term
Value addition: Potential synergies with other value chains		
Value option	How to implement	Time frame
<ul style="list-style-type: none"> Create a connection with the financial services sector 	Create new financial services that are relevant to fisheries (project financing, insurance, ship registration, ship building and repair, etc.).	Medium term
<ul style="list-style-type: none"> Create a connection with the petroleum hub (priority of the Government) 	In connection with the development of Mauritius as a petroleum hub, develop bunkering facilities to attract transshipment and longliners.	Long term
<ul style="list-style-type: none"> Create a connection with the renewable energy sector 	Connect aquaculture or fish processing sectors with renewable energy projects.	Long term
<ul style="list-style-type: none"> Create a connection with the technical textile sector (Fartex) 	Explore potential product diversification in local technical textile companies for nylon ropes, needed by the fisheries industry.	Medium term

Value addition: Key buyers' preference-related quality improvement opportunities

Value option	How to implement	Time frame
• Receive the MSC certification to achieve high international recognition	Advocate to IOTC to implement HCR and target reference points for tuna stocks and a recovery plan for yellowfin tuna	Medium term
• Meet the consumer preference in taste	Study different markets' taste preferences, especially in connection with raw tuna products – e.g. Japanese market versus EU, the United States, the Russian Federation, etc.	Short term
• Implementation of selective breeding in aquaculture	Develop the local selective breeding programme for red drum as well as new breeding programmes for new potential species such as snappers or rabbitfish.	Medium term

Value addition: Opportunities to extend the national value chain and connect it to the global value chain using existing products

Value option	How to implement	Time frame
• Process Mauritius' longliner production which is currently directly exported	Promote and develop Port Louis facilities and service offer and its attractiveness.	Short term
• Cartilaginous fish (ray) for pharmaceutical products	Re-use certain waste from cartilaginous fish brought in by longliners for the local and international pharmaceutical industry.	Short term
• Use of by-catch for other products (if regulation is in place)	Once a common regulation for by-catch treatment is in place (regional obligation to retain by-catch by longliners and purse seiners), new products could be developed based on by-catch production.	Medium term
• Integrate into R&D for the fisheries sector studies on the potential use of fish offal	Based on fish offal, create new products such as tuna steaks for fish burgers.	Medium term

Value creation: Possibilities of product diversification based on current production capabilities and buyers' requirements

Value option	How to implement	Time frame
• Estimation of type, distribution and volumes of seafood in the EEZ	Before going into product diversification, it is essential that Mauritius' EEZ stocks are thoroughly analysed. Currently there is no global picture of possible capture species and their stocks levels, other than for tuna and related species. To ensure sustainability –and thus certification– of any new capture, there needs to be an assessment first.	Short term
• Aquaculture of ornamental species	Due to appropriate climate conditions, there is potential to develop new aquaculture areas for ornamental fish in the lagoons.	Long term
• Diversification of production in connection with stock availability based on the assessment	If the stocks allow for it, there is a possibility to develop into new fish species and their processing.	Long term
• Develop IMTA technologies in industrial aquaculture	To increase sustainability and innovation in the aquaculture sector, IMTA techniques could be an interesting way forward.	Medium term

Value distribution: Economic and social development opportunities

Value option	How to implement	Time frame
Opportunity for SMEs to switch to aquaculture from traditional fisheries	As initiated by the Government, pursue support programmes to accompany the transition from fishery to fish farming, with appropriate R&D and lead firms' guidance.	Long term

Skills development		
Value option	How to implement	Time frame
<ul style="list-style-type: none"> Promote the ocean economy sector and the valued job opportunities that it provides 	Through the integration of the fisheries and aquaculture sector into the broader framework of the 'ocean economy', promote the importance of this sector to scholars and students, especially its importance for tackling the sustainable economic development of Mauritius.	Medium term
<ul style="list-style-type: none"> Improve public R&D support for aquaculture 	Reorganize AFRC's current service offering to improve current modelling, nutrition schemes, pathology management, research on IMTA practices, etc.	Short term
SME integration		
Value option	How to implement	Time frame
<ul style="list-style-type: none"> Accompany new SMEs in the fisheries and aquaculture sector 	Creation of common forums and enterprise incubators in both subsectors to connect newcomers with existing operators and facilitate transfer of knowledge.	Short term
Innovation		
Value option	How to implement	Time frame
<ul style="list-style-type: none"> Launch support programmes in the sector, geared towards innovation 	Develop support for innovation and reinforce private initiatives: Aquaculture: management of broodstock and egg production, mastering the breeding of new fish species, follow-up methods, IMTA	Short term
Branding		
Value option	How to implement	Time frame
<ul style="list-style-type: none"> Find ways to integrate national-level branding for the fisheries and aquaculture sector 	The sustainability, responsibility and fairness of the Mauritian sector could be more valued (as an example, Maldives has developed images to promote their products even within other big consumer brands: 'Maldives Pole and Line').	Medium term
Institutional alignment		
Value option	How to implement	Time frame
<ul style="list-style-type: none"> Reinforce interministerial collaboration for the fisheries sector 	To centralize the management of the sector, develop a one-stop shop system and streamline procedures.	Short term

Unlocking the potential of the sector will require transformations throughout the value chain. These adjustments, as reflected in the future value chain schematic, are the result of targeted efforts to address the competitive constraints identified and capitalize on the structural adjustments required to retain, add and create value in a more effective way. The future value chain will be characterized by:

- i. Improved connections with other national value chains, especially for inputs supplies.
- ii. A higher focus on aquaculture development and the required skills.
- iii. An increased number of connections between lead firms and SMEs.
- iv. Use of existing/transition raw fish for processing.
- v. A focus on product and market diversification (with an intention to move away from 'only-tuna' production and processing).



Photo: Alexandra Golovko (ITC)

IMPLEMENTATION MANAGEMENT FRAMEWORK

This comprehensive Fisheries and Aquaculture Strategy, part of the NES Mauritius, endeavours to generate the conditions for a favourable expansion of the industry so as to contribute to overall socioeconomic development. Nevertheless, a strategy in and of itself is not enough to ensure the industry's sustainable development. Such development will require the elaboration and coordination of various activities. While the execution of these activities will allow for the Strategy's targets to be achieved, success will depend on the ability of stakeholders to plan and coordinate actions in a tactical manner. Apparently unrelated activities must be synchronized across the public sector, private sector and non-governmental organization communities in order to create sustainable results.

Indeed, the Fisheries and Aquaculture Strategy is not the strategy of any specific institution; rather it is the strategy of Mauritius, and to ensure its success, it is necessary to foster an adequate environment and create an appropriate framework for its implementation. The following section presents some of the key success conditions considered necessary for the Strategy to be effectively implemented and achieve self-sustainability and long-lasting benefits for the country.

Establish and operationalize a public and private coordinating platform and its subsidiary organ

A key success criterion for the Fisheries and Aquaculture Strategy is stakeholders' ability to coordinate activities, monitor progress and mobilize resources for the implementation of the Strategy. It is recommended that the country establishes a sector-specific platform for public-private deliberations (under the NES Secretariat) that acts in an advisory capacity to the NES Secretariat, the Government and the private sector on issues related to or affecting the fisheries and aquaculture sector and its Strategy.

The formal dialogue platform will require high-level involvement of the TSN members (public and private), as their role is crucial and will impact the effectiveness with which the Strategy is implemented. Likewise, the ability of the private sector to provide inputs to the Strategy implementation process will significantly influence the success of the Strategy.

The stakeholders' group consulted during the design process is composed of a panel of representatives of key institutions, involving ministries and TSN members. It also comprises private sector representatives of all segments of the industry. As such, once its mandate is appropriately adjusted, this group of stakeholders is best positioned to serve as the public-private platform responsible for the coordination of Strategy implementation. It will also be required that a nominated secretariat coordinates, monitors and mobilizes resources for implementing the Strategy.

The main functions of the public-private platform should be the following:

- a. Act as a consultative group pertaining to the fisheries and aquaculture sector, enabling the private sector and Government representatives to identify priority issues;
- b. Coordinate and monitor the implementation of the Strategy by the Government, private sector, institutions or international organizations so as to ensure Strategy implementation is on track;
- c. Identify and recommend allocation of resources necessary for the implementation of the Strategy;
- d. Elaborate and recommend revisions and enhancements to the Strategy so that it continues to best respond to the needs and long-term interests of the sector;
- e. Propose key policy changes to be undertaken, based on Strategy priorities, and promote these policy changes among national decision makers;
- f. Guide the secretariat in its monitoring, coordination, resource mobilization, and policy advocacy and communication functions to enable effective implementation of the Strategy.

As discussed above, the public-private platform should be supported by a secretariat to complete the daily operational work related to implementation management of the Strategy. The core responsibilities of the secretariat should be to:

- Support and organize the regular meetings of the public-private platform.
- Monitor the progress and impact of Strategy implementation.
- Coordinate Strategy implementation partners.
- Mobilize resources to implement the Strategy.

Specific tasks falling under these broad areas of activities include:

- Formulate projects proposals, including budgets, for implementation of activities of the Strategy;
- Develop annual and biannual workplans for approval by the public–private platform;
- Collect information from project implementation and prepare regular monitoring reports to be submitted to the public–private platform;
- Advocate in favour of the Strategy to public and private partners;
- Execute any other tasks required by the public–private platform.

Private sector support and participation

The private sector should benefit from Strategy implementation through improved productive capacities, reduced costs of doing business, facilitated administrative procedures, enhanced access to finance, etc. However, the private sector clearly expressed during the Strategy design process its willingness to contribute, directly or in partnership with public institutions, to the implementation of the Strategy. Their implementation efforts can range from providing business intelligence to institutions to contributing to development projects, establishing processing and transformation units, advocacy, etc. In brief, the private sector's practical knowledge of business operations is essential to ensuring that the activities of the Strategy are effectively implemented and targeted.

Sensitization of implementing institutions to build ownership

The key implementing institutions detailed in the PoA need to be informed of the content of the Strategy and the implications for their 2016–2020 programming. This sensitization is essential to building further ownership and it provides institutions with the opportunity to review the PoA in order to confirm the activities they can implement immediately and in the medium and long terms. Such a programming approach will permit better resource allocation within the responsible agencies. This allocation can be formalized by integrating the activity of the Strategy in the programme planning of the institution. While the financial dimension is often required, the human resource element is no less important.

Financial resource mobilization for implementation

While resource mobilization is only part of the solution, it plays a crucial and indispensable role in supporting Strategy implementation. An integrated resource mobilization plan should be elaborated as soon as the NES is adopted. Resource mobilization involves planning the

sequencing of communications with donors, project design, project proposals/applications, and resources collection and management. This should facilitate, leverage and strengthen the impact of diverse sources of finance to support sustainable and inclusive implementation, including national resources, development aid and private investment.

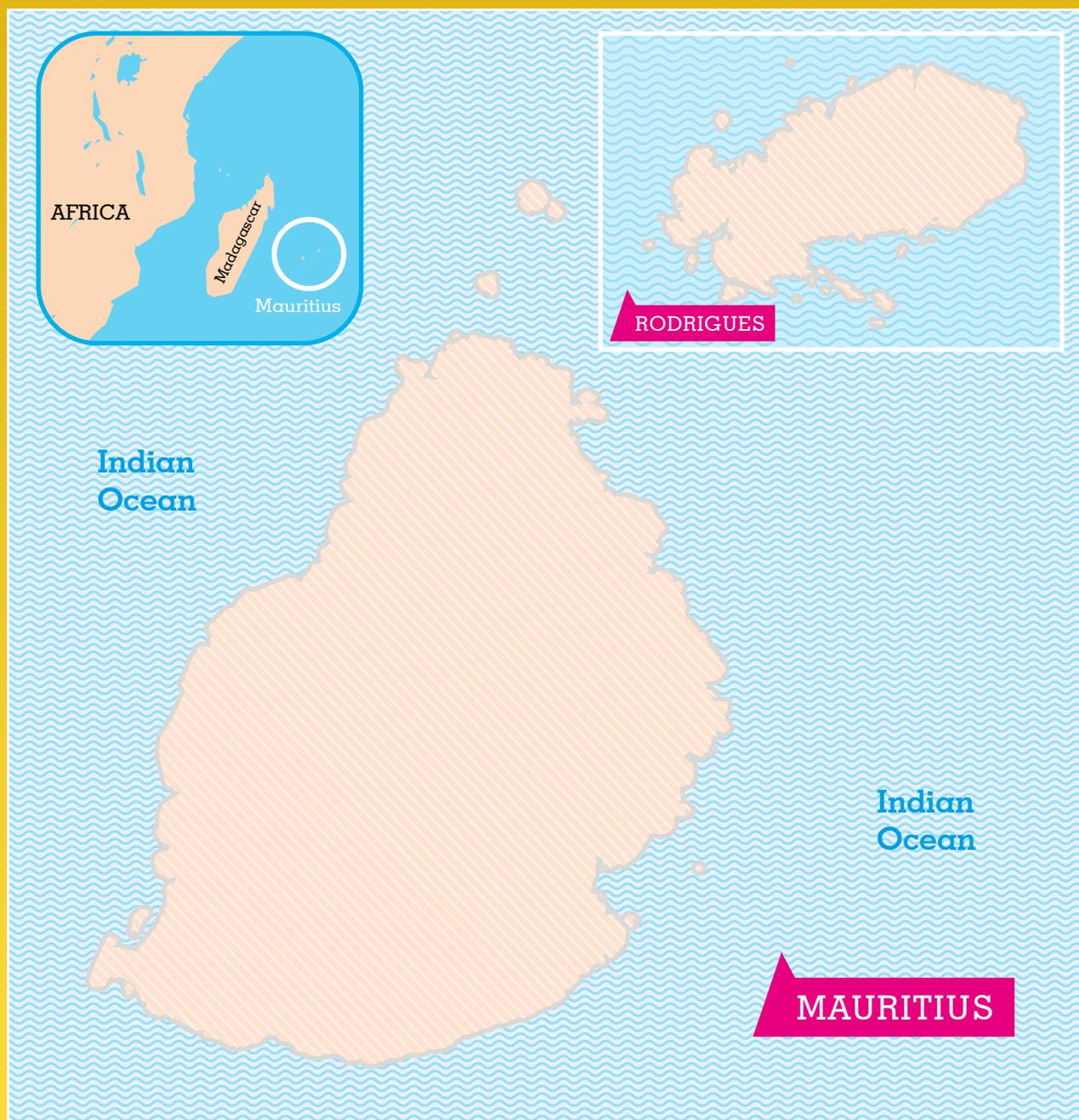
- **National resources through direct budget and support programme:** The Government will need to validate defined minimum budget support towards the implementation of the different Strategy components of the NES, including the fisheries and aquaculture sector. This support for the Strategy's activities will demonstrate the Government's commitment to the initiatives.

- **Alignment of donors' support and interventions with the Strategy:** Besides the SmartFish programme of the EU, little attention and support have been directed towards the fisheries and aquaculture industry from the international donor community. The public–private platform, together with the authorities, will have to capitalize on the significant momentum gained as part of the Strategy design process and leverage it for smooth and efficient implementation. International development agencies can use the Strategy as the logical framework for their programmes as they will surely benefit from its favourable conditions for operation (i.e. political endorsement, private sector buy-in and improved collaboration with national institutions). The PoA of the Strategy should serve the public–private platform as well as the national institutions to improve communication and facilitate the negotiation, planning, coordination and evaluation of commitments made in the context of development aid, in particular through the development of programmes and project proposals aligned with the priorities of the Strategy.

- **National and foreign investment:** The Strategy design stakeholders' group is composed of representatives of national institutions, the TSN and the private sector. If this group becomes the public–private platform, the Strategy should benefit from a solid channel of communication, capable of conveying reliable information to companies about export-related opportunities in the industry, and in turn of communicating to the Government the needs that investors have identified for successful operation. Investment flow in Mauritius could serve as a valuable driver of for certain specific areas identified in the Strategy and requiring support. Even so, it must be targeted at specific prospects in order to benefit the industry's development as detailed in the way forward section of the Strategy.

MAURITIUS NATIONAL EXPORT STRATEGY FISHERIES AND AQUACULTURE SECTOR

PLAN OF ACTION



Strategic objective 1 : Ensure sustainability in the fisheries and aquaculture sector											
Operational objective	Activities	Priority 1=high 2=med 3=low	Implementation period				Beneficiaries	Targets	Lead implementer	Supporting implementers	Possible funding source
			2017	2018	2019	2020					
1.1. Improve understanding of local fish stocks among Mauritian firms.	<p>1.1.1. Undertake a large-scale and multi-year study and assessment of marine resources in the Mauritius EEZ and identify a list of potential species (Other than pelagic fish) for capture as well as for potential aquaculture exploitation.</p> <p>1.1.2. Build knowledge among local firms about the results of the study and fishing diversification potential, and among processing firms about possible new processed products.</p> <p>1.1.3. Accompany firms willing to diversify capture and processing into products based on the new potential exploitable species.</p>	2					<ul style="list-style-type: none"> » Fisheries processors » Fish processors 	<ul style="list-style-type: none"> » Resource mapping finalized in the EEZ at the end of the five years of implementation » A sharing platform is established in the public-private dialogue scheme to release updates 	MoOE	International fisheries expertise	
							<ul style="list-style-type: none"> » Fisheries processors 	<ul style="list-style-type: none"> » Advisory services made available upon request and advertised » At least 15 firms and SMEs trained in the five-year period 	MoOE	MEXA, international fisheries expertise	
							<ul style="list-style-type: none"> » Banks fisheries 	<ul style="list-style-type: none"> » Quota established for each overfished or endangered species 	MoOE	Attorney General's Office	
1.2. Anticipate the development of by-catch use for processing.	<p>1.2.1. Carry out an assessment of the economic and infrastructural impact of the by-catch attraction to Port Louis, to ensure controlled expansion into this new opportunity. Develop different scenarios and corresponding infrastructure development proposals.</p> <p>1.2.2. Ensure that relevant regulations are adjusted for systematic by-catch retention and use: <ul style="list-style-type: none"> » Revise the national regulation on by-catch, to open access to by-catch for trade (especially to put in place a catch certification attached to by-catch, which is currently absent); » Advocate for the development of a common regulation for by-catch treatment and a regional obligation to retain by-catch by longliners and purse seiners. The regulation should provide clear indications as to the characteristics pertaining to the types of by-catch to be kept. It should also provide for: <ul style="list-style-type: none"> » The monitoring of foreign vessels' by-catch landings; » A new landing obligation within the fisheries regulation / foreign vessels licensing; » Setting up of auction sales of foreign vessels' by-catches. </p> <p>1.2.3. Once the regional and national by-catch regulations are approved, develop the necessary infrastructures for handling of by-catch and its processing (unloading, sorting, storing) in preparation for by-catch market development.</p>	2				<ul style="list-style-type: none"> » Fisheries processors » Fish processors 	<ul style="list-style-type: none"> » The assessment is carried out and quantifies the exact requirements for infrastructure development and investment in adapted processing » Several infrastructure development project proposals are put forward » A new national regulation on by-catch, containing clear provisions as to the classification of by-catch, its certification and monitoring, is developed and approved » A regional regulation proposal is formulated and a White Paper drafted 	MoOE (national) IOTC (regional)	Attorney General's Office	Public investment	
							<ul style="list-style-type: none"> » Fisheries processors » Ports » Fish processors 	<ul style="list-style-type: none"> » The infrastructure development project is selected and initiated by the end of the NES span 	MoOE, Mauritius Ports Authority	Public-private sector platforms	

Strategic objective 1 : Ensure sustainability in the fisheries and aquaculture sector											
Operational objective	Activities	Priority 1= high 2= med 3= low	Implementation period				Beneficiaries	Targets	Lead implementer	Supporting implementers	Possible funding source
			2017	2018	2019	2020					
1.3. Participate actively at the IOTC and enable MSC certification for the Mauritian tuna industry.	<p>1.3.1. As a party to IOTC, Mauritius should reinforce its participation and the capacity to advocate for the timely establishment of and agreement on HCR and target reference points, and to contribute to eliminating loopholes in the IOTC conservation and management framework, (which could also contribute to the MSC certification of Mauritian firms).</p> <p>1.3.2. To ensure relaying of common messages within IOTC frameworks, the Mauritius delegation to be advised by a joint tuna technical advisory committee that will include public and private representatives.</p> <p>The technical advisory committee will be formed based on the specific negotiation issues on the agenda of the public-private coordination body (activity 2.1.1.).</p>	2				» Tuna sector	» A detailed proposal on HCR is developed and submitted to IOTC	MoOE	Public-private sector platforms – tuna technical advisory committee		
						» Tuna sector	» Establishment of a tuna technical advisory committee through the public-private sector platform for the tuna sector	Public-private sector platforms			
1.4. Improve oceanographic data quality and availability on potential areas for aquaculture and disseminate it.	<p>1.4.1. Gather oceanographic data for aquaculture for the 20 sites shortlisted for aquaculture by MoOE, and in priority the Mahébourg Lagoon and the west coast (as areas identified as most easily accessible by the recent BOI-led study) :</p> <p>Assessment of the bathymetry, currents and waves;</p> <p>Development of a hydrodynamic and dispersion model of aquaculture effluent in the lagoon of Mahébourg;</p> <p>Additional measures such as T°C, salinity, rainfall events to complete current information.</p> <p>1.4.2. Ensure provision of long-term off-lagoon bathymetric information: develop a finer bathymetry between the coast and 40m – 80m for areas off-lagoon.</p>	1				» Aquaculture	» Data gathered for two priority areas in the first two years of implementation	Mauritius Oceanography Institute in collaboration with MoOE	MEXA, international aquaculture expertise		
						» Aquaculture	» Establish a current data review mechanism in the two priority areas	Mauritius Oceanography Institute in collaboration with MoOE			
	<p>1.4.3. Assess the pollution outputs to the watersheds by quantity as well as the characteristics of polluting agents in the Mahébourg Lagoon and develop solutions to minimize output.</p>	3				» Aquaculture	» A study is carried out	Mauritius Oceanography Institute in collaboration with MoOE	MEXA, international aquaculture expertise, Ministry of Environment, Sustainable Development, and Disaster and Beach Management		
						» At least two corrective measures are implemented by 2019					

Strategic objective 1 : Ensure sustainability in the fisheries and aquaculture sector

Operational objective	Activities	Priority 1=high 2=med 3=low	Implementation period					Beneficiaries	Targets	Lead implementer	Supporting implementers	Possible funding source
			2017	2018	2019	2020	2021					
1.5. Ensure full mastery of the notion of biosecurity among fish farmers.	<p>1.5.1. Refine the currently developed National Aquaculture Biosecurity Plan: Review the composition of the National Aquatic Animal Health Working Group and involve the Competent Authority Seafood;</p> <p>Strengthen the Competent Authority Seafood in the adjustment of the national biosecurity plan through a comprehensive review with key stakeholders in the aquaculture subsector;</p> <p>Finalize the implementation of the biosecurity legal system on marine aspects through the National Aquatic Animal Health Working Group.</p>	1 2 2					» Aquaculture	» The National Aquatic Animal Health Working Group involves all relevant stakeholders » The National Aquaculture Biosecurity Plan is reviewed and adjusted based on stakeholders' input » Biosecurity legal system is in place by end-2016	MoOE			
	<p>1.5.2. Strengthen the capacity of all stakeholders involved in biosecurity through the development of national vocational training on aquaculture diseases and sanitary issues. Develop a subvention scheme for SMEs in aquaculture to take part in the training.</p>	3					» Aquaculture	» A new course is developed on biosecurity and sanitary issues » A support scheme is put in place to facilitate participation of SMEs in the training	MoOE	Mauritius Institute of Training and Development		
	<p>1.5.3. Designate a public reference laboratory for the monitoring of aquaculture-related diseases. Equip the laboratory to analyse aquaculture, and define which diseases need to be monitored and which tests need to be carried out for the sector. Provide training support to the laboratory through provision of international expertise in the sector.</p>	2					» Aquaculture	» Reference laboratory for biosecurity identified (Y1) » The laboratory is fully equipped for disease control and provides all necessary tests » Training of lab personnel is carried out by 2019	MoOE	Quality infrastructure		
1.6. Diversify supply of juveniles for aquaculture to limit contamination risks.	<p>1.6.1. Through investment attraction in aquaculture (see activity 2.5.2.), facilitate the establishment of a second marine fish hatchery in Mauritius through the following measures: Map, plot land priority areas for development and land in the Pas Geometric for further aquaculture land-based facilities with sea access and hatcheries. Produce a land-use analysis and land tenure analysis for hatcheries. Map underwater sources' potential for drilling.</p>	1					» Aquaculture » Investors	» Registry of on-land areas for aquaculture-related facilities created	MoOE	BOI, Ministry of Housing and Lands, public-private sector platforms		
1.7. Connect aquaculture or fish processing sectors with renewable energy projects.	<p>1.7.1. Explore possibilities in connecting the aquaculture industry with small-scale wind turbine installations. Promote investment in the most suitable model.</p> <p>1.7.2. Explore possibilities of re-using aquaculture and fish processing waste. Promote investment in the most suitable model.</p>	3					» Aquaculture	» At least one wind energy initiative is piloted by end-2020	MoOE	Ministry of Energy and Public Utilities	Programme National d'Efficacité Énergétique	
		3					» Aquaculture	» At least one recycling initiative is piloted by end-2020	MoOE	Ministry of Environment, Sustainable Development, and Disaster and Beach Management	Programme National d'Efficacité Énergétique BiFFIO project by the EU	

Strategic objective 2: Secure favourable conditions for current operators and pave the way for their development

Operational objective	Activities	Priority 1 = high 2 = med 3 = low	Implementation period					Beneficiaries	Targets	Lead implementer	Supporting implementers	Possible funding source
			2017	2018	2019	2020	2021					
2.1. Improve public-private coordination in the sector and among lead firms and SMEs.	2.1.1. Set up an overarching fisheries and aquaculture sector public and private platform, composed of the following subsector groups: <ul style="list-style-type: none"> » Artisanal fishing » Banks fishing » Tuna sector (catch and processing) » Aquaculture. Each thematic group will be led by private sector operators, both from lead firms, including foreign investors, and SMEs. Public institutions that will be represented in the platform are: <ul style="list-style-type: none"> » MoOE » BOI » Training institutions. 	1					» Entire industry	<ul style="list-style-type: none"> » Clear terms of reference for the platform are agreed by all stakeholders and formalized » Each group is established and key private sector representatives identified 	Private and public stakeholders	MoOE, EM, MEXA		
								» Entire industry	<ul style="list-style-type: none"> » The public-private sector platform is leading the implementation of the Strategy under the NES Secretariat 	Private and public stakeholders	MoOE, EM, MEXA	
								» Entire industry	<ul style="list-style-type: none"> » Resources mobilized for Strategy implementation » Responsible institutions are on board 	Private and public stakeholders	MoOE, EM, MEXA	
								» Entire industry	<ul style="list-style-type: none"> » 'Extraordinary meeting' mechanism of subsector groups established upon request of public representatives 	MoOE	Private and public stakeholders	
2.2. Bring the quality infrastructure up to speed to support sector operators.	2.1.3. The platform will be responsible for effectively mobilizing and engaging implementing institutions to align all development policies to the fisheries and aquaculture strategy, and to identify activities that fall under their leadership and plan for required human and financial resources in the next five years.	2										
2.2.1. Divide responsibilities in the quality infrastructure for the fisheries and aquaculture sector. Specifically clearly allocate testing responsibilities among public laboratories, in order to complement the work of Mauritius Standards Bureau (MSB) and to avoid competencies and resources duplication (linked with 1.5.3.). Communicate on the final structure to private sector operators and especially MSMEs.	2.1.4. Government officials to involve the four subsector groups in important decision-making processes that have a bearing on sector development and particularly pertaining to : <ul style="list-style-type: none"> » Selection of new investment target areas » Stocks management / assessments » Bilateral fish agreements development » Quality infrastructure » Infrastructure development initiatives » Dialogue with regional bodies such as IOTC. 	1					» Entire industry					
								» Entire industry	<ul style="list-style-type: none"> » A new testing framework is in place for capture, processing and aquaculture » The private sector is made aware of the new framework 	MoOE	MSB, other laboratories	
2.2.2. Build the capacity of testing and certifying bodies for fish and processed fish products quality, as well as for the tests that the industry requires. In addition, provide specific assistance on the following: Work towards accreditation of the remaining tests required by the industry; Establish an internal yearly audit of equipment and develop yearly equipment upgrading plans; Establish collaboration with international leaders in this area and ensure the exchange of best practices.	2.2.1. Build the capacity of testing and certifying bodies for fish and processed fish products quality, as well as for the tests that the industry requires. In addition, provide specific assistance on the following:	2					» Entire industry	<ul style="list-style-type: none"> » Responsible staff are trained at MSB and other identified laboratories for fisheries and aquaculture » A monitoring procedure is established in all relevant laboratories » At least one Memorandum of Understanding signed with an internationally renowned country in the seafood sector 	MoOE	MSB, other laboratories		
								» Entire industry	<ul style="list-style-type: none"> » At least one Memorandum of Understanding signed with an internationally renowned country in the seafood sector 	MoOE	MSB, other laboratories	

Strategic objective 2: Secure favourable conditions for current operators and pave the way for their development

Operational objective	Activities	Priority 1=high 2=med 3=low	Implementation period					Beneficiaries	Targets	Lead implementer	Supporting implementers	Possible funding source
			2017	2018	2019	2020	2021					
2.2. Bring the quality infrastructure up to speed to support sector operators.	2.2.3. Involve sector institutions (MoOE, BOI, SMEDA) in sensitizing and supporting the private sector on quality management and conformity assessment (testing, certification, inspection). MoOE to put in place awareness-raising courses for (M)SMEs willing to export, about international mandatory and voluntary standards related to the fisheries and aquaculture sector.	2						» MSMEs	» Sensitization campaign put in place through joint efforts of MoOE, BOI and SMEDA	MoOE	BOI, SMEDA, MSB and other laboratories	
2.3. Improve the understanding of the fisheries and aquaculture value chain in public institutions.	2.3.1. During the meetings of the public-private thematic platforms, disseminate information among decision makers and representatives of key public institutions regarding important considerations affecting the development of the fisheries and aquaculture value chain: » The state of stocks of major tuna species (skipjack, yellowfin, bigeye and albacore), and promote increasing the utilization of current processing capacities rather than an increase of processing capacities to improve turnover. » The need to develop aquaculture in parallel to the fisheries and processing sector, and why previous initiatives for SME support have not been fully successful (cage size, location, etc.). » Other priorities of the Strategy.	1					» Trade and investment support institutions	» Systematic presentations made by private sector operators within technical public-private groups in order to update decisions makers on the state of the sector	Private sector operators	MEXA, EM		
2.4. Streamline investment in the key areas of the value chain.	2.4.1. Build capacity of BOI officers to effectively facilitate and target investment in the fisheries and aquaculture sector with full understanding of the sector, and improve their investment analysis and targeting capacity / techniques to narrow down and best target potential investors based on investment requirements and specifications (this implies investing in data access and management services such as Dun and Bradstreet, Financial Times, fDi Markets). Strengthen the capacities of BOI in branding and outreach (e.g. social media, events, etc.), including through trade attachés.	2					» BOI » Entire industry	» At least 15 staff from BOI trained in the sector, investment targeting, branding and outreach	MoOE	International expertise		
	2.4.2. Promote and incentivize national / international investments in the following specific areas of the value chain: » Aquaculture and IMTA; » Marine resources and sustainability research – in view of ocean economy development; » Skills development in connection with the fisheries and aquaculture sector – especially low and middle-level specifications; » Processing of new fish species which could be sustainably exploited in the Mauritius EEZ. Product diversification-related research and capacity.	2					» Entire industry	» Promotional strategy and campaign is built by BOI and focuses on the five areas identified	BOI	MoOE, public-private sector platforms		
	2.4.3. Reorient investors that are planning to invest in tuna capture and processing towards other untapped segments, instead of focusing solely on tuna fishing and processing, for instance to by-catch specific processing.	1					» Entire industry	» Promotional strategy and campaign recommends alternatives to investors interested in tuna capture and processing	BOI	MoOE, public-private sector platforms		

Strategic objective 2: Secure favourable conditions for current operators and pave the way for their development

Operational objective	Activities	Priority 1=high 2=med 3=low	Implementation period					Beneficiaries	Targets	Lead implementer	Supporting implementers	Possible funding source
			2017	2018	2019	2020	2021					
2.5. Advocate for the reduction of fixed costs.	2.5.1. Reclassify the fisheries, aquaculture and fish processing sectors from 'commercial electricity users' to 'industrial electricity users' to allow a rebated electricity rate of US\$0.10 per kWh and about US\$0.13 in Rodrigues, in order to ensure international competitiveness.	1					Entire industry	» Seafood sector classified as an industrial electricity user	Ministry of Energy and Public Utilities	MoOE, public-private sector platforms		
	2.5.2. Establish schemes to minimize freight and transport costs: » Small subvention on container transport between Seychelles and Mauritius; » Reduction of bunkering costs in Port Louis to increase the competitiveness of the port.	1					Fish processing	» Two schemes prepared and adopted	Ministry of Public Infrastructure and Land Transport	MoOE, public-private sector platforms		
2.6. Streamline procedures both for ship registration under the Mauritian flag and to establish concession agreements.	2.6.1. Develop an online ship registration mechanism and an easy-to-use guidelines booklet. Change the requirement for ship registration from nationality to long-term residence in Mauritius (at least three years). Minimize registry update procedures.	2				Fisheries	» New ship registration mechanism » Booklet on registration	MoOE	Public-private sector platforms			
	2.6.2. Through the savings created on ship registration procedures, allocate additional funding to the registration surveillance mechanism through an increased number of marine surveyors to monitor compliance with permits.	2					Fisheries	» Marine surveillance mechanism improved with higher effectiveness	MoOE	Public-private sector platforms		
2.7. Align national and international regulatory frameworks to the needs of the industry.	2.6.3. In line with the elaboration of the new Fisheries Act, establish a one-stop shop concession agreement review and delivery mechanism for aquaculture, through a single-institution leadership on the process, with the support of the technical committee chaired by the BOI (once all required business initiation clearances have been obtained). Increase the length of concession agreements to 20 years, with unlimited renewal possibilities. Develop a repertory of available / suitable on-land for areas for aquaculture-related infrastructure and make the list readily available to interested investors (linked with activity 1.6.1.).	1				Aquaculture	» New concession delivery mechanism in place	Prime Minister's Office	MoOE, public-private sector platforms			
	2.6.4. Ease the procedure related to the delivery of a construction permit for docks that would link land- and sea-based activities of aquaculture.	1					Aquaculture	» New simplified procedure for dock building permits in place	Ministry of Housing and Lands	MoOE, public-private sector platforms		
	2.7.1. Prepare the renewal of the bilateral fishing agreement with Seychelles.	1				Fisheries	» The agreement is successfully renewed by end-2016, maintaining the EEZ	MoOE	Public-private sector platforms, Attorney General's Office			

Strategic objective 2: Secure favourable conditions for current operators and pave the way for their development												
Operational objective	Activities	Priority 1=high 2=med 3=low	Implementation period					Beneficiaries	Targets	Lead implementer	Supporting implementers	Possible funding source
			2017	2018	2019	2020	2021					
2.7. Align national and international regulatory frameworks to the needs of the industry.	2.7.2. Consolidate and clarify the legal framework for concessions in the upcoming new Fisheries Act that will replace the Fisheries and Marine resources Act of 1998 (FMRA) – link to activity 1.6.1.	1						» Entire industry	» An amendment to the FMRA is prepared, with separate legislation on aquaculture and a clear concession agreements framework	MoOE	Attorney General's Office	
	2.7.3. Include in the FMRA incentive provisions for IMTA, promoting innovation. Set up a charter / master plan for Lagoon of Mahébourg as a model for Mauritius as a concerted integrated coastal zone management contractual mechanism based on 'contrat de baie / contrat de lagon' systems developed in France. The master plan should aim to harmonize aquaculture activity with the nautical and tourism activities in the lagoon / region of Mahébourg.	2						» Aquaculture	» IMTA included into FMRA	MoOE	Attorney General's Office	
	2.7.4. Reinforce and rationalize marine control in the EEZ of Mauritius concerning illegal fisheries, and especially longliners' transboarding activities.	1						» Fisheries	» New marine control system is put in place	MoOE	Attorney General's Office	

Strategic objective 3: Improve research, skills and knowledge transfers in the sector to stimulate investment, opportunities development, innovation and product diversification

Operational objective	Activities	Priority 1 = high 2 = med 3 = low	Implementation period					Beneficiaries	Targets	Lead implementer	Supporting implementers	Possible funding source	
			2017	2018	2019	2020	2021						
3.1. Establish a quality R&D system that supports industrial operators and the small-scale sector effectively for aquaculture.	<p>3.1.1. Restructure the AFRC in its operation, its resources and its missions, and according to national and regional complementarities with other institutions.</p> <p>3.1.2. Improve research on the most promising species for aquaculture in Mauritius – the red drum – in order to increase and diversify local production of stocks:</p> <ul style="list-style-type: none"> » Secure a regional supply of eggs / larvae of red drum for breeders in order to back up the existing stocks (mutualize supply base); » Improve broodstock performance (strain resistance, productivity, zootechnical performance, etc.) of red drum: characterization of the genetic viability of existing stock, development of a regional breeding programme; » Improve diet, zootechnical performance, sustainability and the quality of the fish feed intended for the red drum. 	1					» Aquaculture	» New terms of reference reviewed through the public-private sector platforms and validated » AFRC restructured	MoOE	Public-private sector platforms			
		1					» Aquaculture	» Juveniles supply for breeders mutualized at the regional level	MoOE, private operators	Renewed AFRC, public-private sector platforms	Common research initiatives with Réunion		
		2							» Improved long-term production performance and consolidated supplier network				
3.2. Accompany SMEs in the equipment upgrading process.	<p>3.1.3. Focus R&D on the development of a sustainable (economically and environmentally) small-scale fish cage production model to definitively set the basis for long-term development of small-scale aquaculture:</p> <ul style="list-style-type: none"> 1 Characterize zootechnical performances of white spotted rabbitfish (Siganus sutor) and goldlined seabream (Rhabdosargus sarba) in Mauritius conditions. 2 Adjust cage production for both species. 3 Transfer of hatchery techniques for Siganus sutor. <p>» Study the procurement opportunities for juvenile supply and detailed economic viability and support needs for hatchery / juveniles supply within the regional context.</p> <p>» Develop a specific fish feed formulation suitable for Siganus sutor (low energy feed) and Rhabdosargus sarba in connection with a local fish feed provider.</p> <p>» Assess the possibilities of sustainable harvest of Siganidae juveniles in the lagoon for supply to small-scale farmers.</p> <p>» In the long term, consolidate ecotourism projects for the barachois (coastal lagoons) through attraction of potential investment projects and supporting small-scale farmers to integrate.</p>	1					» Aquaculture	» Best-performing species under the white spotted rabbitfish are identified	Renewed AFRC	MoOE, public-private sector platforms	Benchmarking of shrimp farming practices in the Philippines (Southeast Asian Fisheries Development Center), Cyprus and South Asia		
		1							» Cage production is adjusted to SMEs' needs			Potential technical collaboration with Mayotte	
		2							» At least one technical collaboration established for hatchery techniques development			(Association pour le Développement de l'Aquaculture à Mayotte) and Réunion Island	
		3							» Juveniles supply for breeders mutualized at the regional level			Réunionnaise de Développement de l'Aquaculture	
									» At least one research programme on Siganus sutor and Rhabdosargus sarba feeds				
									» The state of Siganidae populations in the main lagoons in Mauritius are identified and maximum capture levels and monitoring of stocks are established				
									» At least one barachois site established by end of the NES				
									» Technology plans developed for seven companies in the first two years.	Fisheries Training and Extension Centre		MoOE, public-private sector platforms	
									» Technology plans developed for 20 other companies in the next three years				
									» SMEs in fishery and processing				

Strategic objective 3: Improve research, skills and knowledge transfers in the sector to stimulate investment, opportunities development, innovation and product diversification

Operational objective	Activities	Priority 1=high 2=med 3=low	Implementation period				Beneficiaries	Targets	Lead implementer	Supporting implementers	Possible funding source
			2017	2018	2019	2020					
3.2. Accompany SMEs in the equipment upgrading process.	<p>3.2.2. Conduct awareness-raising training at firm level for middle-level and high-level managers on:</p> <ul style="list-style-type: none"> » Knowledge of existing equipment and its advantages in order to ensure proper identification and purchase of equipment within companies; » Understanding the potential of newly purchased equipment and training requirements for operators to ensure its full-capacity functioning; » Modern budgetary practices that account for regular equipment upgrading. <p>This should be done by:</p> <ol style="list-style-type: none"> a. Public-private sector platforms. b. Instituting technology comparison studies through universities or technical experts. 	2					» SMEs in fishery and processing	» Fifty machinery supply managers trained per year	Fisheries Training and Extension Centre	MoOE, public-private sector platforms	
3.3. Ensure a consistent supply of labour for the fisheries and aquaculture sector.	<p>3.3.1. Conduct a skills gap and needs assessment study covering the fisheries, aquaculture and fish processing value chain from workers up to managers and develop course curricula, assessment standards and infrastructure requirements for training programmes.</p> <p>The study should specifically explore possibilities to develop new sector-related programmes at the University of Mauritius and the Mauritius Institute of Training and Development.</p>	2					» Entire industry	» Reports indicating specific numbers to be trained for various activities » Course curriculum for each area, based on skills gap assessment, assessment standards for certification agency, and identification of ways to train (on-job, theory, mixed)	Human Resources Development Council	MoOE, public-private sector platforms	
	<p>3.3.2. Through the integration of the fisheries and aquaculture sector in the broader framework of the 'ocean economy', conduct a promotion campaign about the importance of this sector targeted at secondary schools (to be adjusted based on the outcomes of activity 3.3.1.).</p> <p>Develop job profiles for the ocean economy sector, especially focusing on:</p> <ul style="list-style-type: none"> » High expertise jobs: <ul style="list-style-type: none"> – Marine resource assessment and management – Ocean economy engineering – Integrated aquaculture technologies and ecosystem biology » Middle-level expertise jobs: <ul style="list-style-type: none"> – Fish processing oversight – Aquaculture caretakers / farmers » Low expertise jobs: <ul style="list-style-type: none"> – Catch management – Fish processing operators – Etc. 	3					» Entire industry	» Promotional campaign carried out in all secondary schools with a focus on sustainability » Interest of scholars is monitored	Human Resources Development Council	MoOE, public-private sector platforms	

Strategic objective 3: Improve research, skills and knowledge transfers in the sector to stimulate investment, opportunities development, innovation and product diversification

Operational objective	Activities	Priority 1 = high 2 = med 3 = low	Implementation period					Beneficiaries	Targets	Lead implementer	Supporting implementers	Possible funding source
			2017	2018	2019	2020	2021					
3.3. Ensure a consistent supply of labour for the fisheries and aquaculture sector.	<p>3.3.3. Strengthen linkages between enterprises and the University of Mauritius (and other universities that may initiate fisheries and aquaculture-related programmes based on the study in 3.3.1.).</p> <ul style="list-style-type: none"> » Based on the gap assessment in 3.3.1., support the updating of curricula and training programmes of the University of Mauritius (including students' apprenticeship and internship programmes). » Establish cooperation with selected leading fisheries and aquaculture countries. » Formulate internship programmes between the private sector and University of Mauritius / Mauritius Institute of Training and Development. » Integrate within courses guest speakers from the industry to deliver special training sessions to Mauritian students and maintain connections with the industry afterwards. » Send teachers on national and international industry visits to provide them with first-hand learning experiences and to help build industry linkages. » Invite international professors in order to share best practices in the sector. » Linkages with industry need to start in the first year of the student's curriculum (and be systematic throughout) to ensure knowledge is properly disseminated. 	1					<ul style="list-style-type: none"> » Academia » Industry 	<ul style="list-style-type: none"> » New curricula in the Faculty of Agriculture » At least one Memorandum of Understanding signed with an international university » At least one internship programme per curricula put in place » At least one industry representative visits universities per curriculum » Systematize connections between students and companies for project reviews » Requirement put in place to have a national or international industry visit per year for professors » Memorandum of Understanding signed with three to four experts or institutes » At least five professors invited per year 	Human Resources Development Council	University of Mauritius, University of Technology Mauritius, MoOE, public-private sector platforms		
3.4. Incentivize innovation in the aquaculture sector.	<p>3.4.1. In preparation for the development of IMTA in Mauritius, optimize technical models of industrial fish cage production – evaluation of the potential of integrated aquaculture systems:</p> <ul style="list-style-type: none"> » Develop technology survey and private R&D initiatives on controlling potential new fish species for diversification; » Develop an IMTA technical production model for Mahébourg lagoon likely to value cage nutrients and serving as a global model; » Improve monitoring of the environmental impacts of cage aquaculture. <p>3.4.2. Mobilize public funding tools dedicated to innovation for feed industry companies to adjust their products to large- and small-scale aquaculture projects (in line with 3.1.2. and 3.1.3.).</p> <p>Develop financing tools supporting collaboration among feed producers, R&D structures and fish producers.</p>	<p>2</p> <p>2</p> <p>3</p>					<ul style="list-style-type: none"> » Aquaculture 	<ul style="list-style-type: none"> » Technology survey carried out » Feasibility study based on technology survey and proposal for a model in the Mahébourg lagoon developed » Monitoring system reviewed 	Renewed AFRC	FMM, University of Mauritius, MoOE, public-private sector platforms, international expertise		
		2					<ul style="list-style-type: none"> » Aquaculture 	<ul style="list-style-type: none"> » Support scheme put in place for R&D for local aquaculture in the fish feed industry » Agree on a financing mechanism for technical collaboration on fish feed 	Public-private sector platforms	MoOE, renewed AFRC		

Strategic objective 4: Increase the competitiveness of processed fish products through new sources of raw material and inputs												
Operational objective	Activities	Priority 1=high 2=med 3=low	Implementation period					Beneficiaries	Targets	Lead implementer	Supporting implementers	Possible funding source
			2017	2018	2019	2020	2021					
4.1. Attract more fish to Port Louis for transshipment and landing.	4.1.1. Set up an efficient and effective -40°C logistic pattern between Seychelles and Port Louis.	2						» Fish processors	» A new line of -40° is established	MoOE	Public-private sector platforms, MEXA	
	4.1.2. Share the Mauritius Port Authority benchmark study with the Shipping Directorate in the MoOE to ensure a clearer view of fish traffic (data is more reliable). Draft a global commercial offer through the public and private sector, before conducting a communication campaign to Korean and Japanese longliner associations.	1						» Fish processors	» Mauritian Port Authority benchmark study as reference point for fish traffic » Communication campaign prepared through the public-private subsector platform	MoOE	Public-private sector platforms, MEXA	
4.3. Promote local manufacturing of inputs and services for the fisheries sector.	4.1.3. Attract Japanese and Korean longliners, as well as toothfish reefers (French and New Zealand), by contacting fleet managers through a consistent and coherent commercial strategy.	1					» Fish processors	» Communication campaign implemented throughout the five years	MoOE	BOI, public-private sector platforms, MEXA		
	4.1.4. Sign an agreement with Australia allowing Australian toothfish reefers to conduct landings in Mauritius for local processing.	1					» Fish processors	» Agreement signed	MoOE	Attorney General's Office		
4.2. Incentivize and promote product diversification.	4.2.1. Support selected companies willing to diversify their product base by providing backup and consulting services throughout the process. The following orientations could be of interest: » Tuna: -40°C skipjack: To be used as -40°C high value product instead of raw material for tuna canning. » Bait: For trap fishing / standardized bait sausage from rejected fish. » Ornamental fish: Due to appropriate climate conditions, there is potential to develop new aquaculture areas for ornamental fish in the lagoons. » Fish burgers: Based on smaller fish steak portions. » Cartilaginous fish: Cartilaginous fish discards are landed at Mauritius to be processed for the pharmaceutical market. » Delicacies: Production of local delicacies increased. » Shark and rays: For fisheries. Use of fish waste for fertilization should also be looked at.	2					» Entire industry	» At least three companies advised per year on diversification	MoOE	MEXA, BOI, public-private sector platforms		
	4.3.1. Connect firms with local inputs manufacturers in the following areas: Nets for aquaculture (from technical textile companies); » Local procurement of nylon ropes for fishing (technical textile companies); » Production of cages diversified to adjust to industrial aquaculture as well as small-scale; » Secure supply of local non-product inputs such as cans, packaging and cartons for all the fish processing plants. In the longer term the following investments in local inputs manufacturing could be envisaged: » Procure oil for canning locally. This could be done through attraction of new investments, FDI or possible local investors (especially in agro-processing); » Attract machinery manufacturers in Mauritius.	2					» Entire industry	» At least two linkages for local inputs sourcing opportunities are developed » At least one new inputs manufacturing company established in Mauritius by the end of the NES	MoOE	MEXA, BOI, public-private sector platforms		

Strategic objective 4: Increase the competitiveness of processed fish products through new sources of raw material and inputs												
Operational objective	Activities	Priority 1= high 2= med 3= low	Implementation period					Beneficiaries	Targets	Lead implementer	Supporting implementers	Possible funding source
			2017	2018	2019	2020	2021					
4.3. Promote local manufacturing of inputs and provision of services for the fisheries sector.	4.3.2. Create new financial services that are relevant to fisheries (project financing, insurance, ship registration, shipbuilding and repair, etc.).	1					» Entire industry	» New products jointly developed with financial services sector representatives	Public–private sector platforms	NES Secretariat, MoOE		
	4.3.3. In connection with the development of Mauritius as a petroleum hub, develop bunkering facilities to increase the attractiveness of Port Louis for transhipment and longliners.	2					» Fisheries	» New products jointly developed with financial services sector representatives	Public–private sector platforms	MoOE, Ministry of Energy and Public Utilities		

Strategic objective 5: Increase market diversification through the use of timely market intelligence

Operational objective	Activities	Priority 1=high 2=med 3=low	Implementation period					Beneficiaries	Targets	Lead implementer	Supporting implementers	Possible funding source
			2017	2017	2019	2020	2021					
5.1. Expand market access for Mauritian fisheries and aquaculture products.	<p>5.1.1. Support the aquaculture sector to access SADC and AGOA under the preferential access schemes available. This would involve the following targeted assistance:</p> <ul style="list-style-type: none"> » Select appropriate exhibitions in SADC and the United States to publicize and promote Mauritian seafood sector quality and sustainability. » Assist selected Mauritian firms like FMM to connect with the right buyers and partners in SADC and the United States through the promotion of Mauritian product quality. » Support FMM and other export-ready firms to ensure compliance with SADC and American standards. 	2					<ul style="list-style-type: none"> » Aquaculture 	<ul style="list-style-type: none"> » One promotion campaign initiated towards the SADC and United States markets » At least two exporting companies are supported to diversify their buyers' base in these markets » At least two companies achieve compliance in these markets 	MoOE	MEXA, BOI, EM		
	<p>5.1.2. Prepare a solid list of arguments for the upcoming negotiations for the ATOs renewal.</p>	1					<ul style="list-style-type: none"> » Tuna sector 	<ul style="list-style-type: none"> » White Paper developed by Mauritius in view of the ATQ renewal in 2018 » White Paper is prepared through a consultative process (public-private sector platforms) 	MoOE	Public-private sector platforms, MEXA		
	<p>5.1.3. Enable Mauritian trade missions (embassies) based in the United States, Botswana (SADC headquarters) and other target markets – such as the Russian Federation, China, Australia or Japan – to connect with local counterparts and potential buyers. Missions to organize buyer-seller meetings to facilitate interaction between Mauritian exporters and foreign buyers in target markets.</p>	2					<ul style="list-style-type: none"> » Entire industry 	<ul style="list-style-type: none"> » At least two buyers identified per year per target market through local trade representatives » At least one buyer-seller meeting organized per year 	MoOE	Ministry of Foreign Affairs, Regional Integration and International Trade		
	<p>5.1.4. Build the capacity of MEXA, EM and BOI to develop market profiles on target markets, using market analysis tools and research methodologies (e.g. the Russian Federation, China, the United States, SADC, Japan, EU, etc.). These market profiles include production and consumption trends (including specific taste and product preferences for specific fish products such as tuna loins), trade analysis, market requirements, price information, distribution channels, logistics (tariff and non-tariff barriers) and key business contacts.</p>	1					<ul style="list-style-type: none"> » MEXA » EM » BOI 	<ul style="list-style-type: none"> » Development of two market profiles and training of MEXA, EM and BOI staff to capacitate them to prepare two more such profiles » Three trainings on competitive intelligence and market profiles organized and conducted 	MEXA, EM, BOI	International expertise, public-private sector platforms		
	<p>5.1.5. Conduct market R&D on market preferences to be undertaken for:</p> <ul style="list-style-type: none"> » The Russian Federation » China » The United States » Japan » Australia » Other key markets identified through the implementation of the Strategy. 	1					<ul style="list-style-type: none"> » Entire industry 	<ul style="list-style-type: none"> » R&D on target markets conducted every two years. » New potential markets identified every two years 	MEXA, EM, BOI	Public-private sector platforms		
5.2. Promote the fisheries and aquaculture sector abroad.	<p>5.2.1. Develop a national eco-label for the Mauritian seafood sector, with a strong focus on the sustainability, responsibility and fairness of the Mauritian sector. This label should appear together with the retailers' branding on end-products to sensitize consumers.</p> <p>5.2.2. Once by-catch processing is developed (activities 1.2.1., 1.2.2., 1.2.3.), complement the label with a specific by-catch product image.</p>	1 2					<ul style="list-style-type: none"> » Entire industry » Entire industry 	<ul style="list-style-type: none"> » A national brand is developed in line with the high level of compliance in Mauritius » Campaign to select the brand's visual is carried out » By-catch processing integrated into the eco-label 	EM EM	MEXA, public-private sector platforms MEXA, public-private sector platforms		

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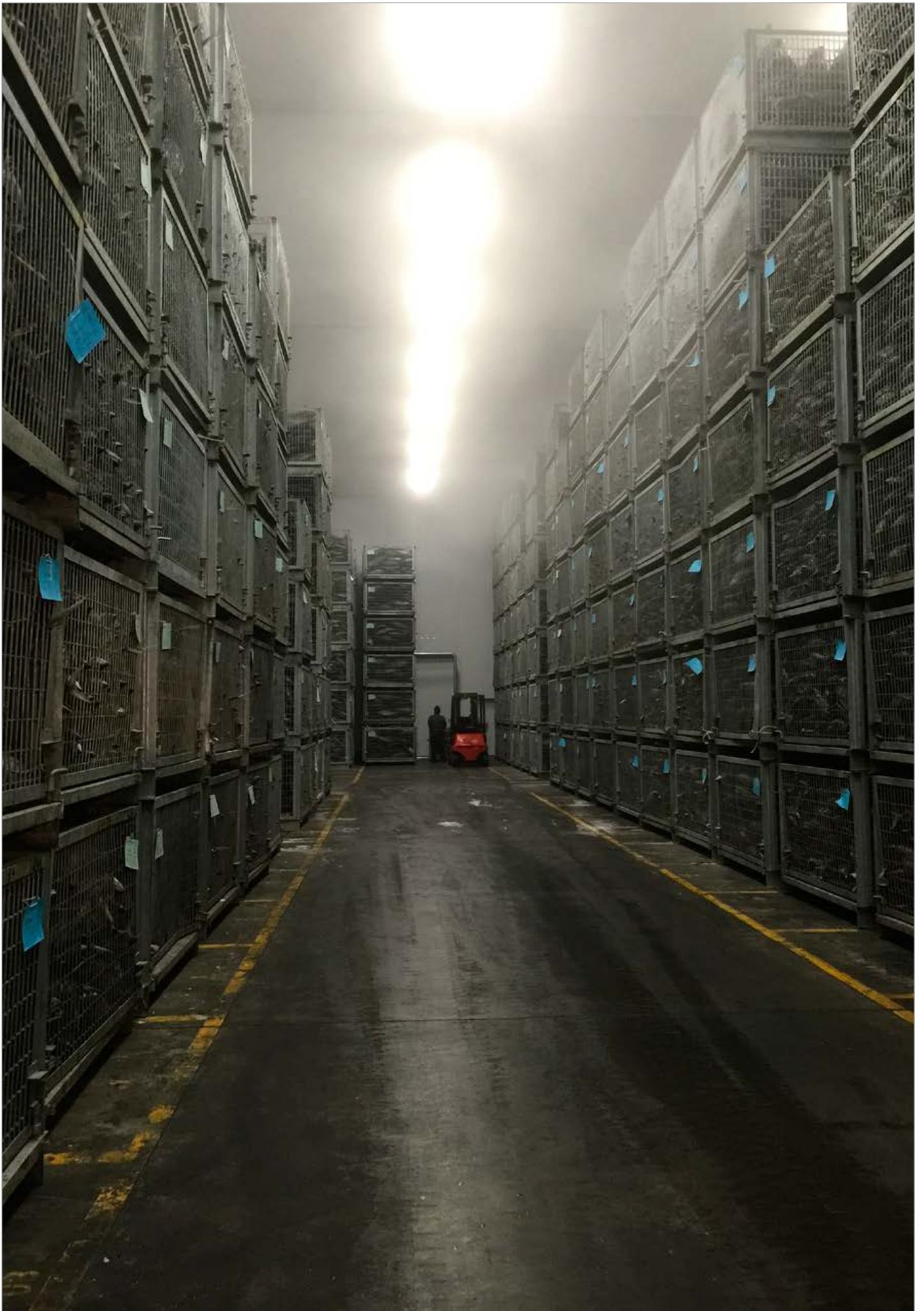


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