REPUBLIC OF THE UNION OF MYANMAR

NATIONAL EXPORT STRATEGY

FISHERIES

SECTOR STRATEGY 2015-2019

Myanmar Ministry of Commerce

International Trade Centre

The National Export Strategy (NES) of Myanmar is an official document of the Government of the Republic of the Union of Myanmar.

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ACRONYMS

ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
CBI	The Centre for the Promotion of Imports from Developing Countries, the Netherlands
DCCA	Department of the Commercial and Consumer Affairs
DIR	Department of Internal Revenue
DoF	Department of Fisheries
DoLF	Directorate of Livestock and Fisheries
DoT	Directorate of Trade
DoTP	Department of Trade Promotion
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FIS	Fish Info & Services
GAqP	Good Aquaculture Practice
GDP	Gross Domestic Product
GMP	Good Manufacturing Practice
HACCP	Hazard Analysis Critical Control Point
HS	Harmonized System
IDE	Institute of Developing Economies
ISO	International Organization for Standardization
ITC	International Trade Centre
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency
LIFT	Livelihoods and Food Security Trust Fund
MFF	Myanmar Fisheries Federation
MFFA	Myanmar Fish Farmers Association
MoC	Ministry of Commerce
MoCoops	Ministry of Cooperatives
MoEnergy	Ministry of Energy
MoFR	Ministry of Finance and Revenue
MoH	Ministry of Health
MoI	Ministry of Industry
MoT	Ministry of Transport
MLFRD	Ministry of Livestock, Fisheries and Rural Development
MPEA	Myanmar Fishery Products Processors & Exporters Association
MSA	Myanmar Shrimp Association
MSC	Marine Stewardship Committee
MSY	Maximum Sustainable Yield
MTDC	Myanmar Trade Development Committee
NACA	Network of Aquaculture Centres in Asia-Pacific
NES	National Export Strategy
PoA	Plan of Action
R&D	Research and Development
SEAFDEC	Southeast Asian Fisheries Development Center
TED	Turtle Exclusion Device
TSI	Trade Support Institution
TT	Telegraphic Transfers
UAE	United Arab Emirates
UMFCCI	Union of Myanmar Federation of Chambers of Commerce and Industry
UN	United Nations

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EXECUTIVE SUMMARY

Myanmar's fisheries sector is an important sector from the perspective of employment generation, contribution to gross domestic product (GDP) and export potential. As an important source of protein in the national diet, and supporting an estimated 3.5 million jobs nationwide, the sector has a significant impact on socioeconomic welfare and domestic food security. Myanmar's generous endowment of water resources and the surplus production resulting from a rich fishery tradition offer the sector attractive opportunities for the expansion of export activity.

CURRENT CONTEXT

The fisheries sector relies upon both aquaculture and capture fishery, although each method of production faces its own challenges. Of total aquaculture ponds, 92,000 hectares are used for shrimp culture and 89,000 hectares for fish culture. Shrimp farming is concentrated in the northwest and central delta regions of the country, and while activity relies largely upon a trap and hold system managed by small-scale farmers, production is supported by a few large commercial firms. The culture of freshwater fish is concentrated in the Ayeyarwady, Yangon, and Bago regions. Producers are comprised of small-scale farmers who supply the local market and larger, vertically-integrated farmers who cater to the export market. Despite advancements in aquaculture since the early 1990s, sectoral expansion is constricted by challenges leading to an inability to develop new sites and a lack of capacities that ultimately hinders the transformation of expansive farms into more productive intensive farms.

The bulk of Myanmar's fisheries sector production, however, is derived from both small-scale inshore and offshore marine fisheries. Despite its important contribution to sector production, marine fishery activity is severely hampered by underdeveloped capacities. Until recently, marine fishers only operated close to shore due to limited investment and a lack of the appropriate vessels, gear and technology. The attractive levels of biodiversity and high catch rates generally achieved near the shore have also contributed to a continuation of the status quo. Although there has been an expansion of deep sea fishing, most fishing activity still occurs near the coast. As a result, high value products such as yellowfin and skipjack tuna are instead captured by foreign vessels.[1] With regards to inland capture fisheries, activity involves the leveraging of both leasable and open fisheries. While leasable fisheries are dominated by larger commercial enterprises, open fishery production involves the informal exploitation of water resources including rivers, streams, lakes and reservoirs.

EXPORT PERFORMANCE

The global market for the sector is comprised of fish products (live fish, whole fresh fish, whole frozen fish, chilled or frozen fish fillets, and cured or smoked fish) and crustaceans. Imports in 2012 were valued at US$67 billion and US$20 billion respectively, both having grown by roughly 4% per annum between 2008 and 2012. While the biggest importers of fish products are Japan (13.6% of total imports), the United States of America (10.8%) and China (5.5%), exports are dominated by Norway (13.3%), China (12%), and the United States (5.5%). The largest markets for crustaceans are the United States (26.2%), Japan (15.3%) and Spain (6.1%), and the most important exporters are Canada (9.9%), India (9.1%) and Thailand (7.8%).

Myanmar's 2012 fishery and crustaceans exports totalled over US$279 million.[2] The main markets for Myanmar's products were Japan (25.9%), China (21.3%), Thailand (16.4%) and Malaysia (13.8%). Frozen fish, whole fish and fish fillets were the most important fish products exported by Myanmar, while live fish and cured or smoked fish accounted for a minor share of total trade. Myanmar's US$156 million of crustacean exports are highly concentrated, as Japan, China and Malaysia account for nearly 80% of total exports.

1. It should be noted that certain literature suggests that Myanmar's vessels are not permitted to engage in deep sea fishing but are instead restricted to shallower waters, while only foreign vessels are granted attractive deep sea fishing rights.

2. National data, which seeks to account for informal exports, indicate that exports could be valued at over US$650 million (see CBI).

Despite the relative success of Myanmar's fisheries sector, export growth for the sector between 2008 and 2012 has been flat. While crustacean exports have grown at an annual rate of 6% in line with the global market, fish exports have declined across all product categories. Of particular concern is the 18% per annum (p.a.) decrease in live fish exports, driven largely by fewer Chinese imports, and the 12% p.a. decrease in fresh whole fish exports, led by fewer Thai imports. Nevertheless, a number of countries have emerged as important and growing destinations for Myanmar's fish and crustacean products. Significant growth in crustacean exports to China have helped offset the decline in fish exports. Macao (China), Hong Kong (China), Australia and the United Kingdom of Great Britain and Northern Ireland have experienced impressive growth as destinations for crustacean products, while Western markets –including Australia and the United Kingdom– have increasingly become important destinations for crustaceans, fish fillets and frozen whole fish. Moreover, exports to Malaysia of nearly all fish products grew at impressive rates.

Accordingly, a number of opportunities exist for Myanmar to both offset and stem declining market share with some of its more traditional partners. Myanmar's strategic position in the heart of emerging Asia, bordering on some of the largest target markets in the sector, makes it well-placed to leverage emerging opportunities through increased quality and processing content.

KEY COMPETITIVENESS ISSUES AFFECTING THE SECTOR'S EXPORT VALUE CHAIN

The following challenges have been identified for the fisheries sector's export value chains.

Supply-side challenges:

- Irregular energy supply;
- Limited capacities to expand production through site development or site transformation;
- Limited access to capital;
- Insufficient supply of post-larvae, fingerlings, and quality feeds;
- Difficulty implementing Good Aquaculture Practices (GAqP);
- Difficulty complying with Good Manufacturing Practices (GMP);
- Inadequate management of Maximum Sustainable Yield (MSY);
- Limited value adding capacities.

Business environment challenges:

- Inadequate policy framework and public–private dialogue;
- Weak implementation and enforcement of fisheries laws;
- Limited existence of direct commercial linkages between producers, processors and exporters;
- High import duties on key inputs.

Market entry challenges:

- Costly and inadequate transport services;
- Difficulties complying with international standards;
- Limited brand development;
- Inadequate access to export finance tools;
- Limited availability of trade information and promotion.

Development-based challenges:

- Inadequate sustainable resource management policy and implementation mechanisms;
- Limited access to key services.

OPTIONS FOR FUTURE DEVELOPMENT

The following vision has been developed to guide the sector and export development efforts of the fisheries sector.

> "An integrated and responsible fisheries sector, producing and exporting quality and value added products for the sustainable socioeconomic development of Myanmar."

To achieve this vision, the strategy will reduce binding constraints on trade competitiveness and capitalize on strategic options identified for the sector. The strategic orientations for the next five years aim at developing key markets in the short and medium terms for Myanmar's exporters and facilitating structural changes in the value chain to increase its efficiency and value generation.

The sector strategy vision will be achieved through the implementation of the Plan of Action (PoA) for the sector. This PoA revolves around the following five strategic objectives, each spelling out specific sets of activities intended to address both challenges and opportunities facing the fisheries sector in Myanmar:

1. Increase the long-term production and productivity of the sector through modernization of infrastructures, adequate financial support, and improved production and processing techniques;
2. Improve the safety and quality of the sector's products through improved quality management capacities, as well as the implementation of a quality management system across the value chain;
3. Enhance the organization of the sector through increased dialogue and partnerships as well as the implementation of effective policies for the management of fisheries resources for sustainable growth;
4. Improve the development and innovation capacity of the sector through effective scientific research and data collection and investment in research and development (R&D);
5. Build the performance and branding of fishery products in order to compete successfully in international markets.

ROADMAP FOR SECTOR EXPORT DEVELOPMENT

The market opportunities identified in this strategy reflect areas in which Myanmar exporters can build the strengths and capacities needed to achieve broader market development of the sector. Exposure to world markets will play a critical role in ensuring greater efficiency, competitiveness and innovation among domestic enterprises. Targeted improvements to the fisheries sector will thus play a key role in facilitating improvements to overall sector capacity, triggering a cascade of improvements throughout the country's agri-food sector and the broader economy.

To achieve efficiency gains in the fisheries sector, key structural changes to the value chain will include the following:

- Add value through the introduction of organic aquaculture;
- Rectify gaps in rural energy provision by introducing solar power;
- Strengthen linkages with the tourism sector;
- Strengthen linkages with the pulses, beans and oilseeds sector;
- Implement waste reuse processes;
- Protect ecosystems and trade with risk-based import systems.

IMPLEMENTATION MANAGEMENT

The achievement of these ambitious targets will require continuous and coordinated efforts from all relevant private and public stakeholders as well as support from key financial and technical partners, donors and investors. Several institutions are designated to play a leading role in the implementation of the sector PoA and bear the overall responsibility for successful execution of the strategy.

They will be assisted by a range of support institutions which are active in the fisheries sector. Each institution mandated to support the export development of the sector is clearly identified in the strategy PoA. Moreover, the Myanmar Trade Development Committee was established in order to facilitate the public-private partnership in elaborating, coordinating and implementing the NES. In particular, the MTDC is tasked with coordinating the implementation of activities in order to optimize the allocation of both resources and efforts across the wide spectrum of stakeholders. Within this framework, implementation of the fisheries strategy also falls within the purview of the MTDC, in close collaboration with the Myanmar Fisheries Federation.

INTRODUCTION

HISTORICAL OVERVIEW

Boasting nearly 3,000 kilometres of coastline and abundant freshwater resources, Myanmar's geography has played a key role in shaping national culture throughout history.[3] Fish and crustaceans from these waters comprise an integral part of the traditional cuisine and represent an important source of protein in a diet that revolves around rice.[4]

While the sector has long relied on traditional fishing methods, Myanmar's first attempts at modern aquaculture took place in the 1950s. Although initially focused on freshwater fisheries, efforts were expanded in the mid-1970s with the introduction of shrimp farming along the Naaf River near the Bangladesh border.[5] These shrimp farms practised trap and hold farming in roughly 10,000 acres of inter-tidal zones, producing around 100 kg per hectare per year. Attempts were made to upgrade capacities in 1984-1985 with the help of the Asian Development Bank (ADB). Although the project did train technicians abroad and establish new hatcheries and farms, there was little further development until the introduction of various government policies in the late 1980s and 1990s.

The government took steps to modernize the regulatory framework by introducing laws on aquaculture (1989), marine (1990) and freshwater (1991) fisheries, while at the same time encouraging sector development through the release of fish seed to natural and man-made water bodies countrywide. The private sector reacted to government support by gradually investing in intensive and semi-intensive farming practices and the donor community also became engaged. In the late 1990s the Food and Agriculture Organization of the United Nations (FAO), with the help of international and regional fishery organizations, implemented its Support to the Special Plan for Shrimp and Prawn Farming Technical Cooperation Project that helped facilitate the development of small-scale hatcheries, while the United Nations (UN) founded a number of small-scale farms, especially in the Ayeyarwady Delta.

The encouragement of aquaculture development was successful, as evidenced by the increase in culture production from 3,000 tons in 1981-1982 to over 85,000 tons in 1998-1999.[6] In light of such positive results, support for the sector has increased and the government implemented a three-year plan to develop shrimp and fish culture between 1999 and 2003, which included the release of 188,720,000 fry and fingerlings into the country's water resources.

The last decade has witnessed sustained sector growth resulting in 4.1 million tons of production in 2011 and an estimated 4.5 million tons in 2012.[7] Although the majority of production still relies on traditional fish capture, aquaculture has played an increasingly important role.

3. Republic of the Union of Myanmar Ministry of Hotels and Tourism (2013). *Myanmar: Tourism Master Plan 2013–2020, Final Draft Report,* p. 3.

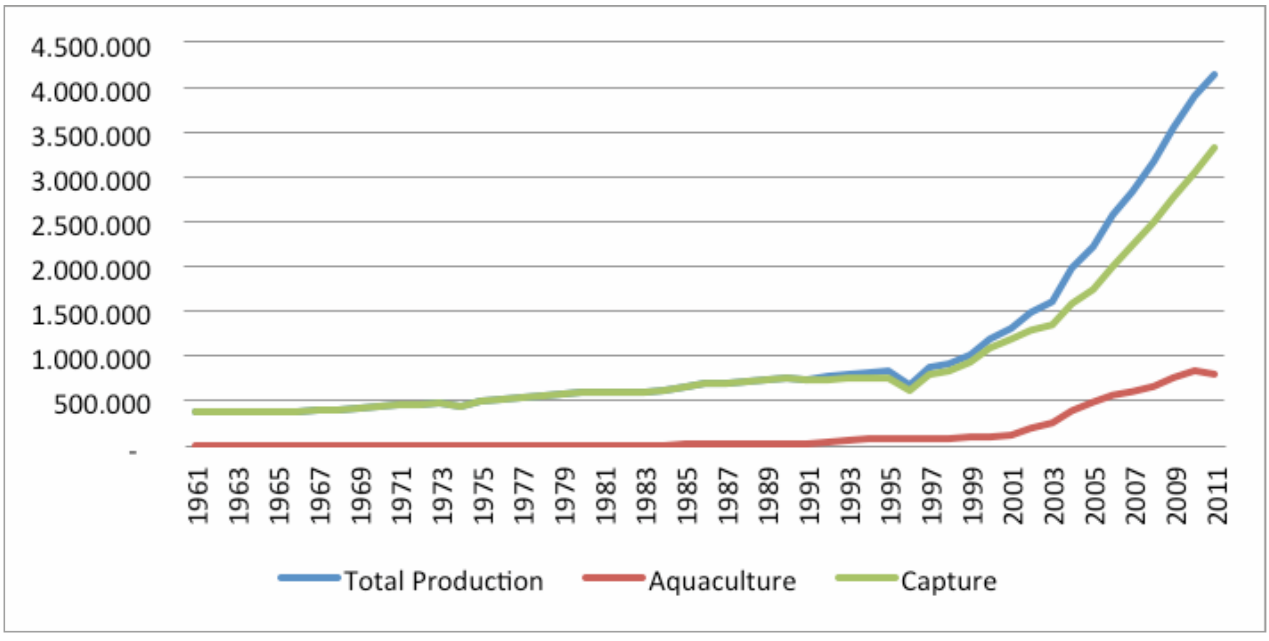
4. Moo, W. (2002). Inland Fisheries of the Union of Myanmar. In *Cold Water Fisheries in the Trans-Himalayan Countries*, T. Petr & S.B. Swar, eds., FAO Fisheries Technical Paper 431, Rome: FAO.

5. FAO (2003). *Myanmar – Mission Report on Coastal Aquaculture.*

6. Moo, W. (2002). Inland Fisheries of the Union of Myanmar. In *Cold Water Fisheries in the Trans-Himalayan Countries*, T. Petr & S.B. Swar, eds., FAO Fisheries Technical Paper 431, Rome: FAO.

7. Republic of the Union of Myanmar Ministry of Livestock and Fisheries, Department of Fisheries (2012). *Fishery Statistics* 2012. Nay Pyi Taw.

Figure 1: *Total sector production (tons) 1961–2011*



Source: FAO Fisheries and Aquaculture Information and Statistics Service.

WHERE WE ARE NOW

CURRENT CONTEXT

Myanmar's population currently leverages its diverse endowment of both marine and freshwater resources for the capture and farming of fish and crustaceans. Marine resources include both vast coastal waters and large areas of coastal mangrove swamps. Its inland water system is comprised of the Ayeyarwady, Sittaung, and Thanlwin rivers, which run for roughly 2,000 km, as well as 2,600 km of tributaries and minor water systems.[8] Although inland fishery production relies mainly on Myanmar's 6 million hectares of floodplains, the river system is complemented by numerous lakes and 260 reservoirs.

AQUACULTURE

A total of 181,000 hectares are used for breeding, rearing and harvesting fish and crustaceans in Myanmar. Of total aquaculture ponds, 92,000 hectares are used for shrimp culture and 89,000 hectares for fish culture.[9]

Shrimp farming is concentrated in the north-west and central delta regions of the country and the majority of shrimp ponds are found in Rakhine (75%) and Ayeyarwady (20%), while a small number are located in Yangon (5%).[10] Activity in the Rakhine region relies largely upon a traditional trap and hold system that is managed by small-scale farmers, although activity is supported by a few large commercial firms. Farmers cultivate animals that have been trapped after flooding through extensive and improved extensive farming systems, and growers will often supplement their production by introducing post-larvae black tiger prawns. Although the main product in this region is the black tiger prawn, other species, including mud crab and sea bass, are often harvested as secondary products.

8. Moo, W. (2002). Inland Fisheries of the Union of Myanmar. In *Cold Water Fisheries in the Trans-Himalayan Countries*, T. Petr & S.B. Swar, eds., FAO Fisheries Technical Paper 431, Rome: FAO.

9. CBI (2012). *Myanmar Seafood Exports: Quick Scan of the EU Market Potential,* p. 9.

10. *Ibid*., p. 9.

Box 1: Aquaculture systems

Different types of aquaculture production vary by the level of intervention in the natural growing process. While generally defined as either extensive or intensive, most production occurs on a continuum between these two extremes. Extensive production is the most basic form. It is performed in enclosed areas of ocean, natural and man-made lakes, and other bodies of water, and it relies mainly upon natural food sources, post-larvae and environmental conditions.

Intensive production, meanwhile, leverages technology in order to increase fish density and output. By optimizing growth through the management of variables such as water quality, feed, temperature and density, this type of farming is able to increase yields, control disease and reduce mortality. Due to its relative complexity, intensive aquaculture requires significant investment, technology and labour resources.

Source: Kenyon College Department of Biology (n.d.). Aquaculture. Available from http://biology.kenyon.edu/stures/Compsnelson/Aquaculturepage.htm. Australia, Department of Agriculture (2014). Aquaculture. Available from http://www.daff.gov.au/fisheries/aquaculture.

Collection is facilitated by local traders, who purchase and consolidate shrimp from small farmers.[11] The larger traders in Rakhine, who prefer to acquire headless prawns, will purchase products from both these local traders as well as larger-scale farms. The prawns are then chilled and transported. While the smaller prawns (16 to 50 headless shrimp per 450 grams) are generally destined for Bangladesh, where prices are more competitive than those offered by local processors, larger ones (2 to 15 headless shrimp per 450 grams) are exported through Yangon.

Shrimp farms in the Ayeyarwady and Yangon regions, which cover roughly 28,000 hectares, are mainly focused on cultivating giant freshwater prawns, alongside a more limited production of Pacific white shrimp.[12] Although the government had helped stimulate the development of intensive and semi-intensive Pacific white shrimp culture, production fell dramatically due to white spot disease, high fuel prices and low market prices.[13] As a result, only a small portion of farms that cater to the local market continue to practice intensive and semi-intensive production of Pacific white shrimp. The local market to which these shrimp farmers cater is a relatively small six tons per day. Giant freshwater prawns, meanwhile, rely on a polyculture system. In such a system the culture of prawns is performed in combination with the culture of other freshwater fish such as carp. The prawns are sold to local traders before being acquired by exporters in Yangon who process the goods for export, mainly to Japan. It is important to note however, that local demand for this species, which is considered by many to be a luxury, is increasing.

Another important species for crustacean aquaculture is the mud crab, which is cultured and collected mainly in the mangroves and tidal flats of the Ayeyarwady Delta, Rakhine and south Myanmar.[14] Mud crab farming is considered to be environmentally friendly as it relies upon traditional and low-cost materials and does not necessitate the destruction of mangroves.[15] Crabs are grown in bamboo pens or cages in the rivers and canals; fed with cut fish parts, Acetes and agricultural by-products; and are mainly exported to Singapore and China.[16] The trading networks, especially those that facilitate land transport to China, are relatively well-organized as the crabs must be alive when they arrive at their destination.[17] Nevertheless, deficiencies in quality management and trade facilitation diminish the ability of this network to operate efficiently.

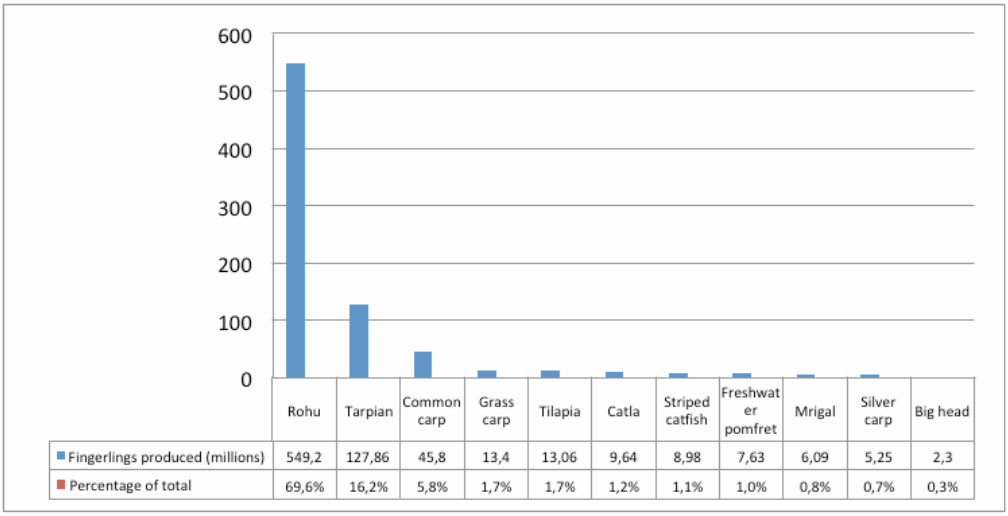
The culture of crab, shrimp and prawns is supplemented by the growing of a variety of marine fish. These fish are farmed in marine and brackish waters near the Ayeyarwady Delta, Rakhine and south Myanmar.[18] The most important fish are the grouper and sea bass. Groupers are generally exported, either chilled, frozen or live, to Hong Kong (China). Sea bass, which are also cultivated in ponds and cages, are mainly destined for the local market. Nevertheless, a small portion of sea bass product is exported to Australia. It should be noted that efforts have been made to collect/produce other marine species such as oysters, cockles and lobsters, but success has been limited due to a lack of capital, research and expertise.

The culture of freshwater fish is concentrated in the Ayeyarwady (50%), Yangon (28%) and Bago (11%) regions of Myanmar.[19] Producers are comprised of small-scale farmers who supply the local market and larger, vertically-integrated farmers who cater to the export market. The large farms generally have their own hatcheries, farms and processing units, and they may even produce their own feed. A variety of species are cultured, including rohu, catla, common carp, grass carp, mrigal carp, silver carp, tilapia, striped catfish, and Philippine catfish.[20] The Department of Fisheries (DoF) meanwhile successfully introduced a number of new species such as *piratus branchatus, notopterus chitala*, and *osphronnemus gouramy*. Export-oriented production is geared towards supplying the intraregional South-East Asian market with indigenous species such as Indian carp, catla, mrigal, pangasius, and tilapia.

The government supports the freshwater fisheries sector through its hatchery programmes, having released over 789 million fingerlings in 2013. Nevertheless, the hatchery programme is unable to meet sector needs. Of particular concern is the low uptake of modern production and harvesting techniques, which has resulted in lower quality exports. Moreover, increased supply of fish seeds and variety is limited by a lack of awareness of international demand and the absence of R&D for the purposes of adopting new production techniques and species.

11. *Ibid*., p. 10.
12. *Ibid*., p. 11.
13. *Ibid*.
14. *Ibid*., pp. 13–14.
15. FAO (2003). *Myanmar – Mission Report on Coastal Aquaculture.*
16. CBI (2012). *Myanmar Seafood Exports: Quick Scan of the EU Market Potential,* p. 14.
17. *Ibid*., p. 14.
18. *Ibid*., pp. 13–14.
19. CBI (2012). *Myanmar Seafood Exports: Quick Scan of the EU Market Potential,* p. 9.
20. *Ibid*., p. 14.

Figure 2: *Government hatchery production by species (2013)*



	Rohu	Tarpian	Common carp	Grass carp	Tilapia	Catla	Striped catfish	Freshwater pomfret	Mrigal	Silver carp	Big head
Fingerlings produced (millions)	549,2	127,86	45,8	13,4	13,06	9,64	8,98	7,63	6,09	5,25	2,3
Percentage of total	69,6%	16,2%	5,8%	1,7%	1,7%	1,2%	1,1%	1,0%	0,8%	0,7%	0,3%

Source: DoF statistics.

CAPTURE FISHERIES

The bulk of Myanmar's fisheries sector production is derived from both small-scale inshore and offshore marine fisheries, which capture a number of species including white pomfret, ribbonfish, pink shrimp, sea eel, hilsa and croaker.[21] According to the DoF, there were 28,350 registered small-scale fisheries boats in 2011 and only 47% of these boats were motorized. In addition, there were 2,450 registered offshore boats, of which 16% were registered to foreigners. The most common catching method employed by these offshore vessels is trawling (41%), followed by driftnet (32%) and purse seine (7%). While other countries have expanded their capacities through the introduction of long-line technology that enables them to catch yellowfin tuna, Myanmar's fleets have yet to pursue similar enhancements. As a result, the sector is unable to capitalize upon this valuable species.

21. CBI (2012). *Myanmar Seafood Exports: Quick Scan of the EU Market Potential,* p. 15.

Box 2: Shrimp capture

Due to the difficulties encountered by shrimp culture farmers including disease, high costs and low prices, the majority of shrimp production comes from marine fishing. Shrimp fishers in Myanmar rely mainly upon the three-layered gill net/cage, although some do operate trawlers. This method generally requires the participation of three crews who split the catch between themselves and the boat owners, who themselves are often crew members.

Nevertheless, the catch rate for these fishermen has been decreasing. The Japan External Trade Organization (JETRO) notes that this decrease can range from 30% to 80% over a five year period, depending on the shrimp subspecies. The resulting depleted income has decreased incentives for fish capture and resulted in a shift to more attractive types of fishing.

Unfortunately, no comprehensive resource survey has been done since the 1980s, and no systematic data related to catch according to fish species is available. Thus, it is difficult to know exactly how much shrimp resources remain in the sea. However, even with limited information from fishermen, the declining status of resources seems quite obvious. This is a typical example of 'Tragedy of Commons' (Hardin 1968).1

This confirms the need to complete an MSY to enable increased control and monitoring of fish stocks.

Source: Okamoto, I. (2008). The Shrimp Export Boom and Small-Scale Fishermen in Myanmar. IDE Discussion Paper No. 135. Japan: Institute of Developing Economies (IDE).

Despite its important contribution to sector production, marine fishery activity is severely hampered by underdeveloped capacities. Until recently, marine fishers only operated close to shore due to limited investment and a lack of the appropriate vessels, gear and technology. Although there has been an expansion of deep sea fishing, most fishing activity still occurs near the coast. The attractive levels of biodiversity and high catch rates generally achieved near the shore have also contributed to the continuation of the status quo. As a result, high value products such as yellowfin and skipjack tuna are instead captured by foreign vessels. Moreover, although foreign vessels are technically banned from coming closer to shore, there is little in the way of coast guard enforcement. Local fishers complain that these boats illegally capture fish from inshore locations that are technically within the purview of domestic fisheries. [22]

22. It should be noted that certain literature suggest that Myanmar's vessels are not permitted to engage in deep sea fishing, but are instead restricted to shallower waters, while only foreign vessels are granted attractive deep sea fishing rights. According to MFF, Such fishing rights to foreign fishing vessels will stop since local fishermen are starting to send their renovated fleet equipped with modern fishing gear to those fishing grounds once occupied by foreign fishing fleets, legally or illegally.

Box 3: Environmental impact

A key concern in the continued growth of the sector is guaranteeing environmentally friendly development that facilitates both sustainability and harm reduction. While the government of Myanmar recognizes the need to ensure sustainable resource management and has implemented a number of policies to this end, its capacities to do so are underdeveloped.2 While all of Myanmar's environmental resources are deserving of protection, two key ecological areas are of special significance: the mangroves and coral reefs.

Myanmar's 29 species of mangroves fulfil a variety of key functions, not least of which is their role as a habitat for over 29 species of fish, 13 species of shrimp, four species of crab and nine species of other shellfish.3 As a good source of food and protection, mangroves are especially important during breeding and the early life of aquatic animals. This importance is evidenced by the high concentration of juveniles found in mangroves in contrast to adjacent areas. Disturbances lead to wildlife outflows and result in decreased density and biodiversity. Due to their ability to absorb nutrients, nitrogen and phosphorus from land runoff, mangroves also function as pollutant sinks. Moreover, complex root systems allow mangroves to protect water resources by trapping sediment from land runoff, as well as protecting the coast from wave erosion. Increased shrimp farming in mangroves has resulted from the inability of farmers to convert agricultural lands to aquaculture lands. While these farms tend to be located in secondary mangroves, there is little in the way of environmental impact analysis prior to their establishment.

Although Myanmar's coral reefs are generally considered to be more secure than those of its neighbours, the World Resources Institute's Reefs at Risk analysis concluded that over 56% of its 1,686 km2 of reefs are at either medium or high risk from overfishing, destructive fishing or other anthropogenic factors.4 Of particular relevance is the increased prevalence of grouper seed collection and live fish capture from reef areas. While some management initiatives have been taken to ensure the health of the reefs – for example, the establishment of three marine protected areas – both specific responsibilities for such management as well as their plans are unclear.

Both of these issues require more research and better national management. Comprehensive studies must be conducted on the ecological function of secondary mangroves and on sustainable farming practices in such environments. The relationship between coral reefs and coastal communities must also be investigated further in order to ensure the minimization of potential harm. Capacities in the government must then be strengthened so that they are able to implement modern policies for environmental protection and resource management effectively.

Table 1: *Divisional and state distribution of ice plants in Myanmar*

Type	Yangon Division	Tanintharyi Division	Rakhine State	Ayeyarwady Division	Mon State	Mandalay Division	Shan State	Total
Private	146	38	53	77	36	7	2	359
Public	4	4	8	0	1	1	1	19
Total	150	42	61	77	37	8	3	378

With regards to inland capture fisheries, activity involves the leveraging of both leasable and open fisheries.[23] Leasable fisheries are dominated by larger commercial enterprises, although there is often room for the participation of sub-lessees and fish sellers. These fisheries are floodplain fishing grounds to which the government grants a yearly or long-term lease through a bidding system. These leases may come with certain requirements, such as an obligation on the part of the lessee to restore the habitat, replenish stock and enhance waterways. The lessee stocks fish seeds after flooding and is able to cultivate and capture all fish in his given area. Open fisheries, meanwhile, include all traditionally and legally exploited bodies of open water including rivers, streams, lakes and reservoirs, where fees are charged according to fishing method and gear. Although the government technically requires that all fishing activity be approved, it recognizes the practical and ethical hurdles to monitoring sustenance fishing, which accounts for a large portion of open fishery activity. This difficulty in registering sustenance fishing also makes it difficult to monitor fish capture effectively.

POST-HARVEST

Both marine and inland water capture fisheries rely on a government-organized fish landing network.[24] Jetties and landing sites are located throughout Myanmar near important fishing sites. DoF assigns each fishing boat a registration number and a landing site at which it can sell its catch through an auction system. It should be noted that many rural landing sites are far from markets and processing facilities and lack electricity, sanitation facilities and ice production capacities, leading to product safety and quality risks.

Although wholesale fish markets exist across the country, the main markets are found in Yangon. These include the Sanpya, Pazundaung, Naungdan and Annawa fish markets. The fisheries sector is supported by 125 cold storage facilities and 378 ice plants. The majority of ice plants are privately owned and located in the Yangon and Ayeyarwady regions.

23. CBI (2012). *Myanmar Seafood Exports: Quick Scan of the EU Market Potential,* p. 15.

24. *Ibid.,* p. 16.

Roughly 80% of Myanmar's fish production is destined for direct consumption. While it is mostly consumed either fresh or after being chilled, some production is frozen or cured. The remainder is processed into fish meal or processed fish products. Fish processing plants in Yangon produce a variety of products including shrimp block, headless and non-headless shrimp, chilled fish, fish fillets, fish paste and fish sauce.

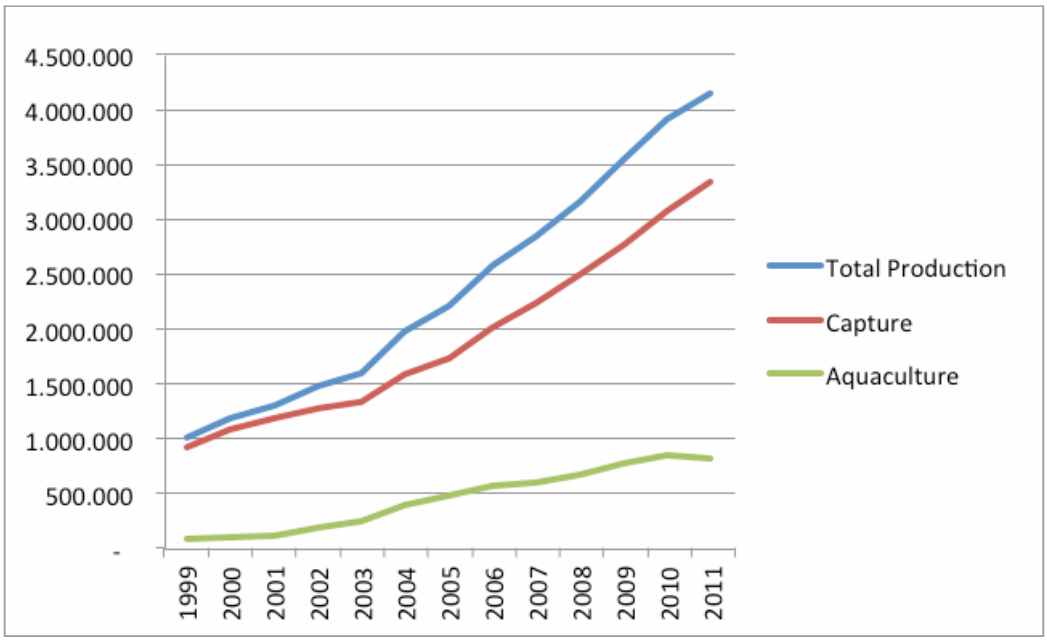
PRODUCTION

The sector produced 4,150,000 tons of fish and crustaceans in 2011 and an estimated 4.5 million tons in 2012.[25] In total, capture fisheries account for roughly 80% of production, while aquaculture accounts for the remaining 20%. Not only is production higher than that of its neighbours (for example Thailand's 4.2 million tons in 2012), but the per capita fish supply of 51 kg is significantly greater than the 18.8 kg world average.

The most important production activity is marine capture, whose 2,170,000 tons of fish accounted for 65% of total captures and 51% of total sector production. Nearly 98% (2,120,000 tons) of marine captures were fish, while the remaining 2% (43,000 tons) were crustaceans. The remaining 35% of total captures, and 28% of total sector production, is comprised of 1,160,000 tons of inland captures.

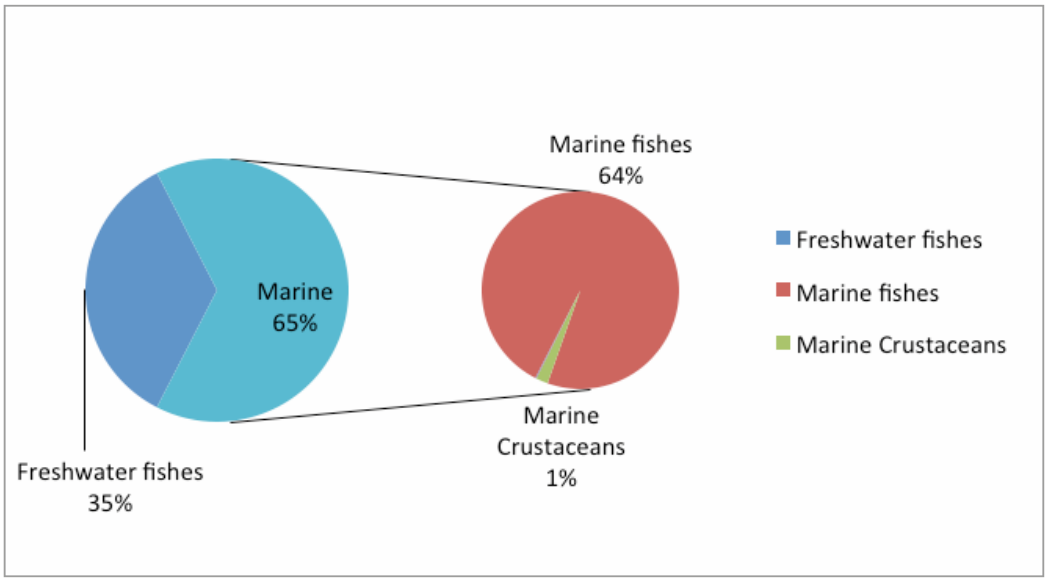
25. *Ibid*., p. 9.

Figure 3: *Total fishery production in Myanmar, 1999-2011 (tons)*



Source: FAO Fisheries and Aquaculture Information and Statistics Service.

Figure 4: *Capture fisheries 2011*



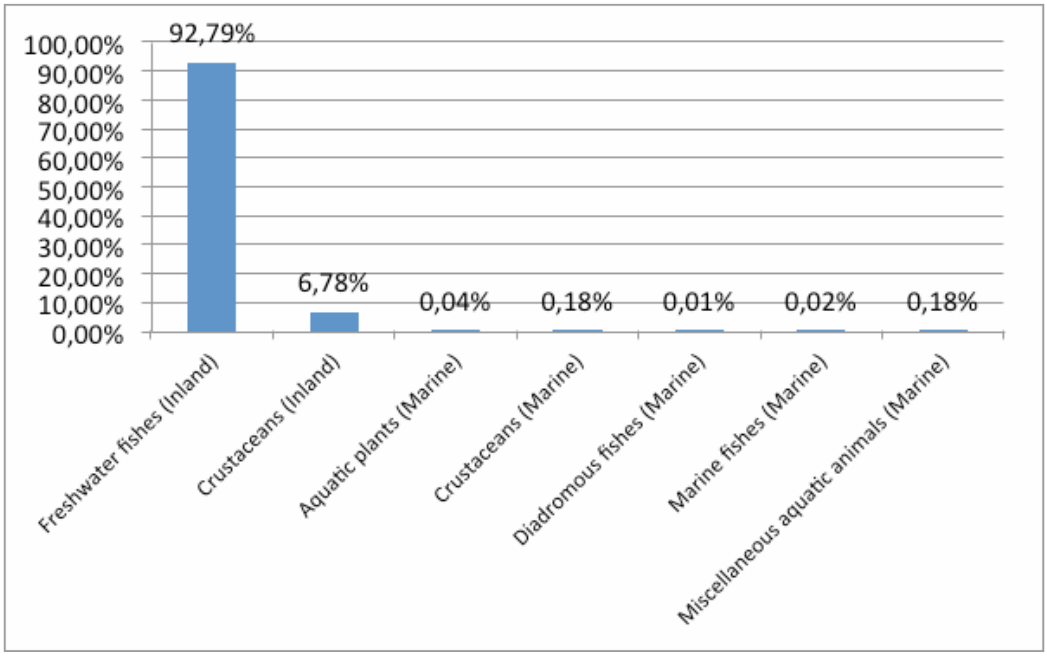
Source: FAO Fisheries and Aquaculture Information and Statistics Service.

As illustrated in figure 5, aquaculture is dominated 99% by inland activity. Inland farms, which account for 19.6% of total sector activity, produced 758,000 tons of freshwater fish (92.7% of aquaculture production) and 55,400 tons of crustaceans (6.7% of aquaculture production).

Freshwater farms are supported by marine aquaculture, whose contribution to the sector is a negligible 3,450 tons. The majority of this activity is focused on crustaceans (1,500 tons) and marine fishes (1,438 tons).

Across both capture and aquaculture, and with regards to both marine and inland water resources, crustaceans accounted for 2.41% of total output, or nearly 100,000 tons. The contribution of each species and method to total sector production is summarized in box 4.

Figure 5: *Myanmar aquaculture production by activity (2011)*



Source: FAO Fisheries and Aquaculture Information and Statistics Service.

Box 4: Contribution to total production by species and method

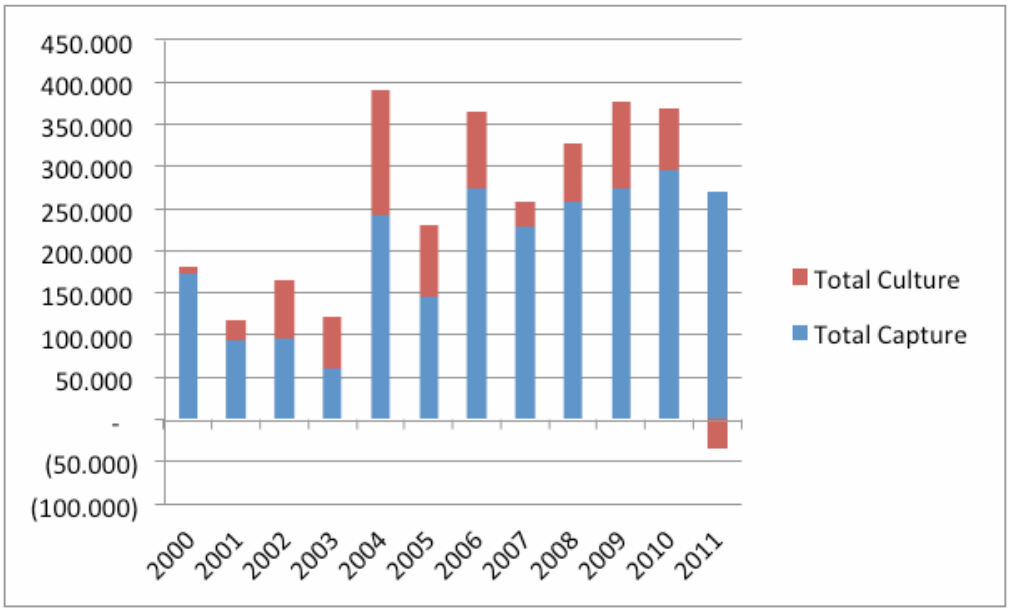
Species	Total (%)
Marine fishes (capture marine)	51.16
Freshwater fishes (capture inland)	28.03
Freshwater fishes (aquaculture inland)	18.27
Crustaceans (aquaculture inland)	1.34
Crustaceans (capture marine)	1.04
Miscellaneous aquatic animals (capture marine)	0.08
Crustaceans (aquaculture marine)	0.04
Miscellaneous aquatic animals (aquaculture marine)	0.03
Aquatic plants (aquaculture marine)	0.01
Marine fishes (aquaculture marine)	0.00
Diadromous fishes (aquaculture marine)	0.00

Source: FAO Fisheries and Aquaculture Information and Statistics Service.

The development of the sector has been impressive, and growth rates exceeding 10% have been realized in 10 of the last 12 years. In 2011 the sector grew by 6%, or 236,923 tons. This is the result of a 9% (269,769 tons) growth in capture and a 4% (-33,846 tons) contraction in aquaculture.

Key drivers of the growth in 2011 were the capture of freshwater and marine fishes (16% and 5% relative growth in 2011 with respect to 2010), which contributed to 68% and 45% of total growth in 2011 respectively. Important relative growth was also achieved by marine crustacean culture, although it had little impact on the overall sector. It is important to note the negative trend in aquaculture, which contracted by 4% in 2011 as a result of decreased output of freshwater fishes and miscellaneous marine animals. As a result, aquaculture contributed -14.3% to the growth of the overall sector.

Figure 6: *Contribution to sector growth by method, 2000-2011 (tons)*



Source: FAO Fisheries and Aquaculture Information and Statistics Service.

Table 2: *Growth by production method (2011)*

			Growth (tons)	Growth (%)	Contribution to sector growth (%)
Capture fisheries	**Inland**	Freshwater fishes	160 729	16.0%	68.1%
		Total inland capture	160 729	16.0%	68.1%
	Marine	Marine fishes	106 720	5.3%	45.2%
		Crustaceans	2 000	4.9%	0.8%
		Miscellaneous aquatic animals	320	10.1%	0.1%
		Total marine capture	109 040	5.3%	46.2%
		Total capture production	269 769	8.8%	114.3%
Aquaculture	**Inland**	Crustaceans	6 454	13.2%	2.7%
		Freshwater fishes	(14 415)	-1.9%	-6.1%
		Total inland aquaculture	(7 961)	-1.0%	-3.4%

			Growth (tons)	Growth (%)	Contribution to sector growth (%)
	Marine	Aquatic plants	30	11.6%	0.0%
		Crustaceans	-	0.0%	0.0%
		Diadromous fishes	-	0.0%	0.0%
		Marine fishes	(5)	-3.4%	0.0%
		Miscellaneous aquatic animals	(25 911)	-94.7%	-11.0%
		Total marine aquaculture	(25 886)	-88.2%	-11.0%
		Total aquaculture production	(33 847)	-4.0%	-14.3%
Total production			235 922	6.0%	100.0%

Source: FAO Fisheries and Aquaculture Information and Statistics Service.

PRODUCT MAP

Myanmar currently produces a wide array of fish and crustacean products. Enterprises sell fresh fish, both frozen and unfrozen. Frozen fish may be sold whole or filleted, while unfrozen fish can be processed into surimi paste. Other products include canned fish as well as ready-to-cook fish that may be breaded. Lastly, enterprises prepare and sell cured fish. These products include dried, smoked, salted and pickled fish. The sector is only partially engaged, however, in producing fish oils. Lastly, although enterprises produce fish meal, they do not engage in reuse of waste.

Crustaceans and molluscs are sold live, cooked, chilled and raw. Ready-to-eat products include pickled and dried prawns. A number of frozen foodstuffs are also produced, including pre-cooked, cooked, frozen soft-shell, and ready-to-cook breaded products. Nevertheless, a key gap in Myanmar's offerings is the absence of canned products. Enterprises could capitalize on this deficiency and leverage canned products in order to diversify and grow the sector.

SOCIAL IMPACT

As the main source of animal protein and an important driver of national employment, the fisheries sector plays a key role in guaranteeing the socioeconomic welfare of Myanmar's population. Indeed, most people living near waterways are involved either directly or indirectly with the sector.[26] Whether they are farming the fish or providing support through the collection of post-larvae, collection of crab and grouper fry, or preparation of feed for mud crabs, coastal households are both involved with and reliant upon fisheries for their livelihood and food.[27]

FAO estimated that 1,398,410 fishers were active in inland waters and 1,278,000 were active in marine waters in 2000–2001.[28] Fish and crustacean farmers are estimated to number around 612,000 (175,000 full time, 1998).[29] More recent data indicates that employment today is similar, at between 3 million and 4 million people.[30]

26. FAO (2003). *Myanmar – Mission Report on Aquaculture and Inland Fisheries.*

27. FAO (2003). *Myanmar – Mission Report on Coastal Aquaculture.*

28. FAO (2003). *Myanmar – Mission Report on Aquaculture and Inland Fisheries.*

29. *Ibid.*

30. CBI (2012). *Myanmar Seafood Exports: Quick Scan of the EU Market Potential,* p. 6.

Figure 7: *Product map – fresh fish*

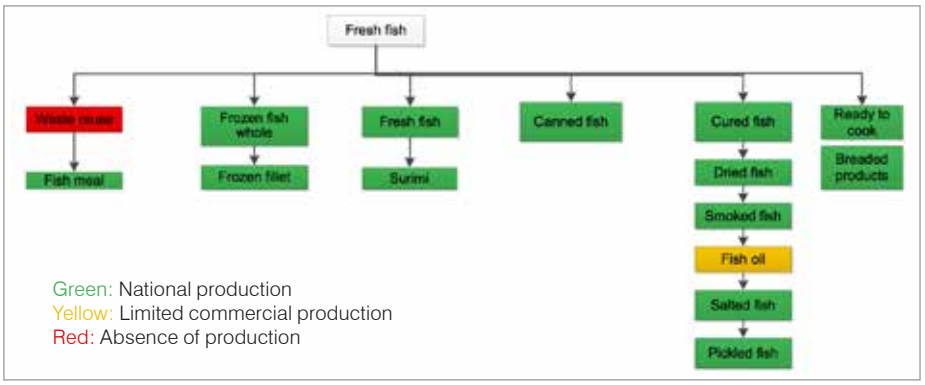


Figure 8: *Product map – fresh crustaceans and molluscs*

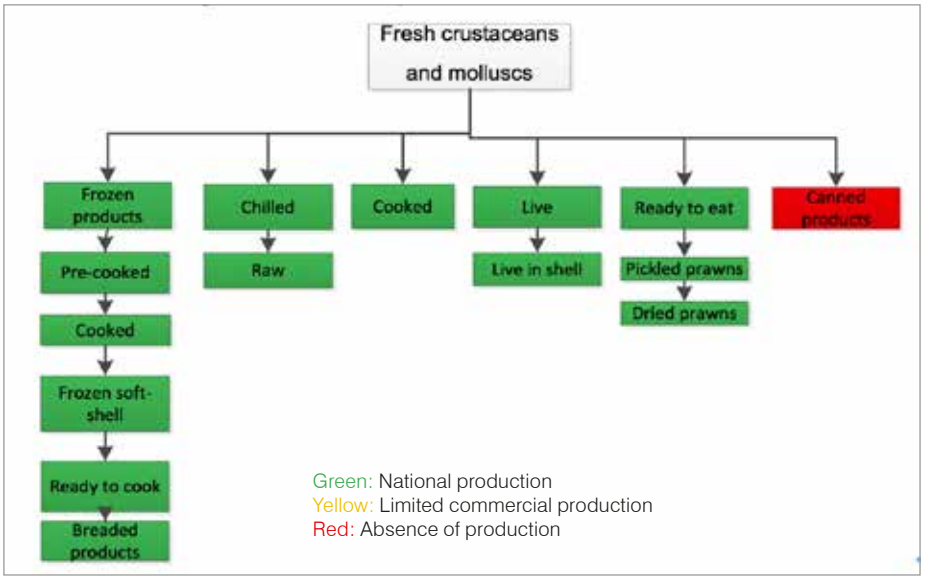
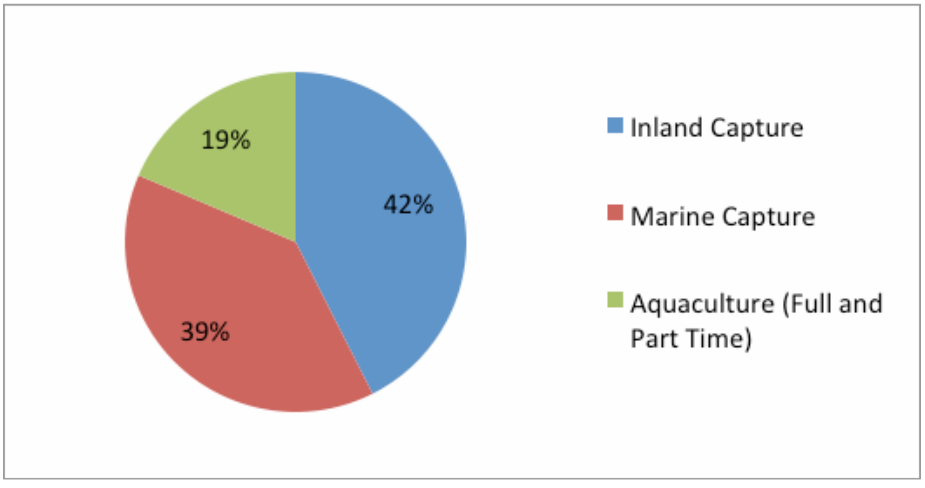


Figure 9: *Sectoral employment by activity*



Source: FAO (2003). Myanmar – Mission Report on Aquaculture and Inland Fisheries.[31]

31. No recent data available.

It should be noted that these figures likely underestimate the sector's impact on employment. As this data is based on licences registered with the government, it does not account for a significant amount of informal and occasional activity, nor does it consider the spillover effects in terms of indirect employment in areas such as transport, marketing, construction and processing.

VALUE CHAIN OPERATIONS

The fisheries value chains involve the participation of a wide range of both national and international agents. Production, collection, processing, marketing and distribution are carried out by an array of stakeholders that range from individual entrepreneurs to large wholesalers and exporters. These stakeholders are aided by both private and public sector support institutions. While the value chain seeks to illustrate the role of each of these participants in producing and bringing sector products to market, it is further detailed in the trade support institution analysis and four gears section of this strategy document.

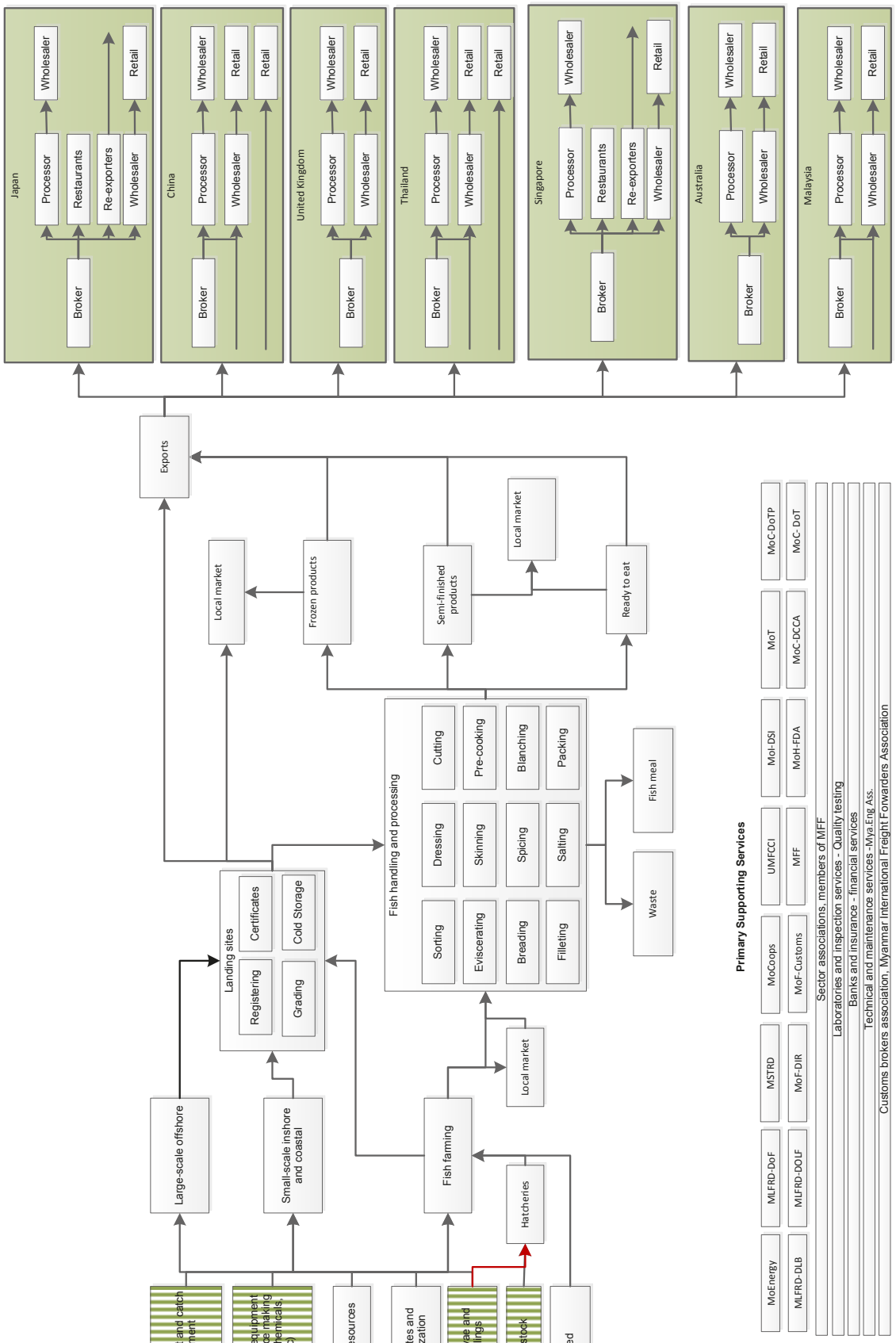
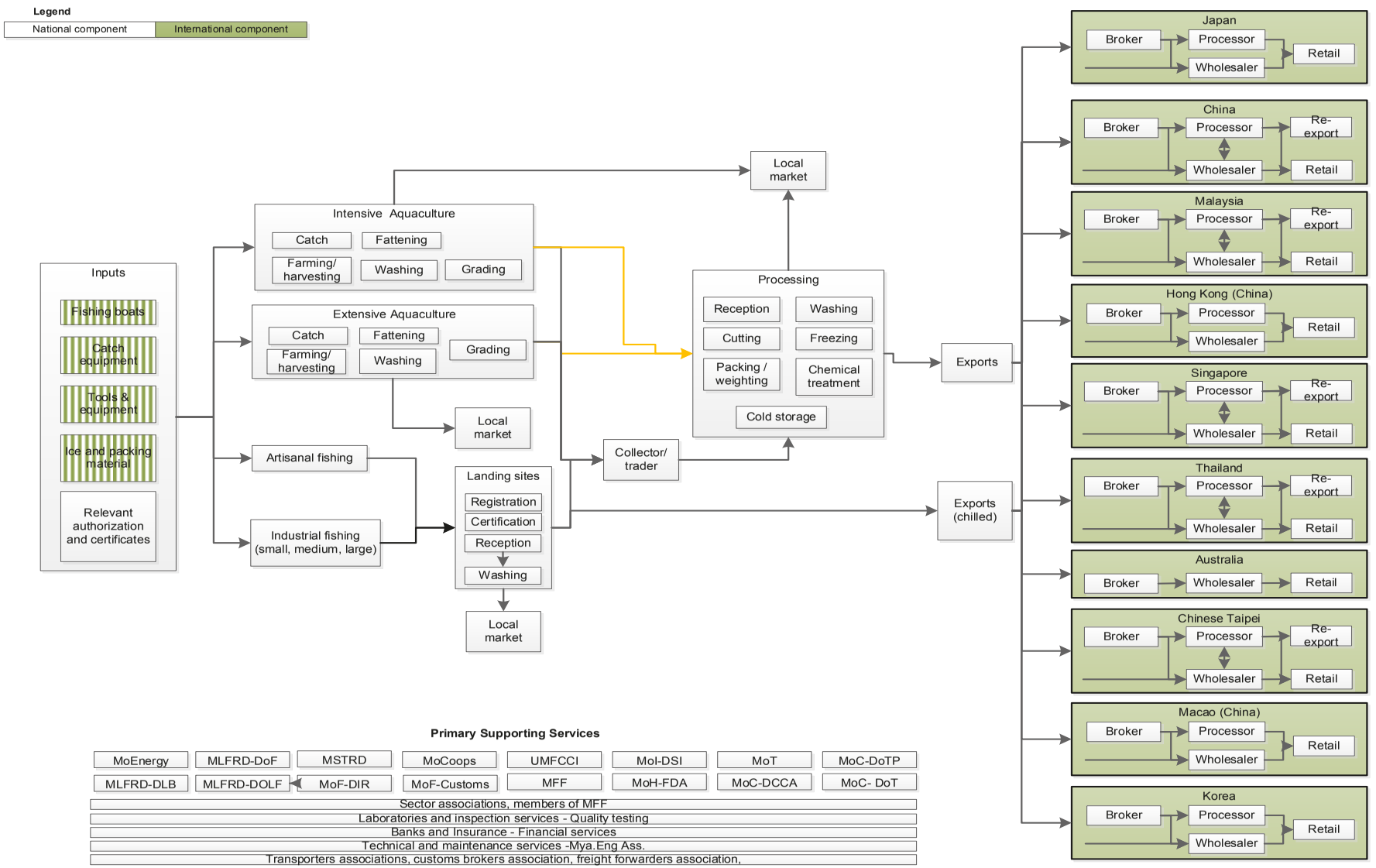


Figure 10: *Current value chain – fish*

Figure 11: *Current value chain - crustaceans*



FISH

The value chain for fish relies on four methods of production: fish farming, inland capture fisheries, small-scale inshore and costal fishing, and large-scale coastal fishing. Fish farmers make use of brood stock and post-larvae/fingerling inputs, which are used in hatcheries. Feed inputs are then used during the farming process. Once collected, fish are sold whole or in cut pieces at local markets for local consumption, or else introduced into the handling and processing stage of the value chain.

The range of inputs required for inshore, inland and costal fishing operations includes human resources; certificates and authorizations; fishing fleets and catching equipment; and other tools such as nets, ice, ice making machines and chemicals. They also rely upon fingerlings and post-larvae as the basis for fishing stock. Small-scale inshore and coastal fishing, inland fishing and large-scale costal fishing operations use these inputs to capture fish, which are then brought to landing sites to be graded, registered, certified and subjected to cold storage. The fish are then sold through auctions directly to exporters, to the local market, or to fish handling and processing enterprises through their agents.

Once fish from all production methods have entered the fish handling and processing stage, they are subject to an array of processing operations. Processing may include sorting, eviscerating, skinning, cutting, dressing, pre-cooking, breading, spicing, blanching, filleting, salting and packaging. By-products of this processing include both waste and fish meal. The resulting frozen, semi-finished and ready-to-eat products are then sold either to the local market or for export.

CRUSTACEANS

The chief product of the crustaceans sector is the headless prawn. Peak export season occurs during the rainy period from May to August, while the dry season is characterized by lower volumes and higher prices.

The crustacean value chain relies upon a variety of inputs that includes fishing boats, fishing gear, tools and equipment, ice and storage material, and any relevant authorizations and certifications. Production follows one of four methods: intensive farming, extensive farming, artisanal fishing and industrial fishing.

Semi-intensive and extensive shrimp farmers generally follow a trap and hold method. Steps in production include trapping, fattening, farming and harvesting. Producers include small-, medium-, and large-scale landowners as well as private investors. Smallholders operate ponds that range from 5 to 50 acres in size and practice either prawn/shrimp monoculture, polyculture with other fishes or rice-prawn systems. While some ponds may be entirely owned by one individual, others are collective investments for up to four households. Following a harvest, products are washed and graded before being sold either to the local market or to a collector. Village collectors provide cash advances to farmers and are linked to larger traders in urban areas. It should be noted that some farmers will sell their products directly to processing enterprises.

A key role in the value chain is played by post-larvae collectors, depots and agents. Post-larvae depots are generally located in villages along the cost where prawn/shrimp post-larvae are abundant. These depots obtain their stock from wild prawn/shrimp post-larvae collectors, who catch them during the spawning season. In addition, some households act as depots by collecting post-larvae and then selling them to both agents and farmers. Wild prawn/shrimp agents will purchase post-larvae from the depots and sell them at the retail level to farmers.

Artisanal and industrial fishers use their resources to capture crustaceans, which are then brought back to a landing site. Once at the site, their products are registered, certified, received and washed. They are then sold to the local market; chilled, processed and exported; or else sold to local collectors and traders.

The collectors and traders then sell production to processing enterprises. After washing and cutting, the crustaceans may be subjected to appropriate treatment before being frozen, packed and weighed. Once they are ready, the products will be placed in cold storage and sold either to the local market or to exporters. Traders and exporters tend to be small-scale enterprises. While some will ship directly to Yangon or Bangladesh, others will sell their products to larger traders for export. In addition to trading prawns for their own companies, the export licence holders often act as transport service providers, charging a fee for each box shipped.

IMPORTS

Despite the participation of a wide range of domestic enterprises and subsectors, the fisheries value chain would be less robust were it not for the support of imported inputs. Chief among these is the import of post-larvae. Attractive production costs abroad, especially in Bangladesh, have increased the market for imported post-larvae. DoF estimates that around 20 million post-larvae are officially imported annually, but farmers frequently import post-larvae informally. The management of diseases, particularly white spot, is an important challenge facing post-larvae importers. Importers have direct connections with agents and hatcheries in foreign countries and domestic exporters are leveraged for their transportation services.

Other imports include various tools and equipment as well as feed.[32] Although domestically produced feed is available, some large farms import it. Problems exist with imported feed, however, including quality issues resulting from lengthy transport procedures.

GLOBAL PERSPECTIVE

The global market for the sector is comprised of live fish, whole fresh fish, whole frozen fish, chilled or frozen fish fillets, cured or smoked fish, and crustaceans. In total, 2012 imports for all products were valued at US$87 billion (US$67 billion of fish products and US$20 billion of crustaceans), having grown 4% per annum between 2008 and 2012. While the three biggest import markets are the United States (14.4%), Japan (14.0%), and China (5.5%), the export market is dominated by China (10.9%), Norway (10.2%) and the United States (5.3%). Of particular note is the significant rise of China as both an importer (11% growth p.a.) and an exporter (19% growth p.a.).

With regards to fish products excluding crustaceans (HS 0301, 0302, 0303, 0304, 0305), import growth is in line with the aggregate and it was led by significant growth from the three most important markets: Japan (4% growth p.a., 13.6% of total imports), the United States (6% growth p.a., 10.8% share) and China (6% growth p.a., 5.5% share). In addition, it is interesting to note that as markets, both Sweden and Thailand have experienced a strong growth in imports since 2008. Exports meanwhile are led by Norway (13.3%), China (12%) and the United States (5.5%). Among top exporters, impressive growth has been experienced by China (16% p.a.), Sweden (12% p.a.) and the Russian Federation (50% p.a.).

32. FAO (2003). *Myanmar – Mission Report on Coastal Aquaculture.*

Table 3: *Global trade (all products: HS 0301, 0302, 0303, 0304, 0305, 0306)*

Rank	Exporter	Exported value in 2012 (US$ thousands)	Share of global exports (%)	Annual growth in value 2008–2012 (%)
	World	83 546 784	100.0%	7%
1	China	9 108 786	10.9%	19%
2	Norway	8 562 246	10.2%	7%
3	United States	4 433 648	5.3%	6%
4	Viet Nam	3 709 813	4.4%	2%
5	Canada	3 347 547	4.0%	3%
6	Chile	3 282 275	3.9%	4%
7	India	2 738 251	3.3%	25%
8	Sweden	2 685 385	3.2%	12%
9	Netherlands	2 634 375	3.2%	5%
10	Indonesia	2 542 820	3.0%	8%

Rank	Importer	Imported value in 2012 (US$ thousands)	Share of global imports (%)	Annual growth in value 2008–2012 (%)
	World	87 038 326	100.0%	4%
1	United States	12 506 420	14.4%	4%
2	Japan	12 188 285	14.0%	4%
3	China	4 779 001	5.5%	11%
4	France	4 096 124	4.7%	1%
5	Spain	3 971 634	4.6%	-6%
6	Germany	3 659 489	4.2%	4%
7	Sweden	3 230 971	3.7%	8%
8	Italy	3 003 559	3.5%	-1%
9	Republic of Korea	2 651 951	3.0%	5%
10	Thailand	2 647 317	3.0%	5%

Source: ITC calculations based on UN Comtrade statistics.

Table 4: *Global trade (fish products excluding crustaceans: HS 0301, 0302, 0303, 0304, 0305)*

Rank	Exporter	Exported value in 2012 (US$ thousands)	Share of global exports (%)	Annual growth in value 2008-2012 (%)
	World	63 802 359	100.0%	7%
1	Norway	8 511 102	13.3%	7%
2	China	7 643 233	12.0%	16%
3	United States	3 533 959	5.5%	6%
4	Chile	3 234 414	5.1%	4%
5	Sweden	2 671 690	4.2%	12%
6	Viet Nam	2 305 686	3.6%	3%
7	Russian Federation	2 161 806	3.4%	50%
8	Netherlands	2 038 856	3.2%	4%
9	Spain	1 978 705	3.1%	2%
10	Chinese Taipei	1 839 644	2.9%	9%

Rank	Importer	Imported value in 2012 (US$ thousands)	Share of global imports (%)	Annual growth in value 2008-2012 (%)
	World	67 019 853	100.0%	5%
1	Japan	9 117 058	13.6%	4%
2	United States	7 266 410	10.8%	6%
3	China	3 653 811	5.5%	6%
4	Germany	3 242 373	4.8%	3%
5	Sweden	3 078 805	4.6%	8%
6	France	3 025 369	4.5%	1%
7	Spain	2 744 742	4.1%	-5%
8	Thailand	2 555 447	3.8%	5%
9	Italy	2 304 336	3.4%	0%
10	Republic of Korea	2 084 903	3.1%	5%

Source: ITC calculations based on UN Comtrade statistics.

Table 5: *Global trade of live fish (HS 0301)*

	Exporter	Value exported in 2012 (US$ thousands)	Quantity exported in 2012 (tons)	Annual growth in value 2008-2012 (%)	Share in world exports (%)
	World	1 898 484	-	7	100
1	China	515 787	80 221	4	27.2
2	Chinese Taipei	229 711	17 075	25	12.1
3	Republic of Korea	81 497	5 720	6	4.3
4	United States	69 223		13	3.6
5	France	68 417	5 444	-5	3.6
6	Malaysia	67 396	12 887	1	3.5
7	Singapore	66 334		-1	3.5
8	Japan	65 958	2 574	-3	3.5
9	Indonesia	60 555	11 056	14	3.2
10	Spain	60 503	10 919	6	3.2

	Importer	Value imported in 2012 (US$ thousands)	Quantity imported in 2012 (tons)	Annual growth in value 2008-2012 (%)	Share in world imports (%)
	World	1 868 173	-	3	100
1	Japan	536 942	14 037	8	28.7
2	Hong Kong (China)	334 328		8	17.9
3	Republic of Korea	251 837	23 592	2	13.5
4	United States	72 637		0	3.9
5	Germany	61 940	7 697	1	3.3
6	Singapore	49 290		3	2.6
7	China	45 363	11 092	25	2.4
8	Malta	42 756	2 189	3	2.3
9	Netherlands	37 003	1 897	-4	2
10	United Kingdom	31 589	1 778	-6	1.7

Source: ITC calculations based on UN Comtrade statistics.

Table 6: *Global trade of fresh whole fish (HS 0302)*

	Exporter	Value exported in 2012 (US$ thousands)	Quantity exported in 2012 (tons)	Annual growth in value 2008-2012 (%)	Share in world exports (%)
	World	14 343 963	-	7	100
1	Norway	4 471 324	1 101 270	12	31.2
2	Sweden	1 905 179		15	13.3
3	Canada	651 293	120 527	2	4.5
4	United Kingdom	624 167	111 211	12	4.4
5	Greece	599 167	94 445	6	4.2
6	Denmark	502 197	211 903	2	3.5
7	Spain	475 856	85 383	0	3.3
8	Netherlands	377 972	55 278	1	2.6
9	France	358 922	55 887	-2	2.5
10	Faroe Islands	344 128	64 163	13	2.4

	Importer	Value imported in 2012 (US$ thousands)	Quantity imported in 2012 (tons)	Annual growth in value 2008-2012 (%)	Share in world imports (%)
	World	13 986 893	-	6	100
1	Sweden	2 006 841		12	14.3
2	United States	1 360 064	195 333	4	9.7
3	France	1 135 363	216 140	3	8.1
4	Spain	964 022	216 340	-4	6.9
5	Russian Federation	887 327	180 638	25	6.3
6	Italy	857 613	131 715	3	6.1
7	Japan	736 234	72 572	3	5.3
8	Poland	592 666	132 459	13	4.2
9	United Kingdom	505 442	150 778	-2	3.6
10	Denmark	470 003	177 748	2	3.4

Source: ITC calculations based on UN Comtrade statistics.

Table 7: *Global trade of whole frozen fish (HS 0303)*

	Exporter	Value exported in 2012 (US$ thousands)	Quantity exported in 2012 (tons)	Annual growth in value 2008–2012 (%)	Share in world exports (%)
	World	22 668 873	10 935 100	12	100
1	China	2 276 738	966 278	40	10
2	United States	1 978 345	690 071	9	8.7
3	Russian Federation	1 947 576	1 306 631	48	8.6
4	Norway	1 574 636	815 876	5	6.9
5	Chile	1 293 139	335 178	10	5.7
6	Chinese Taipei	1 217 848	541 559	9	5.4
7	Spain	1 030 582	457 210	5	4.5
8	Republic of Korea	951 276	425 914	18	4.2
9	Netherlands	820 418	472 569	14	3.6
10	India	657 472	341 227	36	2.9

	Importer	Value imported in 2012 (US$ thousands)	Quantity imported in 2012 (tons)	Annual growth in value 2008–2012 (%)	Share in world imports (%)
	World	24 213 002	-	9	100
1	Japan	4 223 785	776 140	5	17.4
2	China	3 349 468	1 950 516	8	13.8
3	Thailand	2 371 443		8	9.8
4	Republic of Korea	1 323 365	625 009	11	5.5
5	Nigeria	1 230 990	423 104	32	5.1
6	Viet Nam	910 573	-	74	3.8
7	Spain	815 138	283 896	0	3.4
8	Russian Federation	731 685	433 667	0	3
9	United States	562 309	140 553	1	2.3
10	Netherlands	508 292	435 153	23	2.1

Source: ITC calculations based on UN Comtrade statistics.

Live fish imports were valued at US$1.86 billion in 2013. The world's largest importers are Japan (28.7% of imports), Hong Kong (China) (17.9%), and the Republic of Korea (13.5%), while the largest exporters are China (27.2%), Chinese Taipei (12.1%) and the Republic of Korea (4.3%). Asian countries lead the import markets for live fish.

Imports of fresh whole fish meanwhile were significantly greater. Of the US$13.9 billion in imports, Sweden (14.3%), the United States (9.7%) and France (8.1%) are the most important destinations. Norway has the largest market share, supplying 31.2% of fresh fish exports, followed by Sweden (13.3%) and Canada (4.5%).

The sector's largest market is for whole frozen fish, of which just over US$24 billion were imported worldwide. Japan received 17.4% of imports, followed by China (13.8%) and Thailand (9.8%). The top global importers for whole frozen fish are Asian economies in close proximity to Myanmar. Top exporters include China (10%), the United States (8.7%), and the Russian Federation (8.6%).

The fish fillets market meanwhile is valued at US$21.33 billion. Top importers include the United States (23.4%), Japan (15.6%) and Germany (8.3%), while the biggest exporters are China (21.7%), Viet Nam (10.1%) and Chile (8%).

Lastly, US$5.61 billion of cured and smoked fish were imported. The most important markets for these products are Germany (13.9%), Hong Kong (China) (7.8%), and Portugal (7.2%). Norway leads the market, accounting for 17.6% of total exports, followed by Poland (10.3%) and China (8.2%).

The market for crustaceans is valued at just over US$20 billion. The market is heavily concentrated in the United States and Japan, who purchased 26.2% and 15.3% of global imports respectively. Exports, which were much less concentrated, were led by Canada (9.9%), India (9.1%) and Thailand (7.8%).

Table 8: *Global trade of fish fillets and pieces, fresh, chilled or frozen (HS 0304)*

	Exporter	Value exported in 2012 (US$ thousands)	Quantity exported in 2012 (tons)	Annual growth in value 2008–2012 (%)	Share in world exports (%)
	World	19 420 234	-	7	100
1	China	4 218 826	1 014 402	14	21.7
2	Viet Nam	1 959 586	706 099	7	10.1
3	Chile	1 547 656	213 952	2	8
4	Norway	1 500 560	287 502	11	7.7
5	United States	1 120 849	334 251	9	5.8
6	Iceland	814 807	162 481	5	4.2
7	Netherlands	669 709	102 055	2	3.4
8	Germany	538 269	107 222	3	2.8
9	Denmark	493 893	72 813	-3	2.5
10	Indonesia	423 213	90 677	20	2.2

	Importer	Value imported in 2012 (US$ thousands)	Quantity imported in 2012 (tons)	Annual growth in value 2008–2012 (%)	Share in world imports (%)
	World	21 333 132	-	5	100
1	United States	4 984 176	752 334	8	23.4
2	Japan	3 318 207	503 266	8	15.6
3	Germany	1 774 007	424 755	1	8.3
4	France	1 415 140	254 813	3	6.6
5	United Kingdom	1 204 713	203 170	1	5.6
6	Spain	722 440	180 230	-2	3.4
7	Sweden	696 324		12	3.3
8	Italy	663 210	-	2	3.1
9	Netherlands	654 272	124 126	2	3.1
10	Canada	541 689	82 697	10	2.5

Source: ITC calculations based on UN Comtrade statistics.

Table 9: *Global trade of fish, cured or smoked, and fish meal fit for human consumption (HS 0305)*

	Exporter	Value exported in 2012 (US$ thousands)	Quantity exported in 2012 (tons)	Annual growth in value 2008–2012 (%)	Share in world exports (%)
	World	5 470 805	-	6	100
1	Norway	960 793	145 604	2	17.6
2	Poland	566 101	45 429	9	10.3
3	China	450 896	78 149	14	8.2
4	Iceland	364 704	62 591	-4	6.7
5	Sweden	335 027		5	6.1
6	Denmark	307 671	31 710	1	5.6
7	Germany	260 083	21 051	17	4.8
8	Canada	138 246	26 957	-6	2.5
9	Lithuania	136 327	14 035	134	2.5
10	Indonesia	126 372	23 880	13	2.3

	Importer	Value imported in 2012 (US$ thousands)	Quantity imported in 2012 (tons)	Annual growth in value 2008–2012 (%)	Share in world imports (%)
	World	5 618 653	835 158	5	100
1	Germany	779 130	72 638	15	13.9
2	Hong Kong (China)	440 907	13 133	3	7.8
3	Portugal	406 436	65 312	2	7.2
4	Italy	399 017	40 394	1	7.1
5	Sweden	331 396	49 765	0	5.9
6	Brazil	323 302	50 205	9	5.8
7	Japan	301 890	19 536	4	5.4
8	United States	287 224	35 101	4	5.1
9	Spain	214 701	37 064	-9	3.8
10	France	205 484	24 893	8	3.7

Source: ITC calculations based on UN Comtrade statistics.

Table 10: *Global trade of crustaceans (HS 0306)*

	Exporter	Value exported in 2012 (US$ thousands)	Quantity exported in 2012 (tons)	Annual growth in value 2008-2012 (%)	Share in world exports (%)
	World	19 744 425	2 426 654	8	100
1	Canada	1 947 610	199 542	8	9.9
2	India	1 791 279	282 306	27	9.1
3	Thailand	1 534 669	191 608	5	7.8
4	China	1 465 553	189 479	35	7.4
5	Viet Nam	1 404 127	140 197	5	7.1
6	Ecuador	1 279 766	208 928	19	6.5
7	Indonesia	1 206 544	137 778	6	6.1
8	United States	899 689	93 554	13	4.6
9	Netherlands	595 519	69 484	10	3
10	Argentina	495 872	80 672	11	2.5

	Importer	Value imported in 2012 (US$ thousands)	Quantity imported in 2012 (tons)	Annual growth in value 2008-2012 (%)	Share in world imports (%)
	World	20 018 473	2 407 105	6	100
1	United States	5 240 010	533 148	4	26.2
2	Japan	3 071 227	270 921	6	15.3
3	Spain	1 226 892	181 298	-4	6.1
4	China	1 125 190	127 506	42	5.6
5	France	1 070 755	125 338	3	5.3
6	Italy	699 223	84 931	-1	3.5
7	Hong Kong (China)	694 124	62 378	9	3.5
8	Viet Nam	681 355	82 899	91	3.4
9	Canada	671 013	84 982	12	3.4
10	Republic of Korea	567 048	94 314	7	2.8

Source: ITC calculations based on UN Comtrade statistics.

With the exception of live fish, imports of which grew by 3% annually between 2008 and 2012, imports of the other products have grown at an average annual rate of between 5% and 9%. The fastest growing product categories were whole frozen fish, whole fresh fish and crustaceans. A number of target markets have experienced significant growth over this period, including China, whose imports of crustaceans increased at an annual rate of 42%; Germany, whose imports of cured and smoked fish increased by 15% p.a.; Viet Nam, whose imports of whole frozen fish increased by 74% p.a., and Sweden, whose imports of fresh whole fish increased by 12% p.a. Of note is the decrease in size of the Spanish market for crustaceans and fresh whole fish, both of which have declined by 4% annually since 2008.

The market has also evolved with respect to the main producers of export products. China has increased its exports in almost all of the subsectors, becoming a major participant in the supply market. Its exports of crustaceans and whole fish grew by an astounding 35% and 40% p.a. respectively, while exports of cured and smoked fish and fish fillets grew by 14%. Other interesting developments are the growth of India as an exporter of crustaceans (27% p.a.), the Russian Federation as an exporter of whole frozen fish (48% p.a.), Norway, Sweden and the United Kingdom as exporters of whole fresh fish (12%, 15% and 12% p.a.), and Chinese Taipei and the United States as exporters of live fish (25% and 13% p.a. respectively).

EXPORT PERFORMANCE

Myanmar's efforts to increase exports through market penetration have resulted in a significant trade surplus in the fisheries sector. As illustrated in figure 12, attractive growth over the last decade saw sector exports increase by over US$100 million. While imports have also increased from 2007 to 2012, they remain relatively insignificant in relation to total exports.

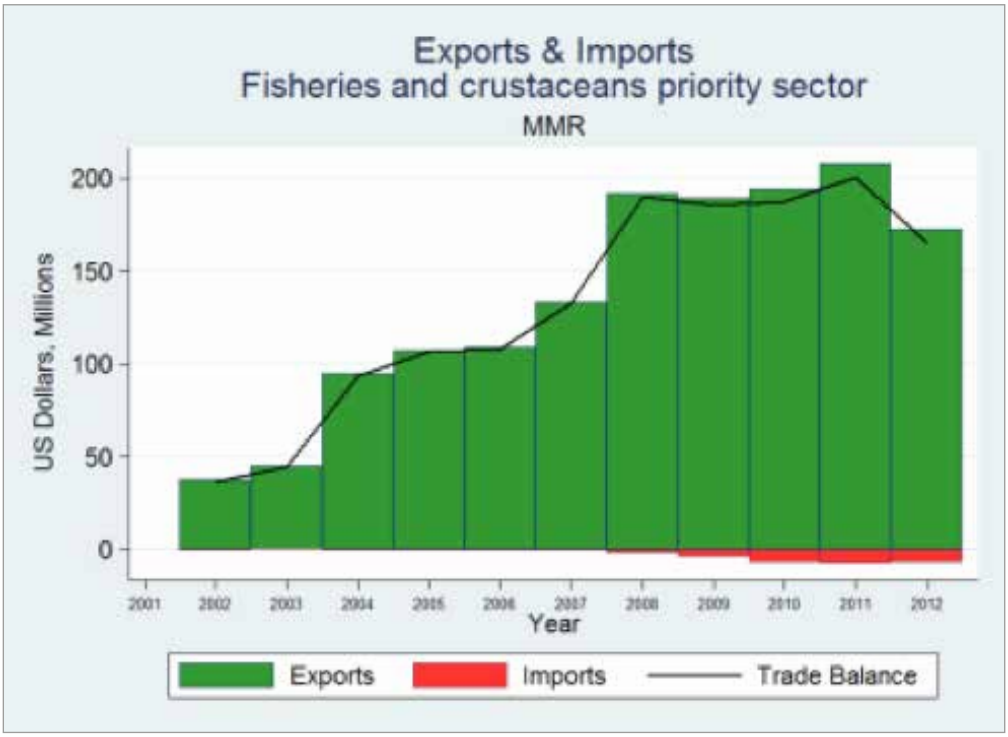
As illustrated in figure 13, 93% of growth between 2002 and 2012 can be attributed to increased penetration of existing markets with existing products, while 12% of growth can be attributed to the introduction of new products to existing markets. Slightly negative growth was due to product extinction and decreases in the export of old products to old markets. Of particular note is the absence of market development efforts. The introduction of products, both new and old, to new markets has had no impact on sectoral growth over the last decade. An enhanced ability to diversify exports into new countries will therefore constitute a key element of future sector growth. In addition, enterprises must expand their capacities to develop and introduce new products with high value content.

Although enterprises have been able to achieve attractive export growth, difficulties in maintaining stable export relationships threaten the realization of the sector's full potential. As noted in figure 14, less than 60% of export relationships in the sector last beyond the first year; less than 40% survive until the second year; less than 20% survive until the fifth year; and less than 10% survive by year ten. Sustainable export development will require that enterprises improve their ability to maintain stable relationships with foreign buyers.

According to national figures, Myanmar exported over 386,981 tons of fish and crustaceans in 2011/2012 for a value of US$653 million.[33] The biggest export product was fish, of which 283,688 tons were sold for US$396 million, while 17,995 tons of prawns were sold for US$86 million. The remaining US$171 million was derived from various other species including mud crabs and sea eels. The fact that these figures are significantly higher than those reported in standard international trade data is likely due to large amounts of unreported border trade with Bangladesh, India, Thailand and China.

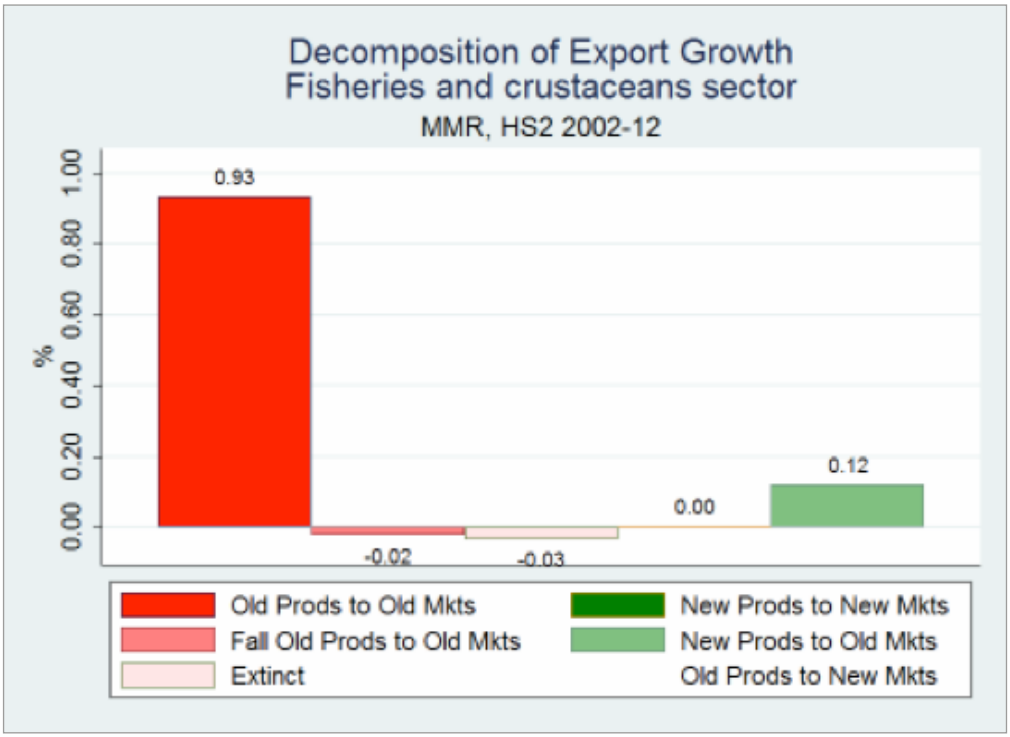
33. CBI (2012). *Myanmar Seafood Exports: Quick Scan of the EU Market Potential.*

Figure 12: *Trade balance of the fisheries sector 2001-2012*



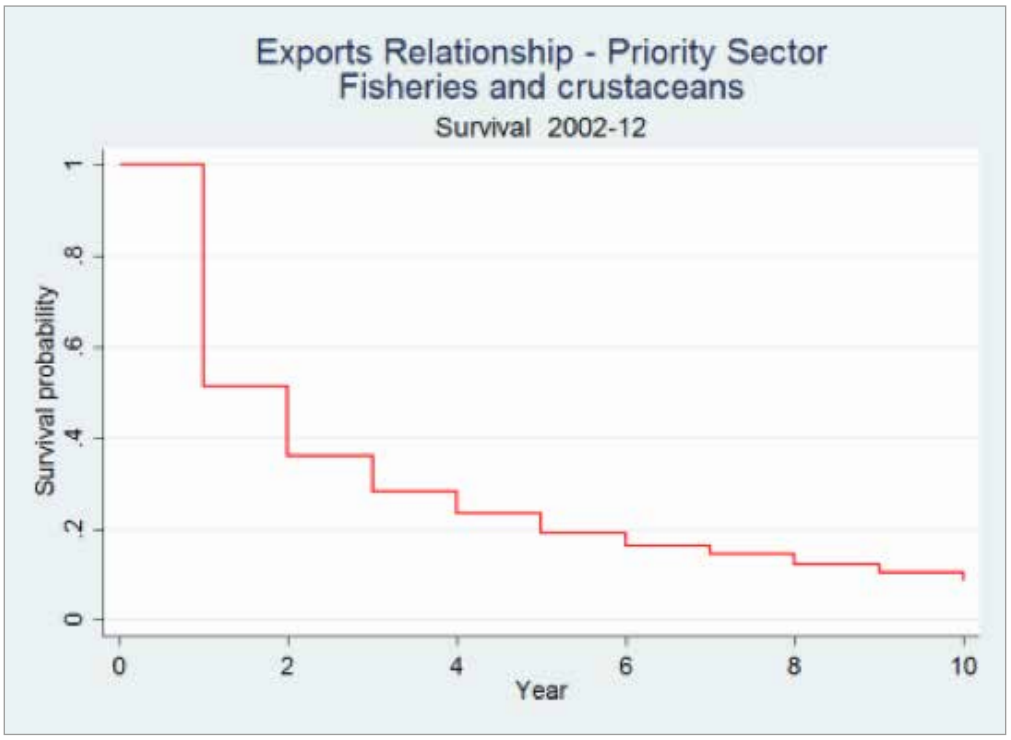
Source: ITC calculations based on UN Comtrade statistics.

Figure 13: *Decomposition of export growth*



Source: ITC calculations based on UN Comtrade statistics.

Figure 14: *Survival rate of fisheries exports 2002-2012*



Source: ITC calculations based on UN Comtrade statistics.

Table 11: *Fishery sector exports (DoF data), 2006-2007 to 2011-2012*

Year	Fish		Prawns		Others		Total	
	Quantity (tons)	Value (US$ millions)	Quantity (tons)	Value (US$ millions)	Quantity (tons)	Value (US$ millions)	Quantity (tons)	Value (US$ millions)
2006–2007	235 858.25	240.2	25 369.89	120.89	82 198.47	107.07	343 426.61	468.16
2007–2008	245 473.15	315.46	21 061.3	109.74	85 117.6	135.82	351 652.05	561.02
2008–2009	234 060.74	273.27	18 382.1	88.85	72 267.7	121.11	324 710.54	483.23
2009–2010	277 823.74	309.857	17 439.31	56.329	79 829.384	130.404	375 092.434	496.59
2010–2011	273 043.74	342.441	19 142.91	68.661	81 706.06	144.413	373 892.71	555.515
2011–2012	283 688.76	396.276	17 995.03	86.187	85 297.53	171.387	386 981.32	653.85

Source: CBI (2012). Myanmar Seafood Exports: Quick Scan of the EU Market Potential.

According to Comtrade data, Myanmar's 2012 fishery and crustaceans exports totalled over US$279 million. The most important markets for Myanmar's products were Japan (25.9%), China (21.3%), Thailand (16.4%) and Malaysia (13.8%).

Frozen fish, whole fish, and fish fillets were the most important fish products exported by Myanmar, while live fish and cured or smoked fish accounted for a minor share of total trade. Although China, Thailand, Singapore and Malaysia are key destinations for most products, some Western markets do contribute significantly to Myanmar's exports. The United Kingdom, for example, imports over 27% of Myanmar's frozen whole fish, and Australia is the second largest market for Myanmar's fish fillets.

Table 12: *Total fisheries exports (HS 03 fish, crustaceans, molluscs, aquatic invertebrates n.e.s.)*

Rank	Importer	Trade indicators						Tariff (estimated) faced by Myanmar (%)
		Exported value 2012 (US$ thousands)	Share in Myanmar's exports (%)	Exported growth in value 2008–2012 (%, p.a.)	Ranking of partner countries in world imports	Share of partner countries in world imports (%)	Total import growth in value of partner countries 2008–2012 (%, p.a.)	
	Total	**279 793**	**100**	**0**		**100**	**7**	
1	Japan	72 536	25.9	3	1	14.2	6	1.3
2	China	59 676	21.3	5	3	5.6	13	0
3	Thailand	45 913	16.4	-11	11	2.9	8	
4	Malaysia	38 536	13.8	8	23	0.9	17	0.1
5	United Kingdom	15 303	5.5	2	12	2.5	1	10.5
6	Hong Kong (China)	14 967	5.3	6	10	3.2	11	0
7	Singapore	11 956	4.3	-9	25	0.8	6	0
8	Australia	8 593	3.1	1	24	0.8	13	0
9	Chinese Taipei	3 745	1.3	5	26	0.7	9	20.4
10	Republic of Korea	2 547	0.9	-10	9	3.3	9	8.4
11	Macao (China)	1 983	0.7	56	65	0.1	19	0
12	Italy	1 734	0.6		6	4.3	2	10.5
13	Canada	507	0.2	9	16	1.9	9	0.5
14	India	447	0.2	-4	74	0.1	15	30
15	Sweden	306	0.1	-5	8	3.3	10	10.5

Source: ITC calculations based on UN Comtrade statistics.

Table 13: *Fish exports by product*

Product	Importer	Exported value 2012 (US$ thousands)	Share in Myanmar's exports (%)	Exported quantity 2012 (tons)	Exported growth in value 2008–2012 (%, p.a.)	Ranking of partner countries in world imports	Share of partner countries in world imports (%)	Total import growth in value of partner countries 2008–2012 (%, p.a.)	Tariff (estimated) faced by Myanmar (%)
Live fish (HS 0301)	Total	3 591	100	0	-18		100	3	
1	China	2 806	78.1	690	-25	7	2.4	25	0
2	Thailand	447	12.4	262	26	35	0.2	23	
3	Singapore	283	7.9		4	6	2.6	3	0
4	Malaysia	39	1.1	25	-10	16	1.3	3	0
Fresh whole fish (HS 0302)	Total	35 621	100	64 392	-12		100	6	
1	Thailand	34 749	97.6	64 137	-11	27	0.5	-3	
2	Malaysia	543	1.5	142	139	16	1.3	14	0
3	Singapore	328	0.9	113	37	24	0.9	6	0
4	China	1	0	0	-90	21	1.1	34	0
Frozen whole fish (HS 0303)	Total	53 360	100	19 930	-2		100	8	
1	United Kingdom	14 775	27.7	5 461	3	29	0.7	-3	10.5
2	Malaysia	14 442	27.1	5 594	10	17	1.1	15	0
3	China	8 323	15.6	1 646	-20	2	14.5	8	0
4	Singapore	6 316	11.8	2 951	-7	30	0.7	1	0
Fish fillets (HS 0304)	Total	11 283	100	3 734	-6		100	5	
1	Japan	4 689	41.6	1 507	-9	2	15.5	8	0.6
2	Australia	2 648	23.5	511	-11	17	1.3	8	0
3	Malaysia	1 712	15.2	319	10	30	0.4	15	0
4	China	1 008	8.9	979	68	27	0.4	13	0
Cured or smoked fish (HS 0305)	Total	4 789	100	1 305	-6		100	5	
1	Malaysia	2 102	43.9	976	29	28	0.5	21	2.6
2	Thailand	1 454	30.4	173		41	0.2	14	
3	Japan	1 045	21.8	105	20	7	5.3	4	4.6
4	Singapore	125	2.6	42	26	16	1.4	18	0

Source: ITC calculations based on UN Comtrade statistics.

Table 14: *Crustaceans exports (HS 0306)*

	Importer	Trade indicators							Tariff (estimated) faced by Myanmar (%)
		Exported value 2012 (US$ thousands)	Share in Myanmar's exports (%)	Exported quantity 2012 (tons)	Exported growth in value 2008–2012 (% p.a.)	Ranking of partner countries in world imports	Share of partner countries in world imports (%)	Total import growth in value of partner countries 2008–2012 (% p.a.)	
	Total	**156 583**	**100**	**22 602**	**6**		**100**	**6**	
1	Japan	61 126	39	6 466	4	2	15.3	6	0
2	China	44 970	28.7	5 830	39	4	5.6	42	0
3	Malaysia	16 406	10.5	3 839	0	15	1.3	24	0
4	Hong Kong (China)	14 791	9.4	1 960	8	7	3.5	9	0
5	Singapore	4 756	3	437	-13	21	0.9	9	0
6	Thailand	4 373	2.8	1 851	-15	26	0.5	-5	
7	Australia	3 629	2.3	568	14	16	1.2	20	0
8	Chinese Taipei	3 238	2.1	1 089	6	20	0.9	1	20.1
9	Macao (China)	1 951	1.2	354	59	41	0.1	35	0
10	Korea	694	0.4	65	-29	10	2.8	7	14.8
11	United Kingdom	439	0.3	100	13	12	2.1	6	13.7
12	Indonesia	179	0.1	24	-8	29	0.3	54	0

Source: ITC calculations based on UN Comtrade statistics.

Lastly, Myanmar exported 22,602 tons of crustaceans in 2012 for a value of US$ 156 million. Crustacean exports are highly concentrated, as the top three destinations account for nearly 80% of total exports.

As illustrated by the figures above, export growth for the sector between 2008 and 2012 has been flat. **While crustacean exports have grown at an annual rate of 6%, fish exports have declined across all product categories.**

Of particular concern is that while exports of Myanmar fish products have declined across all product categories, global imports of those products have increased. For example, Myanmar's live fish exports decreased by 18% p.a. despite a 3% p.a. increase in its trading partners' imports. This was driven largely by a 25% p.a. *decrease* in Chinese imports of Myanmar live fish despite a 25% p.a. *increase* in total Chinese imports of live fish. This means that not only is Myanmar losing business to competition through decreased trade, it is also not benefitting from increases in global demand. Even where trading partners have decreased imports, Myanmar's exports are often disproportionately affected. The 12% p.a. decrease in fresh whole fish exports was led by an 11% p.a. decrease in Thai imports of Myanmar products. Thailand's total trade in whole fish, however, declined by only 3% p.a.

Indeed, Myanmar has been losing market share in a number of key markets. Singapore has been importing fewer crustaceans and frozen whole fish from Myanmar, while Thailand has been importing fewer crustaceans and fresh whole fish. The result is an 11% annual decrease of total sector exports to Thailand between 2008 and 2012 and a 9% decrease to Singapore for the same period. Exports of fish products to China have undergone a similar trend, with live fish and frozen whole fish exports declining by 25% and 20% p.a. respectively.

Nevertheless, a number of countries have emerged as important and growing destinations for Myanmar's fish and crustacean products. Significant growth in crustaceans exports to China have helped offset the decline in fish exports. Macao (China), Hong Kong (China), Australia and the United Kingdom have experienced impressive growth

as destinations for crustacean products, while Western markets, including Australia and the United Kingdom, have increasingly become important destinations for crustaceans, fish fillets and frozen whole fish. Moreover, exports to Malaysia of nearly all fish products grew at impressive rates. These markets offer Myanmar an opportunity to offset declining market share with some of its more traditional trading partners. In order to capitalize on these opportunities, Myanmar's enterprises must enhance their capacities in order to produce the value added products demanded by these more sophisticated customers, while at the same time redoubling their efforts to stem the tide of losses in traditional markets.

THE INSTITUTIONAL PERSPECTIVE

Trade support institutions (TSIs) are institutions that have an interest in, and bearing on, the sector's export development. Broadly, the TSIs providing important services to Myanmar's fisheries sector can be categorized in the following support areas:

- Policy support network
- Trade services network
- Business services network
- Civil society network.

Tables 15 to 18 identify the main TSIs whose service delivery affects the fisheries sector in Myanmar. An assessment of the TSIs along four key dimensions – coordination, human capital, financial sustainability, and advocacy – is provided. The ranking (high/medium/low) for each TSI was selected in the context of service delivery of the TSI to fisheries sector stakeholders. In other words, the assessment was conducted based on the evaluation by stakeholders of each TSI from the perspective of how well it serves the fisheries sector.

POLICY SUPPORT NETWORK

These institutions represent ministries and competent authorities responsible for influencing or implementing policies at the national level.

Table 15: *Policy support network for Myanmar's fisheries sector*

Name of institution	Name or function of TSI	Description of TSI in line with sector	Coordination	Human capital	Financial resources	Advocacy/ Communication
Ministry of Livestock, Fisheries and Rural Development (MLFRD)	DoF	• Technical support • Inspection • Enforcement of fisheries laws • Supervision (government enterprises) • Sanitation and quality checks • Certification and lab testing • Management of fisheries • Compliance with international regulations • Monitoring (monitoring and compliance systems, compliance with Association of South-East Asian Nations (ASEAN) Good Agricultural Practices, factories' GMP and Hazard Analysis and Critical Control Points (HACCP)) • MSY monitoring (not yet implemented) • R&D and extension services • Revenue	M	L	L	M
	Livestock Breeding and Veterinary Department	• Veterinary drug registration	L	L	L	L
	Directorate of Livestock and Fisheries	• Fisheries policy	M	M	L	L

Name of institution	Name or function of TSI	Description of TSI in line with sector	Coordination	Human capital	Financial resources	Advocacy/ Communication
Ministry of Commerce (MoC)	Department of Trade Promotion (DoTP)	• Market information, trade promotion, business-to-business meetings, trade fairs, export training, commodity prices	L	L	L	M
	Directorate of Trade (DoT)	• Trade facilitation, trade liberalization, trade negotiation, policy and regulation, regional cooperation, rules of origin, trade registration, trade statistics, weekly commerce journal	M	L	L	M
	Department of Commerce and Consumer Affairs	• Issuance of export and import license, border trade (check points, license), consumer protection, competition	L	M	L	M
Ministry of Industry	Department of Industrial Supervision and Inspection	• Licensing and registration of industrial operators (only for ice factory registration and boiler certificate for feed production).	M	M	M	M
Ministry of Labour, Employment and Social Security	Employment and Social Security	• Compliance with labour law • Negotiation between employers and employees • Encourages establishment of labour unions	M	L	M	M
Ministry of Health	Food and Drug Administration	• Water quality testing • Imported ingredient testing	M	M	M	M
Ministry of National Planning & Economic Development	Directorate of Investment and Company Administration	• Company registration • Joint venture services • Investment promotion and regulation • (no specific line for fisheries)	M	L	n.a.	M
Ministry of Finance and Revenue (MoFR)	Internal Revenue Department	• Collects income taxes • Tax rebates	L	M	L	L
	Customs Department	• Tax duties for imports (partial application of temporary admission) • Export documentation	M	L	L	L
Central Bank & commercial banks	Monetary policy, planning and currency, financial stability	• Interest rate management • Credit line management • Banking • Financing	L	L	L	L
Ministry of Science and Technology	Myanmar Scientific & Technological Research Department	• Establishes national standards • Metrology	M	L	L	L
Ministry of Transport	Department of Meteorology and Hydrology	• Weather forecasts	L	L	L	L
Ministry of Electric Power	Electricity Supply Enterprise & Yangon Electricity Supply Board	Electricity supply	L	L	L	L
Ministry of Energy		Fuel supply	M	L	L	L

TRADE SERVICES NETWORK

These institutions or agencies provide a wide range of trade-related services to both government and enterprises. They support and promote sectors and are concerned with the delivery of trade and export solutions within a developing country.

Table 16: *Trade services network for Myanmar's fisheries sector*

Name of TSI	Description of TSI in line with sector	Coordination	Human capital	Financial resources	Advocacy/ Communication
Myanmar Fisheries Federation (MFF)	• Trade and technical information • Introducing advanced technology • Exploring potential markets • Representing the sector • Market surveys • Recommendations • Promoting investment • Enhancing business facilities and infrastructure • Human resources development • Extension and collaboration	H	M	L	H
Union of Myanmar Federation of Chambers of Commerce & Industry (UMFCCI)	• Exhibitions • Information • Coordination	M	M	L	H
Myanmar Fishery Products Processors and Exporters Association (MPEA)	• Producing • Collecting • Processing • Manufacturing • Trading • Exporting • Marketing	M	L	H	H
Myanmar Fish Farmers Association (MFFA)	• Farming • Trading	M	L	L	M
Myanmar Marine Fisheries Association	• Fishing • Trading	H	H	H	H
Myanmar Freshwater Capture Fisheries Association	• Fishing • Trading	M	M	L	M
Myanmar Shrimp Association (MSA)	• Farming • Trading	M	L	L	M
Myanmar Aqua-Feed Association	• Providing feed to aquaculture farms	M	L	M	M
Myanmar Crab Entrepreneurs Association	• Farming • Capturing • Trading	M	M	L	M
Eel Entrepreneurs Association	• Capturing • Farming • Trading	M	M	L	M

Name of TSI	Description of TSI in line with sector	Coordination	Human capital	Financial resources	Advocacy/ Communication
Ornamental Fish Entrepreneurs Association	• Farming • Collecting • Trading	L	L	L	L
Myanmar Engineers Association	• Refrigeration installation and service	L	L	L	L
Government Insurance Service	• Fire, flood and transport insurance • Theft insurance	M	M	H	M

BUSINESS SERVICES NETWORK

These are associations, or major representatives, of commercial services providers used by exporters to effect international trade transactions.

Table 17: *Business services network for Myanmar's fisheries sector*

Name of TSI	Description of TSI in line with sector	Coordination	Human capital	Financial resources	Advocacy/ Communication
Global Treasure Bank	• Only bank that provides loans to fisheries sector	L	H	H	M
Transport associations (truck and highway truck associations)	• Logistics	L	M	M	L
Private insurance companies	• Loans to large processors and exporters • Loans for processors and exporters	M	M	H	M
Inspection agencies	• Inspection, weight, quantity, quality, packing, fumigation and marking testing • Upon buyer request only • International Organization for Standardization (ISO) certificates	M	M	H	M
Myanmar Customs Brokers Association	• Export import procedures • Clearing agents	H	M	M	M
Myanmar plastic and packaging industries	• Packaging production	H	H	H	H

Table 18: *Civil society network for Myanmar's fisheries sector*

Name of institution	Description of TSI in line with sector	Coordination	Human capital	Financial resources	Advocacy / Communication
University of Veterinary Science	• Initiating some training service • No R&D	M	M	L	M
Institute of Fisheries Technology	• Some limited training • Some minimal R&D	M	L	L	L
Universities	• Marine science courses • Zoology departments	M	L	L	L

CIVIL SOCIETY NETWORK

ANALYSIS OF THE TRADE SUPPORT NETWORK

These institutions are not explicitly engaged in the sector's trade-related activities. However, they are opinion leaders representing specific interests that have a bearing on the sector's export potential and socioeconomic development.

Coordination among TSIs is perceived as being of mid to high quality, especially among the trade services network. However, there is room for improvement. The policy support network, and in particular DoF, the Livestock Breeding and Veterinary Department, and the various MoC departments must increase their coordination with stakeholders in order to ensure their ability to fulfil their role as leaders in the sector strategy implementation.

Of particular concern is the perceived lack of human resources, financial resources and advocacy. As anchors of sector knowledge and focal points for strategy implementation, it is important that TSIs have access to qualified staff and sustainable financial resources. Moreover, sector stakeholders must be able to rely on the support network to advocate on their behalf so that they may best confront and capitalize on a constantly changing global trade environment. The lack of such capacities is especially disconcerting with regards to a number of ministries directly charged with guiding sector development.

Table 19: *Perception of Myanmar's TSIs – influence versus capacities*

		Capacity of institution to respond to sector needs	
		Low	High
Level of influence on the sector	High	• MLFRD • MoC • DoF • MFF • MPEA • MFFA • Myanmar Marine Fisheries Association • Myanmar Crab Entrepreneurs Association • MSA • Eel Entrepreneurs Association • Banks	
	Low	• DoTP • Customs Department • Government local authorities • Ministry of Agriculture & Irrigation • Myanmar Aqua-Feed Association • Myanmar Freshwater Capture Fisheries Association • Ornamental Fish Entrepreneurs Association • Local logistics agencies	

The preceding analysis confirms that the institutions with the most influence on the sector are those that are the most lacking in capacities to respond to sector needs. It is therefore of the utmost importance that capacities are built at influential TSIs so that they may best participate in sector strategy implementation.

DEVELOPMENT INITIATIVES

As illustrated by ADB's aid to shrimp farmers in the mid-1980s, the donor community has long been active in the fisheries sector, seeking to promote sustainable development that increases income generation and employment opportunities while at the same time reducing negative environmental impact.

The Livelihoods and Food Security Trust Fund (LIFT) is a multi-donor organization that seeks to channel aid towards improving food and livelihood security in Myanmar.[34] Supported by Australia, Denmark, the European Union (EU), France, the Netherlands, New Zealand, Sweden, Switzerland, the United Kingdom and the United States, and administered by the United Nations Office for Project Services, LIFT is currently implementing a variety of projects aimed at enhancing agricultural capacities, food security and rural development.

One such initiative is the Improving Governance in the Fishing Sector project (2011-2014). With a budget of US$ 721,000, it seeks to improve sector capacities in the Dadaye and Pyarpon townships of the delta region. Specific objectives include linking fishers with the local DoF; establishing a source of revolving funds at the community level; assessing income generation with a focus on women and the families of collectors; and piloting aquaculture micro-projects.

Another LIFT initiative is the Coastal Livelihoods and Environmental Restoration in Rakhine Project (2011–2014). Its goal is to address environmental issues by raising awareness and educating the community on the importance of conservation. It will perform an inventory and assessment of environmental resources in order to facilitate coastal mangrove conservation, and mangrove rehabilitation will be supported through the establishment of mangrove nurseries and plantations in gap and depleted areas. Moreover, the initiative will aid in developing community water supplies. Lastly, the project will provide grants to fisheries interest groups.

Other LIFT projects, although not directly targeted at the fisheries sector, will nonetheless have an impact. These include projects that seek to improve access to finance and price information and enhance marketing capacities.

34. Livelihoods and Food Security Trust Fund (LIFT) (2012). Website. Available from http://lift-fund.org.

Another donor currently engaged in Myanmar's fisheries sector is the Japan International Cooperation Agency (JICA). Their Small-Scale Aquaculture Extension for Promotion of Livelihood of Rural Communities in Myanmar project (2007-2012)[35] targeted five townships in the Ayeyarwady, Bago, and Kayin areas.[36] It sought to stimulate the development of small-scale aquaculture by enhancing farmer capacities. Another initiative is the Ayeyarwady Delta Integrated Mangrove Rehabilitation and Management Project.[37] The goal of this project is to facilitate local decision-making with regards to the management of mangrove resources.[38] Efforts will be made to enhance local capacities for sustainable forest use and harm reduction in order to guarantee the sustainability of mangrove forests.

The Ecosystem Approach to Fisheries-Nansen project (Norwegian Agency for Development Cooperation, FAO) is currently working with the MLFRD to re-assess – after 33 years – the MSY of Myanmar fisheries. A number of new projects are currently being designed with the objective of improving the performance of the fisheries sector. The objectives of the project are varied and will surely address critical areas of the fisheries strategy. Most importantly, the strategy can serve as a guide to coordinate these multiple projects under a coherent framework.

LEGAL AND LEGISLATIVE FRAMEWORK

The government has implemented a number of laws with the goal of promoting its national fisheries policy. This multifaceted policy seeks to:

1. Promote the development of the fisheries sector;
2. Increase fish production for domestic consumption and share surplus with neighbouring countries;
3. Encourage the expansion of marine and fresh water aquaculture;
4. Upgrade the socioeconomic status of fishery communities; and
5. Conserve fishery resources and the environment.

Myanmar's legislative framework relies on three main laws to regulate fish capture activity. The first of these is the Law Relating to the Fishing Rights of Foreign Fishing Vessels of 1989. This act regulates the activities of foreign vessels wishing to fish in Myanmar's offshore waters while

35. Still implementing according to the JICA website.

36. JICA (2009). *Small-Scale Aquaculture Extension for Promotion of Livelihood of Rural Communities in Myanmar: Project Design Matrix*.

37. Still implementing according to the JICA website.

38. JICA (n.d.). Activities in Myanmar: Ayeyawady Delta integrated mangrove rehabilitation and management project. Available from http://www.jica.go.jp/myanmar/english/activities/activity13.html.

empowering DoF to determine the terms of licensing.[39] Meanwhile, the Marine Fisheries Law of 1990 established the legal framework under which national individuals and enterprises can engage in fishing.[40] It outlines the means by which fishing zones will be determined and grants DoF sector oversight of inshore fishing activity. Lastly, the Freshwater Fisheries Law of 1991 was passed in order to regulate inland fish capture.[41] The stated objectives of this law are to:

1. Further develop fisheries;
2. Prevent fish extinction;
3. Safeguard and prevent the destruction of freshwater fisheries waters;
4. Obtain duties and fees; and
5. Manage fishery activity.

The law introduces the means by which fishers may lease or be licensed to fish in inland water resources and once again establishes the powers of DoF to regulate activity.

The main legislation that regulates aquatic animal farming is the 1989 Law Relating to Aquaculture.[42] This law establishes the rules by which DoF may allocate, in accordance with existing land laws, agricultural and waste land for aquaculture activity, and outlines licensing rules. Such grants must be in accordance with existing land laws and farmers are required to develop at least 75% of the leased land into pond surface area. The law also allows DoF to designate other fishing waters to any type of aquaculture. It should be noted that both the Marine Fisheries Law and the Freshwater Fisheries Law allude to aquaculture activity. While the former's definition of fishery includes the breeding and hatching of fish, the latter specifically includes aquaculture and stocking in its definition of regulated activity. As such, fish farmers are also subject to the regulations and procedures ascribed under these two laws. At the moment, all foods produced in Myanmar are regulated by the National Food Law of 1997 which oversees the production, import, export, storage, distribution and sale of food.[43]

QUALITY MANAGEMENT

In addition to the legislation governing the activities of the sector, DoF has issued a number of directives affecting food safety and quality within the framework of the Marine Fisheries Law. Collectively, these directives seek to minimize health risks associated with fish and crustacean production and guarantee an acceptable quality of production.

39. Myanmar State Law and Order Restoration Committee (1989). *Law Relating to the Fishing Rights of Foreign Fishing Vessels (Law No 11/89).*

40. Myanmar State Law and Order Restoration Committee (1990). *The Myanmar Marine Fisheries Law (Law No. 9/90).*

41. Myanmar State Law and Order Restoration Committee (1991). *The Freshwater Fisheries Law (Law No. 1/91).*

42. FAO Fisheries and Aquaculture Department (2014). National aquaculture legislation overview – Myanmar. Available from http://www.fao.org/fishery/legalframework/nalo_myanmar/en.

43. Myanmar State Law and Order Restoration Committee (1997). *National Food Law (Law No. 5/97).*

Box 5: Drugs in aquaculture

DoF Directive 2/2014 and the ASEAN Guidelines for the Use of Chemicals in Aquaculture address the application of aquaculture medical drugs in fish and fish products and require monitoring of the production process. The presence of certain residues and substances must be detected in fish, their excrement and body fluids, fish products, aquaculture feed and drinking water. Products that have been illegally treated with aquaculture medical drugs must be rejected for human consumption and for export.

Source: FAO Fisheries and Aquaculture Department (2014). National aquaculture legislation overview – Myanmar. Available from http://www.fao.org/fishery/legalframework/nalo_myanmar/en. Modified by sector team.

All enterprises wishing to engage in the processing of fish products for export must first apply to the Myanmar DoF System of Inspection for approval.[44] This department issues guidelines related to documentation and HACCP implementation. These enterprises are then graded depending on their level of compliance with Myanmar DoF System of Inspection requirements.

44. FAO Fisheries and Aquaculture Department (2014). National aquaculture legislation overview – Myanmar. Available from http://www.fao.org/fishery/legalframework/nalo_myanmar/en.

Box 6: Directives relating to food safety (under process of revision)

Directive	Purpose
Directive No. 7/96	Addresses structural requirements for buildings, food handling areas, waste disposal and water supply to ensure safety, quality and hygiene.
Directive No. 8/96	Addresses operational requirements to ensure safety, quality and hygiene, including guidelines for processing and production areas.
Directive No. 9/96	Addresses additives and other contaminants and establishes maximum residual limits.
Directive No. 10/96	Establishes rules for the sampling of processed fish products.
Directive No. 11/96	Establishes rules for the packaging and labelling of processed fish products.
Directive No. 3/98	Establishes criteria on the microbiological content of cooked crustaceans and shellfish.
Directive No. 4/98	Details acceptable food additives for fish and fish products.
Directive No. 5/98	Addresses water standards for the sector.
Directive No. 6/98	Establishes inspection rules for the purpose of detecting parasites.
Directive No. 7/98	Establishes histamine and total volatile basic nitrogen limits for certain fish products.
Directive No. 8/98	See box 5.
Directive No. 9/98	Established the Myanmar DoF System of Inspection, which must grant approval to fish processing enterprises.

Source: FAO Fisheries and Aquaculture Department (2014). National aquaculture legislation overview – Myanmar. Available from http://www.fao.org/fishery/legalframework/nalo_myanmar/en.

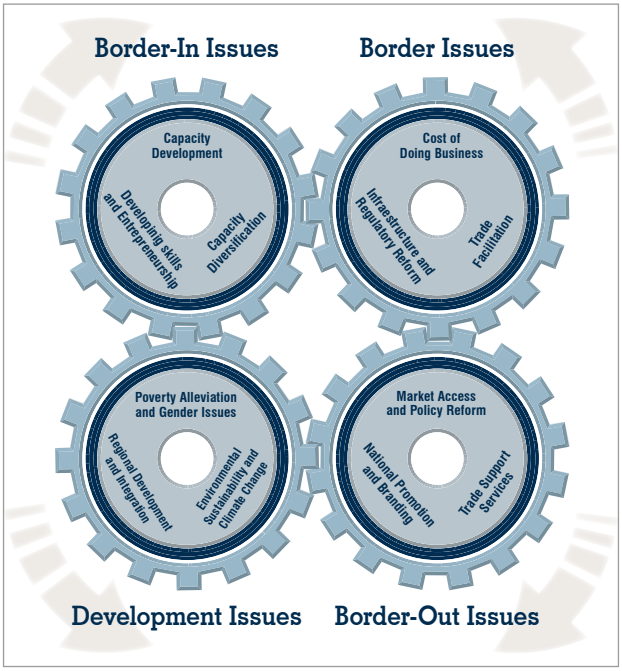
According to legislation, DoF –and in particular the Fish Inspection and Quality Control Division– is responsible for inspecting and monitoring fish quality.[45] As such, it operates an ISO 17025-2005 accredited laboratory to perform relevant microbiological and chemical analysis. The EU has determined that the standards used by the Fish Inspection and Quality Control Division to monitor fish handling and processing are generally in line with EU requirements. There are, however, deficiencies in the monitoring of fish and water processing, vessel hygiene and landing site traceability. Moreover, the Division is understaffed. While its 16 inspectors and two assistants are considered sufficient for the monitoring of marine fish production, they are unable to properly monitor inland and pond production.

Other organizations involved in ensuring product quality are the Ministry of Health, whose laboratory is capable of biological and chemical analysis, and the Ministry of Industry, whose food control laboratory aids it in its function of licensing food manufacturing establishments. Lastly, the Food Industries Development Supporting Laboratory of the Myanmar Food Processors and Exporters Association conducts quality and safety analyses on food and water.

EXPORT COMPETITIVENESS ISSUES

The export constraints analysis uses the four gears framework presented below to determine the major concerns to export development.

- **Supply-side issues** affect 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.
- **The quality of the business environment issues** are constraints that influence transaction costs, such as regulatory environment; administrative procedures and documentation; infrastructure bottlenecks; certification costs; Internet access; and cost of support services.
- **Market entry issues** are essentially external to the country (but may also be manifested internally), such as market access, market development, market diversification and export promotion.



The analysis presents those major constraints that are currently main export competitiveness bottlenecks for the fisheries sector in Myanmar. However, the assessment also explores issues limiting socioeconomic spillovers of exports to the society at large.

Social and economic concerns include poverty reduction, gender equity, youth development, environmental sustainability and regional integration.

45. United Nations Industrial Development Organization (Myanmar Standards Department) (2013). *Myanmar: Strengthening the National Quality Infrastructure for Trade (Mission Report)*.

THE BORDER-IN GEAR (SUPPLY-SIDE)

Box 7: Overview of supply-side issues related to Myanmar's fisheries sector

- Irregular supply of energy (electricity and fuel) leads to high production costs, production problems and reduced competitiveness.
- Capacity to develop new aquaculture sites or transform existing ones to increase production is limited.
- Difficult access to capital or development funds, as well as insurance products, at different levels of the fisheries value chain limits sector growth.
- Production of post-larvae, fingerlings and quality feeds is insufficient to ensure growth in production.
- Important challenges limit the efficient application of GAqP.
- There is difficulty complying with GMP such as HACCP.
- Challenging management of MSY leads to a decreasing catch.
- There is limited capacity to add value to fisheries products in Myanmar.

IRREGULAR SUPPLY OF ENERGY (ELECTRICITY AND FUEL) LEADS TO HIGH PRODUCTION COSTS, PRODUCTION PROBLEMS AND REDUCED COMPETITIVENESS

The difficulty of regular access to energy has been identified as a key challenge by most enterprises consulted for the elaboration of the NES. The fisheries sector is no different. Specifically, the absence of a reliable and consistent supply of electricity in industrial zones (or upcoming Special Economic Zones) makes it challenging for processors to ensure supply and quality consistency of their products. Irregular supply of electricity also requires enterprises to run expensive generators which increase the cost of doing business.

The absence of electricity in rural areas is specifically challenging for the fisheries sector since it makes it difficult for landing sites to maintain refrigerated storage and ice plants to produce a regular supply of ice. According to ADB, Myanmar's average electrification rate was about 26% in 2011, with Yangon City having the highest electrification rate (63%), followed by Nay Pyi Taw (52%), Kayah (37%), Mandalay (29%) and rural areas (16%).[46] The economic development of every sector in Myanmar, including the fisheries sector, will require significant quantities of electricity. However, planned investments in electricity production, mainly in hydroelectricity, over the next five years are only 617 megawatts of capacity, a growth rate of less than 5% a year.[47] This increase in production will not be sufficient to satisfy demand.

The fisheries sector can generate some of its required electricity while new national level electricity generation capacity is created. The electricity demand in the fisheries sector is mainly for water pumping, refrigerated storage, ice production and processing. There are a number of initiatives in Myanmar from the private sector, non-governmental organizations and ministries (the Myanmar Scientific and Technological Research Department and the Ministry of Energy) to pilot alternative energy production. Support to these alternative energy production initiatives would help increase the production and quality management capacities of the sector. There is a specific need to simplify the negotiations and procedures required to set up alternative energy production units.

In addition to electricity supply challenges, the high costs of petroleum and diesel increase costs for fishers. The government policy on industrial fuel, primarily relating to the tax rate, is unfavourable for the sector. Current fuel

46. Asian Development Bank (2013). *Myanmar Off-Grid Renewable Energy Demonstration Project: Project Data Sheets*.

47. Dapice, D. (2012). *Electricity in Myanmar: The Missing Prerequisite for Development*, p. 6. Ash Center for Democratic Governance and Innovation at the John F. Kennedy School of Government, Harvard University.

taxation policy does not differentiate between domestic usage and industrial production. This exerts a significant burden on enterprises through increasing their operational costs.

CAPACITY TO DEVELOP NEW AQUACULTURE SITES OR TRANSFORM EXISTING ONES TO INCREASE PRODUCTION IS LIMITED

Current land use laws give priority to agriculture, placing significant restrictions on the ability of farmers to repurpose agricultural land for aquaculture. As indicated earlier, it is within the capacity of DoF to allocate land for aquaculture. However, insufficient amounts of adequate land (access to water, good water retention capacity) with services (roads and electricity) are available for DoF to allocate. Moreover, poor road quality inhibits access to areas with high potential as production sites (Twantay to Yangon; Pyarpon/Bogalay to Yangon; Labutta to Myaungmya; Hainggyi to Pathain; Maubin to Yangon; and Maungtaw, Yathaytaung and Buthitaung to Sittwe (Rakhine State)), further limiting the expansion of sector production. These issues have been complicated by the lack of public–private dialogue advocating for policy changes that would facilitate aquaculture site development.

As indicated below, there is limited access to outside financing, which is hindering the ability of farmers to transform extensive sites into intensive sites. Access to finance is further constrained for smallholders by slow and difficult land lease titling procedures, which make it difficult to show collateral to financial institutions. Limited access to finance, combined with limited dissemination of best practices and low dissemination of technology, has resulted in the low uptake of modern aquaculture techniques, leading to lower yields and returns on investment. Not only does this limit the production capacity of existing sites, it discourages more investment in the development of new sites.

Without the ability to increase production, aquaculture has little room for growth. Comprehensive efforts must be made to increase the availability of easily accessible land with access to services. Farmer capacities must also be enhanced in order to allow for higher yields, while support, financial tools and incentive mechanisms should be put in place to stimulate the development of intensive aquaculture systems.

DIFFICULT ACCESS TO CAPITAL OR DEVELOPMENT FUNDS, AS WELL AS INSURANCE PRODUCTS, AT DIFFERENT LEVELS OF THE FISHERIES VALUE CHAIN LIMITS SECTOR GROWTH

Myanmar's financial sector is significantly underdeveloped, an issue which is compounded for many rural sector stakeholders. Banking facilities in such areas are inadequate and mobile finance has yet to become a viable alternative. Moreover, there is no policy that seeks to stimulate the development of rural finance. A pressing concern for the fisheries sector is that most commercial banks are located in urban areas with very limited outreach to rural regions. This situation makes it almost impossible for rural fishermen and farmers, as well as processors, to access the financial resources required to increase production. Enhanced financial access would provide stakeholders with investment capital that would allow them to upgrade production in line with changing market conditions.

A key constraint for enterprises seeking bank financing is stringent collateral requirements. Not only is collateral high, but movable assets are not accepted due to inadequate laws. Moreover, leasehold title, which can be used as collateral for access to credit, is rarely accepted because of complicated procedures and a complex legal system to recognize leasehold titles. High collateral requirements are further stimulated by difficult banking regulations and the absence of loan guarantee mechanisms. Additionally, the absence of an implemented movable asset law that ensures movables such as cultured fish/shrimp in the ponds, machinery, fishing boats and gear can be used as collateral makes it even more difficult for the fisheries sector to access credit.

Deficiencies in the banking sector are complicated by an absence of alternative funding sources such as specialized finance lines, leasing microcredit or sector development funds. There is also limited availability of microfinance services. The International Monetary Fund estimates the total demand for microcredit at close to US$1 billion while, based on the limited data available, the total portfolio of microloans is estimated at US$283 million.[48] The development of microfinance and innovative finance mechanisms for rural regions would contribute to building the production capacity of the fisheries sector. It should be noted, however, that the Global Treasure Bank will be encouraged to provide loans of up to US$500 per acre to fish farms.

In addition to depriving enterprises of funding that is needed to invest in upgraded capacities, limited financial instruments increase the risk of doing business. In

48. IFC Advisory Services in East Asia and the Pacific (2013). *Microfinance in Myanmar Sector Assessment*.

particular, there is a low level of insurance use due to the previously government managed insurance system. It will be important for the Government of Myanmar to establish specialized insurance for the fisheries sector in collaboration with emerging new private insurance companies. These insurance products would aim to protect the industry against natural catastrophes[49] and stock-depleting disease.

PRODUCTION OF POST-LARVAE, FINGERLINGS AND QUALITY FEEDS IS INSUFFICIENT TO ENSURE GROWTH IN PRODUCTION

The production of shrimp/prawn post-larvae is overwhelmed by both quality and supply problems. With regards to fresh water hatcheries, there is a high incidence of disease in post-larvae which is partly the result of the limited capacity of the DoF disease lab to conduct effective monitoring and control of hatcheries and aquaculture sites. The problem is compounded by a lack of coordination with the private sector and limited cooperation with the Southeast Asian Fisheries Development Center (SEAFDEC) and the Network of Aquaculture Centres in Asia-Pacific (NACA) as regional technical cooperation partners. Limited financial access also limits the purchasing capacity of farmers and hatcheries for the necessary inputs, such as chemicals and primers, required to counteract such diseases.

Marine shrimp and prawn hatcheries suffer from low productivity across the country and specifically in Rakhine and Ayeyarwady. A key challenge of the sector is the limited human resources, technical capacities and inputs available at DoF hatcheries to effectively supply the market for post-larvae. As a result of shortfalls in production (DoF hatchery output is estimated at 10 million, demand at 500 million), the strategic production zone of Rakhine State needs to satisfy demand through import of post-larvae from Bangladesh. Diseases among these imports are not uncommon. Similar issues exist in the delta region, where public–private partnerships are currently being developed as a solution to capacity limitations.

The case of fish hatcheries is different from crustacean hatcheries. The main problem is not technology. Myanmar fish hatchery owners have enough technical knowhow, experience and facilities. The main constraint in producing fish seed is low demand from fish farmers, resulting from stagnant business both in domestic and international markets, particularly the Middle East.

The sector also struggles with inadequate quantity and quality feed supply. Importation limits on enriched flours and other key inputs compels hatcheries to use oilseed cakes as an alternative. However, there is also a short supply of cake for the fisheries sector since a large majority of the cake is absorbed by the livestock sector. Also, it has only been possible to import oilseed cake since 2012 and current volumes remain insufficient to satisfy a growth in hatcheries production. Another issue is the uncertain quality of the cake that is imported, as border controls of oilseed cake imports remain inadequate due to limited testing facilities and the absence of standards against which to evaluate the product. In order to stimulate hatcheries production and demand for quality feeds, it is important to ensure fish farmers are informed of the issues associated with feed quality.

IMPORTANT CHALLENGES LIMIT THE EFFICIENT APPLICATION OF GAQP

GAqP involves a series of protocols and systems intended to ensure product quality and safety and environmental sustainability through responsible farming practices.[50] They address a variety of issues including 'site location; production system design; incoming seed stock; facility biosecurity; feeding management, procurement and storage; production techniques to maximize fish health; harvest; and cleaning and sanitation basics to ensure final product quality and safety.'[51] The application of GAqPs would have far-reaching effects on sector competitiveness. Not only would it ensure that production achieves high levels of quality while simultaneously reducing both health and environmental hazards, but the introduction of quality management principles would put enterprises on a path towards trade with more demanding markets.

Myanmar's fisheries sector faces several hurdles in its attempt to implement GAqP. Foremost among them is the lack of technical knowledge among aquaculture stakeholders. The Institute of Fisheries Technology has limited capacities in aquaculture techniques and technologies training due to its small size, limited budget and inadequate facilities. This lack of training capacity cannot be filled by DoF and MFF, neither of which have sufficient vocational training capacities. Limited extension services capacities limit the effective transfer of production techniques and monitoring of farms. As indicated above, the limited collaboration with regional technical partners limits the building of national skills and capacities in the fisheries sector.

49. Post typhoon Nargis, recovery has been slow and difficult for a large majority of fisheries sector stakeholders. According to FAO, the typhoon wiped out 7,000 acres of fish and shrimp ponds and some 1,550 marine fishing vessels, up to 100,000 small inland fishing boats (50%) and 70% of fishing gear. Most of the fishermen and farmers affected did not have access to finance or insurance to cover reconstruction.

50. Schwarz, M.H., Jahncke, M.L. & Lazur, A.M. (2010). *Overview of Good Aquaculture Practices*. Virginia: Virginia Cooperative Extension. Available from http://pubs.ext.vt.edu/600/600-054/600-054.html.

51. *Ibid*.

As detailed above, the ability to apply GAqP is severely hampered by the lack of access to finance. As many fish and shrimp ponds maintain a traditional infrastructure that is inappropriate for intensive production, an upgrading of infrastructure and techniques would require significant investment.

THERE IS DIFFICULTY COMPLYING WITH GMP SUCH AS HACCP

GMP systems are designed to ensure that goods are consistently produced according to specific levels of quality standards. Applicable at all stages of production, GMP standards seek to ensure adequate levels of product safety and quality.

The application of GMP and quality management enhancements in Myanmar is challenged by the absence of trained technicians capable of applying GMP processes in factories, feed plants, ice plants and landing sites. Current public vocational training programmes on GMP are outdated and university curricula do not offer adequate courses on the subject. The one private GMP training course available in Myanmar, and its adjoining certification of production processes, is costly for many processors.

A key challenged faced by fisheries processors is the absence or inadequate supply of clean water for human consumption. This problem at landing sites and ice factories leads to possibilities of contamination of fish and crustaceans. In processing plants, the absence of a clean water supply can lead to failures in compliance with sanitary and phytosanitary and technical barriers to trade measures. To ensure compliance, processors need to invest in large water treatment facilities, which heightens production costs.

Successful sector development will to a large extent rely on the ability of enterprises to deliver products adhering to consistently high quality standards. The enhanced quality and consistency of production accompanying GMP compliance will permit the sector to improve its brand image, foster long-term relationships with buyers, export to more demanding nations, and develop new products in response to changing market trends.

CHALLENGING MANAGEMENT OF MSY LEADS TO A DECREASING CATCH

MSY 'refers to the maximum use that a renewable resource can sustain without impairing its renewability through natural growth or replenishment.'[52] As such, it is a critical tool for nations seeking to ensure the long-term management of their fish resources. The implementation of MSY has been difficult in Myanmar for a variety of reasons.

One of the most pressing challenges is the lack of data collection and management capacities. The current MSY framework is outdated and has resulted in a deficiency in knowledge of the true MSY. Although current catch levels could be above the old MSY (1979-1980), limited data makes verification impossible. Moreover, inadequate and irregular data collection at fishing and landing sites has done little to shed light on true harvest levels.

Nevertheless, even if MSY data management capacities were adequate, the government still has problems enforcing regulations. Authorities have few resources in place to combat unregulated and unreported fishing, and little means of controlling illegal fishing, even during closed seasons. Although a transition from capture to aquaculture activity could help alleviate pressures on the fish population, without effective control of fishing zones the fish stock could continue to decline.

It is of utmost importance that Myanmar addresses these issues and develops the ability to manage its fish resources responsibly.[53] Overfishing would have dire consequences, not just for the future of the fishing sector but also for the population that consumes fisheries products and for the ecosystem, which would be affected by innumerable spillover effects.

THERE IS LIMITED CAPACITY TO ADD VALUE TO FISHERIES PRODUCTS IN MYANMAR

A key challenge for fisheries processors is the difficulty of increasing processing volumes due to low and irregular supply of raw materials. Inconsistent provision of raw material limits the ability of processors to comply fully with client volume requirements. The difficulty of consistently supplying clients with volumes is reflected by export data that confirm a low survival rate of export relationships and declining market shares in top destination markets such as China and Thailand.

The availability of raw material is directly linked to the production capacity of the sector. Nevertheless, it should be pointed out that existing supplies cannot proceed to factories since the transport of materials such as

52. Organisation for Economic Co-operation and Development (2001). Glossary of Statistical Terms: Maximum Sustainable Yield. Available from http://stats.oecd.org/glossary/detail.asp?ID=3075. Accessed 16 January 2014.

53. A new MSY survey is underway with the support of the Ecosystem Approach to Fisheries-Nansen project in cooperation with the Myanmar Government, Institute of Marine Research, the FAO and the Bay of Bengal Large Marine Ecosystem project. See: Institute of Marine Research (2013). Dr. Fridtjof Nansen surveying the waters of Myanmar. Available from http://www.imr.no/forskning/utviklingssamarbeid/surveys/myanmar_2013/dr._fridtjof_nansen_surveying_the_waters_of_myanmar/en.

shrimps/prawns is difficult from certain production zones. This situation is made dire by the import promotion activities of foreign processors in Bangladesh and Thailand that offer premiums for raw material.[54] In the absence of sufficient raw material for the processing industry there has been an increased reliance on imported inputs, as shown in the trade balance analysis.

The ability of sector enterprises to add more value is hampered by the lack of integrated farms. With no enterprises operating across all levels of the value chain, the sector is unable to ensure the quality and consistency of supply. It should be noted, however, that such integrated farms could develop as a result of lifted sanctions.

The absence of qualified food technicians in the sector limits the capacity of enterprises to develop new products. There is no specific food technology lab dedicated to the fisheries sector. This complicates the product adaptation efforts of processing companies that can only rely on their own knowledge and expertise. The significant difficulties involved in processors and exporters accessing relevant and reliable market information, combined with limited participation in trade fairs or other intelligence gathering events, makes it almost impossible for sector exporters to capitalize on emerging market trends and preferences. Finally, the limited availability of key inputs such as spices, food preservatives or even breadcrumbs makes it even more difficult for processors to compete in global markets.

54. It was indicated by fisheries stakeholders that Bangladesh processors are capable of offering premiums of 15% for shrimps and 8% for fish, while Thailand is offering 3% for all fisheries products. These premiums are supposedly made possible through tax reductions for processing plants in the countries.

THE BORDER GEAR (BUSINESS ENVIRONMENT)

Box 8: Overview of business environment issues related to Myanmar's fisheries sector

- An inadequate policy framework and ineffective public–private dialogue in support of the fisheries sector limits its growth.
- Inadequate implementation of fisheries laws inhibits sectoral development.
- Limited direct commercial linkages between producers and processors challenges the consistency of both quality and supply and limits opportunities for sector expansion.
- High import duties on key inputs result in increased costs for producers.

AN INADEQUATE POLICY FRAMEWORK AND INEFFECTIVE PUBLIC-PRIVATE DIALOGUE IN SUPPORT OF THE FISHERIES SECTOR LIMITS ITS GROWTH

Despite the important role that the fisheries sector plays in both the economy and the national food chain, there are not enough enabling policies to facilitate the growth of the sector. A key component hindering Myanmar's public policy effectiveness in the sector is the lack of incentive programmes that would promote development across the value chain. As such, there are currently no incentive packages to facilitate conversion of land use or export development, nor are there any tax rebate systems that would encourage positive investment decisions. The new policies being designed by MoFR should be elaborated in conjunction with the private sector to ensure synchronization of policies with the needs of enterprises. Together, public and private stakeholders are best placed to establish support and incentive mechanisms that will encourage the sector's growth.

While public–private dialogue can be leveraged to enhance the policy framework, it should be noted that the formal dialogue between the public and private sectors is operational but remains imperfect. There is currently a lack of formal and permanent public–private dialogue mechanisms. This makes it difficult for the government to understand and act upon issues crucial to the sector, especially outside urban areas. With the objective of having a dynamic sector performing in global markets, it will be necessary to effectively target and resolve emerging

issues. To that end, enhanced and formalized mechanisms for regular public–private dialogue are of the utmost importance. The strengthening of regional DoF offices would also serve to strengthen dialogue with local stakeholders. However, at the moment power is not widely delegated to regional DoF offices.

INADEQUATE IMPLEMENTATION OF FISHERIES LAWS INHIBITS SECTORAL DEVELOPMENT

The legislative framework relies on outdated laws that must be enhanced in order to account for modern aquaculture and fishery management practices and policy. Current laws refrain from addressing a number of issues including fish disease control, environmental impact assessments, and aquaculture guidelines and codes of conduct.[55] A chief concern is the lack of power delegated to relevant authorities by these laws. Enforcement is further complicated by a lack of resources, monitoring frameworks and punitive measures. As a result, even the areas of activity addressed by legislation are not subject to adequate implementation and enforcement. This has led to the prevalence of fraudulent conduct and informal arrangements to resolve conflicts with the law.

The absence of a comprehensive, reliable and enforced legal framework has broad implications for fisheries sector development. Unsure of whether or not laws will be enforced and punitive measures implemented, enterprises are faced with incentives to dodge their legal responsibilities. This can result in both product and process quality deficiencies at the expense of brand reputation, consumer health and environmental degradation. Likewise, the risk of incidental oversights is heightened. With the absence of standardized enforcement of the law, some stakeholders may also find themselves with a competitive advantage solely on the basis of what enforcement authorities, if any, they deal with. As such, the sector is less able to guarantee fair competition, efficient resource allocation and the rewarding of best practices. Moreover, the uncertainty associated with such an environment increases the risks of doing business and discourages investment by both domestic and foreign stakeholders. A key difficulty for the implementation of laws in Myanmar is the inadequacy of resources available to regulatory bodies to enforce laws.

55. FAO Fisheries and Aquaculture Department (2014). National aquaculture legislation overview – Myanmar. Available from http://www.fao.org/fishery/legalframework/nalo_myanmar/en.

LIMITED DIRECT COMMERCIAL LINKAGES BETWEEN PRODUCERS AND PROCESSORS CHALLENGES THE CONSISTENCY OF BOTH QUALITY AND SUPPLY AND LIMITS OPPORTUNITIES FOR SECTOR EXPANSION

Although some farmers reach informal arrangements with collectors and processors, the absence of contract farming means that the majority sell their products through markets. This is due largely to an inadequate legal and arbitration environment. The guarantee mechanisms that would normally allow a lender to recuperate his or her investment are inadequate. At the moment, some disputes between contracting parties in Myanmar are settled by MFF, when both parties of the dispute are members of it.[56] The difficulty of establishing contractual agreements is confirmed by the World Bank Doing Business survey, which ranks Myanmar as the second worst country in the world for enforcement of contracts.[57]

In addition to the frequent informal arrangements between buyers and sellers, an outdated Myanmar Companies Act (1914) and Myanmar Arbitration Act (1944),[58] combined with widespread informal agreements between sellers and buyers, complicate the absence of clear payment policies between buyers and sellers. Based on the Myanmar Export/Import Rules and Regulations issued by MoC, international trade disputes must be resolved in accordance with the Arbitration Act.[59] However, there is no public record of any international commercial arbitration cases conducted under it.[60] This confirms the low utilization of the court system to conduct international arbitration awards. In addition to Myanmar becoming, on 15 July 2013, a signatory of the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards,[61] it is important to ensure the country rapidly revises and implements the newly completed Arbitration Act. This will facilitate contract farming in the fisheries sector and the settling of arbitration cases.

The absence of direct linkages between farmers and processors makes it difficult for the latter to guarantee the consistent supply and quality of inputs. Processors are largely reliant on producers/suppliers/traders for the sourcing of raw materials, and as such their ability to purchase the required quantity and quality of inputs is mostly outside their control. Continuously changing

56. Myanmar Legal Services Ltd (2013). *Doing Business in Myanmar*.

57. World Bank (2013). Doing Business in Myanmar: Enforcing Contracts. Available from www.doingbusiness.org/data/exploreeconomies/myanmar#enforcing-contracts.

58. Myanmar Legal Services Ltd (2013). *Doing Business in Myanmar*.

59. PricewaterhouseCoopers (2012). *Myanmar Business Guide*.

60. Myanmar Legal Services Ltd (2013). *Doing Business in Myanmar*.

61. Clifford Chance (July 2013). *Myanmar Update: New York Convention Enters Into Force*. Available from www.cliffordchance.com/publicationviews/publications/2013/07/myanmar_update_newyorkconventionentersint.html.

supply and demand conditions, not regulated by contractual agreements, subject processors to uncertainty concerning their capacity to meet production and buyer requirements. Enhanced sector competitiveness will to a large extent require an increase in the quality and consistency of processed goods for more demanding markets. Strengthened linkages between processors and farmers through contract farming would greatly increase processors' ability to deliver such enhancements.

Moreover, the absence of contract farming diminishes opportunities for farmers to access finance that would allow them to expand production in accordance with demand. Without this, producer output is limited to that which can be achieved through self-financing. As a result it is difficult for producers to cater to large demands, thereby further depriving them of opportunities to capitalize on new business prospects.

HIGH IMPORT DUTIES ON KEY INPUTS RESULT IN INCREASED COSTS FOR PRODUCERS

While many key value chain inputs are produced domestically, their lesser quality diminishes their usefulness for sector enterprises with respect to foreign competition. As a result of the import duties imposed on these inputs, producers choosing to use higher quality materials are forced to bear an increased cost burden. The heightened costs result in smaller profit margins or less competitive prices.

The private sector, and in particular the MFF, has not effectively communicated the sector's needs to Customs authorities. There has been no provision of a detailed list of sector import requirements for enhanced national processing capacity. The provision of such a list by MFF to the appropriate authorities could facilitate possible tariff reductions for selected imported products. It is imperative that producers be able to access the highest quality inputs at competitive prices.

THE BORDER OUT GEAR (MARKET ENTRY)

Box 9: Overview of market entry issues related to Myanmar's fisheries sector

- Costly and inadequate transport services in Myanmar result in diminished returns.
- Inability to comply with international standards limits access to duty-free, quota-free schemes.
- Limited brand development hinders sectoral expansion.
- Inadequate export finance mechanisms limit market development.
- Limited availability of trade information and promotion hampers market development.

COSTLY AND INADEQUATE TRANSPORT SERVICES IN MYANMAR RESULT IN DIMINISHED RETURNS

Exporters are faced with high transport costs in Myanmar. The cost of shipping a container from the warehouse in the Yangon region to the port is higher (~US$12/ton) than from port to destination (~ US$2/ton). These high transport costs are caused by a variety of administrative and logistics delays that restrict the ability of transport companies to build efficiencies. A primary administrative issue is inefficient Customs procedures with limited opening hours and weekend closure, which often leads to additional days of surcharge at port. There are also expensive toll charges on roads and bridges which increase the transport cost from warehouse to port. An important share of transport costs are caused by traffic jams which require trucks to be on the road for up to four hours to complete a journey that should take one hour. The truck fleets, which rely largely upon second-hand vehicles, are subject to frequent repairs, while both fuel and labour costs are significant. As such, any delays can result in significant variable cost increases for transport companies, which are then passed on to exporters, thereby increasing their cost of doing business. Moreover, the absence of insurance on cargo during transportation from warehouse to port increases the likelihood of unexpected write-offs due to lost or damaged goods.

Unless stated otherwise in the contract, under a free on board contract the shipper is liable for terminal handling charges at origin and the receiver is liable at destination. Inadequate warehousing and cargo management capacities in Myanmar often lead to unexpected storage surcharges that must be met by the exporter. Moreover, the limited knowledge and support provided to exporters for managing shipping documentation leads to cases where unloading terminal handling charges are charged to the seller, thereby increasing costs of exports. Compounding the issue is an absence of proper documentation, which leads to difficult arbitration between buyers and sellers. Increasing the cost burden for sector enterprises, Myanmar exports are still subject to an old EU regulation (249/2001). As a result, containers must be held for 14 days at EU ports for antibiotic testing. Both the testing and container holding costs are then charged back to the exporter.

A specific challenge to the fisheries sector, and more generally agro-processing, is the absence of refrigerated containers when cargo is in transit. Since the outdated truck fleet is generally not equipped with integrated electricity supply, and road regulations prohibit operators from attaching generators to trucks, this leads to refrigerated containers not being connected to electricity while in transit. Even if alternate solutions are used, such as the storing of ice in the containers during transit, this is a serious breach in cold chain management in a country where temperatures can often reach 40°C. As a result, some exports are shipped in three-quarter full containers covered with ice. Not only does this reduce the capacity of each shipment, it presents health and safety hazards. This increases the incidence of damage, loss or sanitary issues that can cause lost profits and reputational damage. It should be noted that crab trucks do not need refrigeration.

A special note should be made of the risks and costs associated with the inadequate level of refrigerated transport. There are few refrigerated containers arriving in Myanmar except for those destined for fish exports, which can often result in additional surcharges being imposed by the shipping companies. Moreover, unreliable electricity provision makes it difficult to prepare these containers, creating the possibility of delays or inadequately stored goods.

INABILITY TO COMPLY WITH INTERNATIONAL STANDARDS LIMITS ACCESS TO DUTY-FREE, QUOTA-FREE SCHEMES

Intended to facilitate preferential access to developed markets, duty-free, quota-free schemes could provide Myanmar's fisheries sector with an important foothold that can be leveraged for market expansion. A key condition for exports to the United States of marine products is the need for fishermen to demonstrate use of Turtle Exclusion Devices (TEDs). At the moment, TED use is unmonitored, leading to very few fishermen actually implementing such practices. Until TEDs are used in marine capture fishing, exports to the United States will be hampered.

A number of additional factors have thus far inhibited Myanmar's ability to comply with international standards requirements. Of particular concern is the lack of quality management capacities along the value chain, including inspectors, lab technicians, producers, processors and exporters. The DoF lab is the only ISO 17025 accredited laboratory in Myanmar for a limited number of parameters, and accreditation must be expanded to more laboratories. Moreover, quality management infrastructure requires significant investment in personnel training and laboratory upgrades. In particular, laboratory equipment is currently inadequately able to test: for chemical residues as required by the EU; water quality and ready-to-eat food; for environmental contaminants; and for hormones. With regards to sanitary and phytosanitary measures, there has been difficulty experienced in implementing the drug residue monitoring plan at the national level due to a lack of technical knowledge, facilities and education schemes.

Myanmar must work to address these issues in order to capitalize on the opportunities provided by preferential access schemes. Not only will they directly facilitate the development of new markets for fisheries products, but the benefits of enhanced standards and quality management capacities are likely to have spillover effects into other sectors and contribute to national branding efforts.

LIMITED BRAND DEVELOPMENT HINDERS SECTORAL EXPANSION

Due in large part to limited market exposure resulting from trade sanctions, the sector was unable to develop the knowledge required to effectively design and implement branding strategies. One issue of particular importance is the limited capacity to design and create packaging. Moreover, both quality and market research that match sector capacities with market demands are needed before the sector can seriously engage in targeted branding efforts.

Once key quality management issues are resolved, brand development will play a key role in allowing Myanmar to differentiate its products and engage in trade with more advanced and demanding markets. Branded products will eventually be able to command a price premium over generic goods, thereby stimulating higher profits and an upward shift in value addition.

INADEQUATE EXPORT FINANCE MECHANISMS LIMIT MARKET DEVELOPMENT

As noted previously, Myanmar's financial sector is severely underdeveloped. While deficiencies in financial access have wide-ranging implications across all stages of the value chain, the limited availability of trade finance tools is particularly disconcerting given its effect on market access.

National regulations on exports are applied by Customs authorities before allowing exports. Exporters need to demonstrate to Customs that payment for goods has been received in full before export clearance is given, so enterprises must receive full payment before the shipment leaves port. This system uses telegraphic transfers (TT) to ensure payments are received. The TT system contrasts with the letter of credit system, which is a conditional guarantee of payment in which an overseas bank takes responsibility for paying you after you ship your goods, provided you present all the required documents (such as documents of title, insurance policies, commercial invoices and regulatory documents).[62]

The TT system, which aims to protect exporters by ensuring they are paid for their goods, was useful during the sanctions period. This system now needs to be revised and new directives issued as the TT system actually causes exporters to lose contracts since international buyers prefer to use the letter of credit system. Furthermore, the TT system is most often circumvented by exporters through depositing the payment in an account themselves to demonstrate compliance to Customs. This ensures shipment of the goods and provides time for the buyer to actually pay upon receipt of the goods. This practice is risky for exporters and confirms that the regulation requiring advance payment of goods should be abolished.

In addition to the establishment of a letter of credit system, it is important for Myanmar to develop its export finance mechanisms as a means to increase the ease with which exporters can conduct their business. A positive change is that private banks have been authorized to establish international banking businesses and 11 private banks are in the process of installing the Society for Worldwide Interbank Financial Telecommunication (SWIFT) system to begin international remittance operations.[63] Nevertheless, export finance products are mostly absent from the financial system in Myanmar. There is a lack of direction and expertise among both financial institutions that could potentially provide trade finance and the Central Bank of Myanmar, which regulates them. There is a need to develop export finance instruments such as documentary collections, open accounts, export insurance, etc. at the national level.

The absence of adequate insurance products increases the risk of engaging in trade as well. The market provides no service liability insurance and no limited liability insurance for trucks and cargo. The only protection available is that which is covered by standard trading conditions, which are specified at 10 times the cost of transportation.

LIMITED AVAILABILITY OF TRADE INFORMATION AND PROMOTION HAMPERS MARKET DEVELOPMENT

The availability of adequate trade information and promotion mechanisms plays an integral role in facilitating sector export development. Trade information allows enterprises to respond to the dynamic needs of customers through targeted product design and marketing. Moreover, trade promotion is a cornerstone of the effort to penetrate both new and existing markets. The trade information and promotion environment in the fisheries sector, and more generally in Myanmar, is characterized by a low level of both knowledge and capacities.

Problems relating to trade information are twofold. First, there is limited availability of market research. As a result, both processors and exporters in the fisheries sector have relatively little knowledge about new techniques and product developments in the global market. The second issue is that exporters and traders do not have the capacities required to use such trade information when it exists. Providing sector enterprises with the ability to respond to changing markets and expand their reach will therefore require an increase in both data and capacities.

Another constraint is the absence of trade promotion efforts, which is characterized by a low trade fair participation rate. Not only do stakeholders forgo opportunities to meet with and promote their products to potential buyers, but participation in trade fairs would expose producers to the newest trends and demands, thereby providing an opportunity for the gathering of even more trade information. In addition, the sector makes no use of newly appointed commercial attachés. Such resources could leverage their networks and knowledge of international clients to promote sector interests.

62. Export Finance Navigator (2013). Documentary credit. Available from www.exportfinance.gov.au/Pages/Documentarycredit.aspx#content.

63. IFC Advisory Services in East Asia and the Pacific (2013). *Microfinance in Myanmar Sector Assessment*.

THE DEVELOPMENT GEAR

Box 10: Overview of development issues related to Myanmar's fisheries sector

- Inadequate sustainable resource management policy and implementation mechanisms increase the risks to ecosystems, habitats, fish stock, biodiversity and health.
- Limited access to key services results in difficulties in the socioeconomic development of the sector's rural stakeholders.

INADEQUATE SUSTAINABLE RESOURCE MANAGEMENT POLICY AND IMPLEMENTATION MECHANISMS INCREASE THE RISKS TO ECOSYSTEMS, HABITATS, FISH STOCK, BIODIVERSITY AND HEALTH

Myanmar is endowed with a vast array of environmental resources, including a number of unique and important ecosystems such as ice-fed mountain streams, important rivers, flood plains, coral reefs and mangrove forests. These resources form important habitats for a variety of species while at the same time fulfilling valuable roles such as, in the case of mangroves, pollutant sinks and sediment traps. However, Myanmar has yet to fully appreciate the importance of such resources and the effect of the fisheries sector upon them. The greatest threat to coral reefs comes from destructive fishing, while coastal development, sedimentation and marine pollution are estimated to have smaller, yet still concerning, effects. Secondary mangrove forests are threatened by the expansion of local businesses, including aquaculture farming, as local communities and stakeholders seek out new areas for production.

Aquaculture feed can lead to imbalances in the food chain by favouring certain species, while chemical treatments, feed additives and waste build-up may have adverse effects on local populations and water safety. Moreover, high levels of nutrients found in feeds and faecal matter can result in eutrophication, reducing oxygen supply and releasing toxins. Together, these issues can result in decreased biodiversity and resource contamination.

Despite the risks posed to ecosystems, habitats, and economic and environmental sustainability, the government has thus far developed only limited capacities to help it engage in harm reduction and sustainable management. The FAO notes that there are no provisions for environmental impact assessments in fisheries legislation.[64] Moreover, there is limited knowledge among both public and private stakeholders about the importance of these resources and the possible harm caused by the sector. Even where steps have been taken, for example with the establishment of marine protection areas, enforcement capacities are lacking. Myanmar must develop a policy framework that allows for the protection of these resources in the light of sector exploitation. Such a policy should provide for environmental impact assessments and create efficient monitoring and enforcement mechanisms.

With regards to animal resources, the long-term sustainability of capture fishery activity will depend on the successful management of fish populations. The government must take steps to better understand local population dynamics and establish an effective system for implementing quotas in line with MSY. Such management must consider both reproductive and carrying capacities in order to accurately judge the impact of changing population sizes on the rest of the ecosystem.

Similarly to marine capture fishers, enterprises of the sector must improve their environmental impact through the upgrading of their waste management and water treatment capacities. Potential solutions could include the upgrading of water treatment technologies, the introduction of natural treatment systems, and the expansion of water and waste recycling. In this way potential harm to the environment can be minimized, thereby guaranteeing that these resources continue to be available in the future.

64. FAO Fisheries and Aquaculture Department (2014). National aquaculture legislation overview – Myanmar. Available from http://www.fao.org/fishery/legalframework/nalo_myanmar/en.

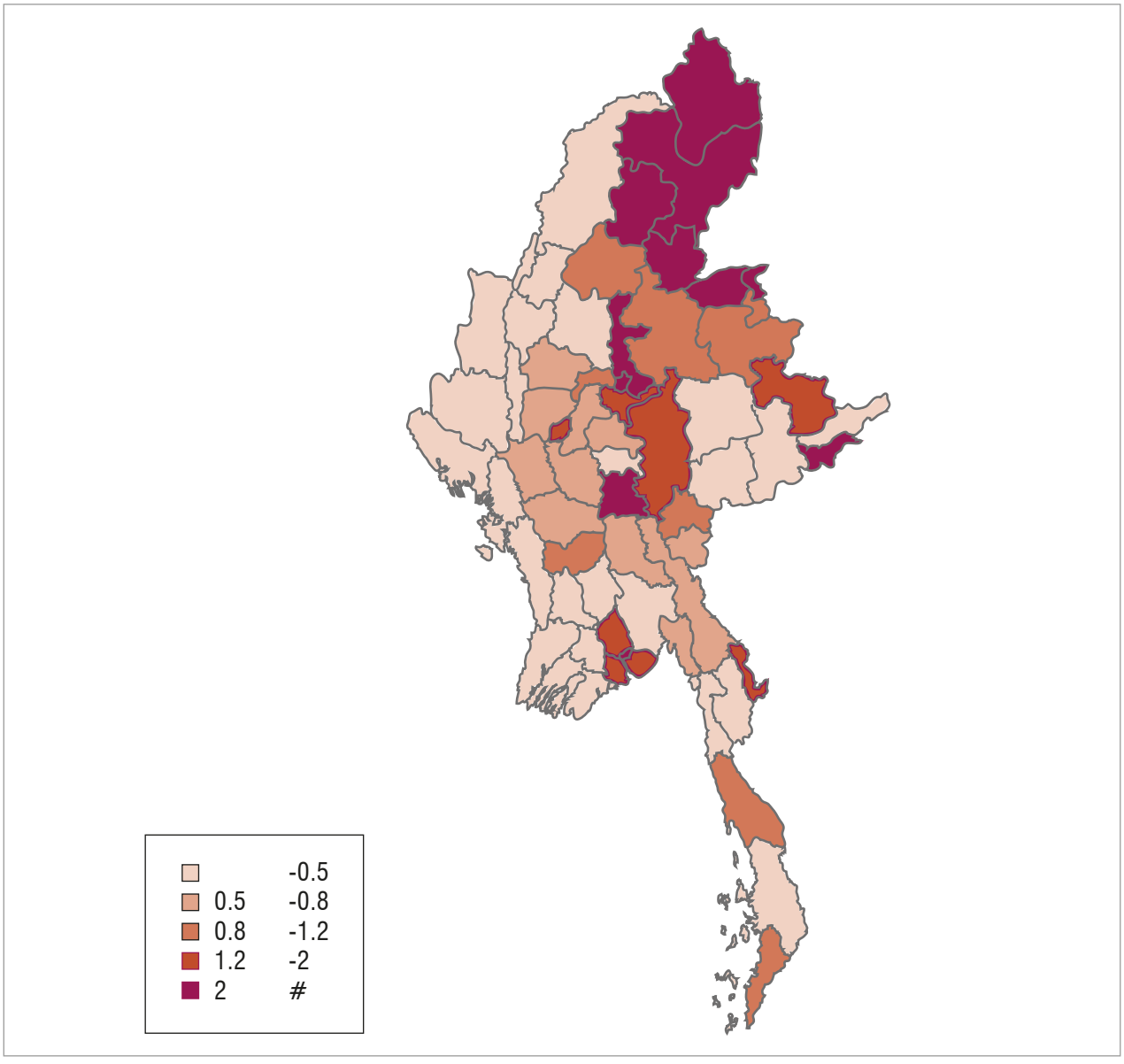
LIMITED ACCESS TO KEY SERVICES RESULTS IN DIFFICULTIES IN THE SOCIOECONOMIC DEVELOPMENT OF THE SECTOR'S RURAL STAKEHOLDERS

The quality and availability of key services such as electricity, telecommunications, transportation and finance is limited outside of main urban and industrialized areas. Moreover, GDP per capita varies greatly by region, and wealth in some rural districts is less than half that of urban centres.[65] As the fisheries sector largely relies on the labour of more rural populations, it is imperative that these stakeholders are able to access adequate levels of service.

The strategic focus of favouring rural and agricultural development as part of fisheries sector development is fully aligned to Myanmar's Framework for Economic and Social Reforms, which aims to favour private sector development as well as food security.

65. IDE-JETRO (2012). Myanmar economy viewed at night. *Policy Review Series on Myanmar Economy*, No.05, August.

Figure 15: *Estimated GDP per capita by district (2009)*



Source: IDE-JETRO (2012). Myanmar economy viewed at night. Policy Review Series on Myanmar Economy, No.05, August.

WHERE WE WANT TO GO

VISION

The following vision has been developed to guide the sector and export development efforts of the fisheries sector.

> "An integrated and responsible fisheries sector, producing and exporting quality and value added products for the sustainable socioeconomic development of Myanmar."

The scope for opportunities in the fisheries sector is immense and extends along the entire value chain. While in some instances enhanced performance of the sector requires the strengthening of certain links within the value chain, other opportunities lie in structural modifications of the links. The enhancement of the sector value chain shall lead to increased market penetration (increasing exports in existing markets), product development (increasing exports of new products in existing markets), market development (increasing exports of existing products in new markets), and full diversification (increasing exports of new products in new markets). The market development of the sector is a key requisite to achieve the sector's vision of enhanced socioeconomic growth.

The envisaged future state of the fisheries sector is discussed in greater detail below.

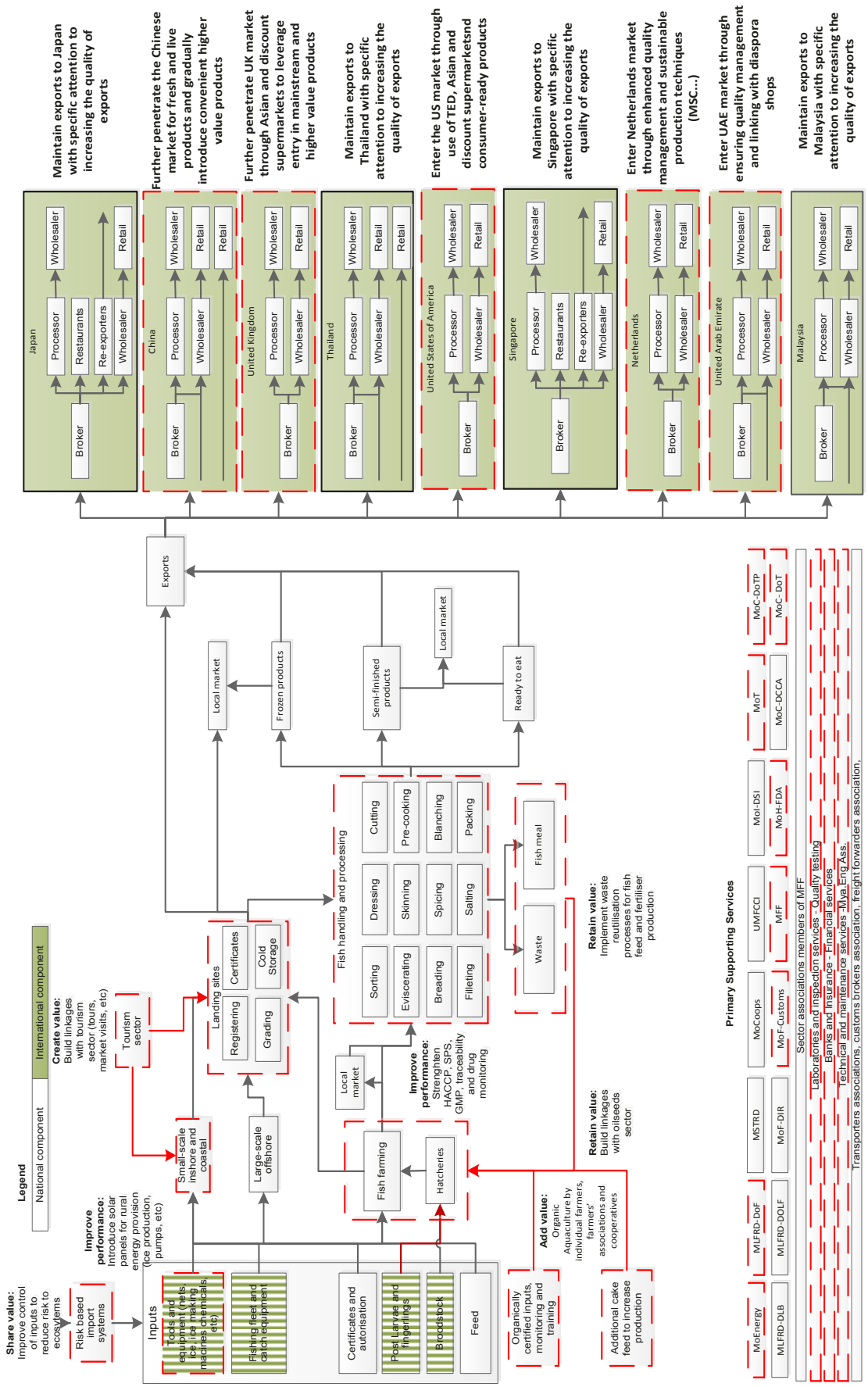


Figure 16: *Future value chain – fish*

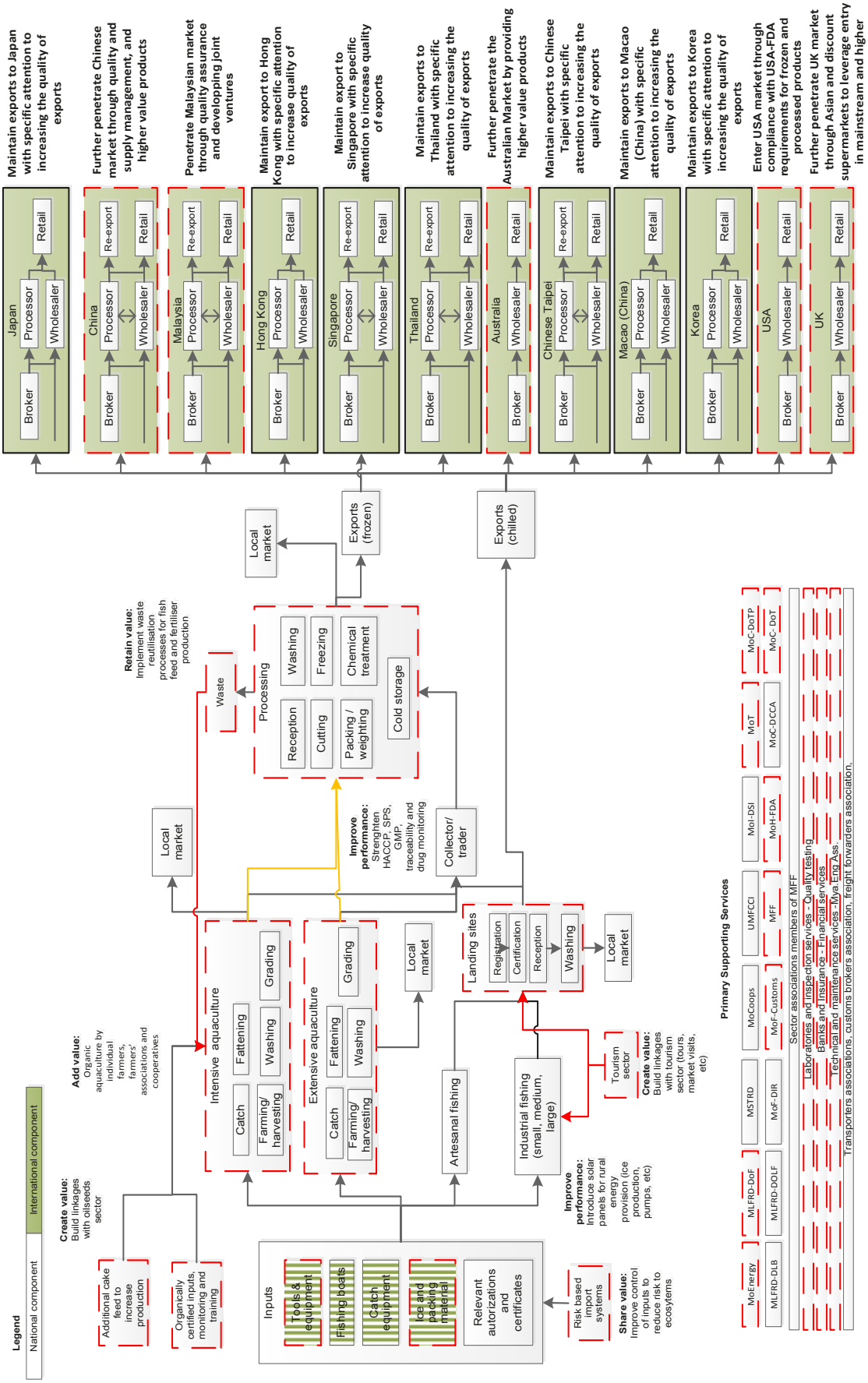


Figure 17: *Future value chain – crustaceans*

MARKET IDENTIFICATION

Demand for fish and seafood products is expected to increase significantly in the coming decades, alongside a rapidly rising world population. Demographic changes (such as an emerging middle class in China or a growing diaspora seeking traditional fish species in the United Kingdom) are also leading to changing consumption patterns, reflecting opportunities in new and existing markets for Myanmar exporters. Meanwhile, the increasingly obvious environmental impacts of overfishing are leading many consumers to recognize the benefits associated with aquaculture while demanding the sustainable management of ocean resources through the adoption of standards such as the Marine Stewardship Committee (MSC) and others. Although the Myanmar fisheries sector is poised for significant growth, long-term success will depend on strategic investments that build the sector's reputation as a sustainable source of quality fish and crustacean products.

Increased diversification and profitability can also be achieved by accessing opportunities through higher value addition with investments in new product development and upgraded production/processing capacity. Myanmar's large domestic population and proximity to key markets means that the country is well positioned to expand into value added activities. However, entering higher value markets will require significant institutional, financial and technical capacity upgrading in Myanmar. Beyond an enhanced institutional framework and improved production techniques/capacity, exporters will also depend on marketing surveys and business development efforts to strengthen the sector's competitiveness in world markets.

The resources and expertise developed as exporters move into higher value markets will ultimately strengthen the fisheries sector while unlocking new opportunities in other segments of the economy. For instance, the enhanced cold chain needed for the distribution of frozen or chilled fish can be applied to other commodities requiring refrigerated distribution. Similarly, the expertise and technical capacities established to ensure food safety and compliance with foreign regulatory requirements can be leveraged across the agri-food sector. Overall, efforts directed towards strengthening export development will facilitate critical improvements to the fisheries sector's capacity while stimulating the modernization and development needed to build value in other areas of Myanmar's economy. An overview of short- and mid-to-long-term country-specific market opportunities is presented below.

Table 20: *Fish and crustaceans – short term (1-3 years)*

Target market	Product	Distribution channel	2012 exports to market (US$ thousands)	Exported growth in value (%) (2008–2012)	Average forecast GDP growth 2013–2018 (% change)
United Kingdom	Frozen fish, whole (HS 0303)	Brokers	14 775	3	1.94
China	Frozen fish, whole (HS 0303)	Brokers	8 333	-20	7.14
	Crustaceans (shrimp, prawn, crab) (HS 0306)	Brokers	45 081	39	
	Processed crustaceans (HS 1605)	Brokers	--	--	
Australia	Crustaceans (shrimp, prawn, crab) (HS 0306)	Brokers	3 629	14	2.86
	Processed crustaceans (HS 1605)	Brokers	938	3	
Malaysia	Crustaceans (shrimp, prawn, crab) (HS 0306)	Brokers	16 406	0	5.07
	Processed crustaceans (HS 1605)	Brokers	26	--	
United Arab Emirates	Frozen fish, whole (HS 0303)	Brokers	--	--	3.69
United States	Frozen fish, whole (HS 0303)	Brokers	--	--	2.90
	Crustaceans (shrimp, prawn, crab) (HS 0306)	Brokers	--	--	
	Processed crustaceans (HS 1605)	Brokers	--	--	
Netherlands	Frozen fish, whole (HS 0303)	Brokers	--	--	1.13

UNITED KINGDOM

Product: frozen fish (whole)

The United Kingdom is an important existing market for Myanmar frozen fish exports. The country is home to a large South Asian diaspora and retailers are increasingly catering to consumer demands for a diverse range of foreign fish/seafood ingredients. Of the United Kingdom's US$156 million total imports of frozen fish (HS 0303, 0.6% of world imports) in 2012, Myanmar's share was US$14 million of exports. This value places the United Kingdom among the top existing export destinations for Myanmar frozen fish. There is a good opportunity to build on these existing trade relationships to expand market penetration and gain further experience operating in Western markets. Moreover, Myanmar exporters can work towards gaining an important advantage in this market by obtaining preferential treatment granted as part of the Generalized System of Preferences. The majority of seafood purchased by United Kingdom consumers is in pre-prepared, ready-to-cook formats, indicating strong potential for further value addition in Myanmar's exports. Nevertheless, it should also be noted that the market is experiencing a shift in preference towards chilled fish products which are perceived by consumers to be fresher and of higher quality than frozen.[66] Exporters can increase market value and demand through improved marketing and quality and supply management in order to meet regulatory requirements and respond to customer demands.

CHINA

Products: frozen fish (whole), crustaceans, processed crustaceans

Of China's US$3.34 billion total imports of frozen fish in 2012 (HS 0303, 13.8% of world imports), Myanmar contributed US$8.3 million of exports. Myanmar exporters have been focused on China's highly price-competitive frozen fish segment, with large volumes of imports ultimately destined for further processing and re-export. China's total imports of crustaceans (HS 0306) from world markets in 2012 were valued at over US$1.12 billion (5.6% of global imports) and imports of processed crustaceans (HS 1605) totalled US$143 million (1.7% of global imports). Myanmar's exports of crustaceans (HS 0305) to China totalled US$45 million in 2012; however, no trade was recorded for processed crustaceans (HS 1605). Export volumes are suspected to be substantially higher than reported, given high levels of unrecorded border trade.

The rapidly growing Chinese market is characterized by a growing appetite for fish and seafood and a desire for more convenient meals driven by increasing urbanization and rising incomes. Overall, Chinese demand remains strongest for fresh and live seafood; however, frozen and prepared products are gaining traction in consumer markets. Beyond a growing appetite for prepared foods, these trends are leading to increased consumption in restaurants, indicating new opportunities for exporters to further diversify into food service markets.[67] These opportunities can be seized through increased efforts in quality and supply management, including adherence to required quality management certificates. Strengthening firm-level partnerships between licensed and unlicensed exporting firms can also play an important role in boosting short-term export volumes needed to satisfy demand in this rapidly growing market. China's close geographic proximity, existing trade relationships with Myanmar, and growing demand underscore significant opportunities for increased trade and value addition.

AUSTRALIA

Products: crustaceans, processed crustaceans

In 2012 Myanmar exports of crustaceans (HS 0306) to Australia totalled US$3.6 million, while processed crustaceans (HS 1605) totalled US$938,000. This same year, Australia's total imports from world markets for these products were over US$247 million for crustaceans (1.2% share of world imports) and over US$185 million for processed crustaceans (2.2% of world imports). Australian seafood consumption has been rising rapidly and was estimated at 25 kg per capita in 2010.[68] The market is largely driven by demand for low-cost seafood products; however, consumers are also increasingly mindful of sustainability issues. Imports also face strict quality and safety requirements, which underscores the importance of improving production and processing methods while adhering to certifications and standards (such as HACCP and others). Market access can also be strengthened by undertaking new modes of entry such as expanded contract processing or the development of partnerships with established Australian or multinational counterparts. Exporters can also develop relationships within the Australian market by interacting with the Austrade office opened in Rangoon in 2013.

66. Seafood Choices Alliance (2007). *The United Kingdom Marketplace for Sustainable Seafood*, p. 15. Available from http://www.seaweb.org/resources/documents/SCAUKMPReport.pdf.

67. SeafoodSource.com (2013). China eating more seafood than it produces, 13 June. Available from http://www.seafoodsource.com/en/news/supply-trade/18903-china-eating-more-seafood-than-it-produces.

68. Australia, Department of Agriculture (2013). *Australia's Seafood Trade*, p. 5. Available from http://www.daff.gov.au/__data/assets/pdf_file/0005/2359643/aus-seafood-trade.pdf.

MALAYSIA

Products: crustaceans, processed crustaceans

Malaysia is among the top seafood import markets in South-East Asia. Malaysian cuisine is very diverse and seafood plays a prominent role in local recipes and diets. Strong demand for seafood is reflected by the country's high per capita seafood consumption, estimated at roughly 55 kg per year – below Japan and Hong Kong (China), but among the highest in the world.[69] Malaysia is also home to an important processing sector which demands significant supplies of crustaceans for the domestic market and for re-export. Consumers are very price-sensitive when purchasing seafood products, highlighting the importance of price competitiveness. In 2012 the value of Malaysia's crustacean imports (HS 0306) from world markets totalled US$263 million, or 1.3% of global imports, while imports of processed crustaceans (HS 1605) totalled US$28 million, or 0.3% of global imports. This same year, exports of crustaceans (HS 0306) from Myanmar to Malaysia totalled US$16 million and processed crustaceans (HS 1605) totalled US$26,000. Market access can be improved through adherence to Malaysia's quality and certification requirements among a larger number of firms, as well as the development of partnerships with Malaysian processors. Malaysia's rapidly growing economy and participation in ASEAN represent valuable opportunities for growth among Myanmar crustacean exporters.

UNITED ARAB EMIRATES

Product: frozen fish (whole)

The United Arab Emirates (UAE) is considered an important trading partner for the Myanmar fisheries sector thanks to existing trading relationships and ties in other sectors. Per capita seafood consumption in the UAE is among the highest in the world, at roughly 51 kg per capita per year.[70] The country is home to a large expat community seeking access to a wide range of fish and seafood products to meet diverse tastes. Myanmar is among the top exporters of fish into the UAE, behind India.[71] Imports of frozen fish (HS 0303) from world markets to the UAE totalled US$58.5 million (0.2% share of world imports) in 2012. According to DoF, there were approximately US$40 million exports to UAE between 2011 and 2013. Within the UAE market, fresh fish is generally perceived to be of superior quality to frozen, and consumption of canned or prepared seafood is relatively low. Exporters can access new opportunities within the UAE market through enhanced quality and supply management capabilities, as well as improved marketing initiatives, possibly jointly with other important export sectors such as pulses and oilseeds.

UNITED STATES

Products: frozen fish (whole), crustaceans, processed crustaceans

With the suspension of economic sanctions against Myanmar, the United States will offer significant opportunities for exporters. The total value of frozen fish (HS 0303) imported to the United States from world markets was over US$562 million in 2012, representing a 2.3% share of global imports. For crustaceans (HS 0306) and processed crustaceans (HS 1605), imports from world markets totalled US$5.2 billion (26.2% share of global imports) and US$2.2 billion (26.5% share of global imports) respectively. This same year, total retail sales of fish and seafood products in the United States were over US$14.7 billion. Retail sales are expected to grow to US$17.1 billion by 2017.[72] Annual per capita seafood consumption in the United States averaged 25 kg in 2012.[73] Myanmar exporters will require increased marketing, production and quality management capabilities in order to improve their position in the United States market. Ensuring compliance with strict United States food safety and quality standards will also strengthen the modernization of Myanmar's seafood sector while unlocking opportunities in new markets which closely follow United States regulatory standards and consumer trends.

NETHERLANDS

Product: frozen fish (whole)

The Netherlands is an important hub for access to the European market and is recognized as a leader in agri-food marketing and product development. In 2012, world imports of frozen fish (HS 0303) to the Netherlands totalled US$508 million, representing a 2.1% share of global imports. The Netherlands is home to an important fish processing industry and is also viewed as a leading marketer and wholesale distributor of fish through fish auctions. Enhanced access to the Netherlands market will depend on the development of strong trading relationships as well as improved production techniques and

69. Agriculture and Agri-Food Canada (2010). *Malaysia's Market for Imported Fish and Seafood: A Guide for Canadian Exporters.* Available from http://www.ats-sea.agr.gc.ca/ase/5688-eng.htm.

70. Seafish (n.d.) *Seafood Export Profiles: United Arab Emirates*, p. 9. Available from http://www.seafish.org/media/Publications/ExPro_UAE_SEP.pdf.

71. *Ibid.*

72. Packaged Facts (2013). *Fish and Seafood Trends in the U.S.* Available from http://www.marketresearch.com/Packaged-Facts-v768/Fish-Seafood-Trends-7649917/.

73. Economist Intelligence Unit (n.d.). Data tool. Available from http://data.eiu.com.

capacity, with an emphasis on food safety. The European market also places a strong importance on sustainability, highlighting the need for the implementation of sustainability standards (such as MSC, Friends of the Sea, etc.) to unlock further value addition and competitiveness. Exporters can identify market opportunities by building relationships with industry players through intermediaries such as the Dutch Fish Product Board, the Centre for the Promotion of Imports from Developing Countries (CBI) or through commercial attachés. Myanmar's market access to the Netherlands and other EU countries can benefit from the preferential treatment accorded by the Generalized System of Preferences.

Table 21: *Fish and crustaceans: medium-to-long term (3+ years)*

Target market	Product	Distribution channel	2012 exports to market (US$ thousands)	Exported growth in value (%) (2008–2012)	Average forecast GDP growth 2013–2018 (% change)
United Kingdom	Frozen fish fillet/steak(HS 0304)	Brokers	88	-7	1.94
	Prepared/preserved fish (HS 1604)	Brokers	--	--	
	Processed crustaceans (HS 1605)	Brokers	119	--	
Australia	Processed crustaceans (HS 1605)	Brokers	938	3	2.86
China	Frozen fish fillet/steak (HS 0304)	Brokers	17	87	7.14
	Prepared/preserved fish (HS 1604)	Brokers	--	--	
United States	Frozen fish fillet/steak (HS 0304)	Brokers	--	--	2.90
	Prepared/preserved fish (HS 1604)	Brokers	--	--	
	Processed crustaceans (HS 1605)	Brokers	--	--	

UNITED KINGDOM

Products: frozen fish fillet/steak, prepared/preserved fish, processed crustaceans

Myanmar's trade relationship with the United Kingdom offers important opportunities for further expansion with value added fish products. Beyond frozen whole fish, opportunities have been identified in the frozen fish fillet/steak, prepared fish and processed crustacean market segments. In 2012, the United Kingdom imported over US$ 1.2 billion of frozen or chilled fish fillets (HS 0304), over US$ 1 billion of prepared/preserved fish (HS 1604) and over US$ 465 million of processed crustaceans (HS 1605) from world markets. These values represent a 5.6% share of world imports in frozen/chilled fish fillets, a 6.7% share of prepared/preserved fish, and a 5.5% share of processed crustaceans.

The United Kingdom's large South Asian diaspora offers opportunities for market entry with processed and frozen products or specific fish species catering to traditional tastes. Current trade in fish between Myanmar and the United Kingdom is characterized by large volumes of low value products. Indeed, in 2012 the average unit value for exports of frozen or chilled fish fillets (HS 0304) from Myanmar to the United Kingdom was US$ 1,725 per unit, in contrast to a high of US$ 7,833 per unit for exports from Myanmar to Canada. Over the long term, the experiences gained serving this segment can be leveraged for entry with more mainstream and value added products such as breaded fish products, shrimp rings, etc. Upgrading production/processing and marketing capacities to gain market share in the United Kingdom can also open the door for further expansion into other European markets. Long-term success and the achievement of higher value addition in this market will also depend on offering products that meet consumer expectations on sustainability, safety and quality.

AUSTRALIA

Product: processed crustaceans

Of Australia's over US$ 185 million of imports of processed crustaceans (HS 1605) from world markets in 2012 (2.23% of global imports), Myanmar provided over US$ 938,000 of exports. Myanmar's existing trade relationships within the Australian market offer important opportunities for further expansion through enhanced quality and the introduction of new, higher-value products. Enhancing capacity to enable the introduction of new products (such as crumbed prawn cutlets, shrimp spring rolls or others) will help Myanmar exporters achieve greater levels of diversification and value addition. Achieving higher value addition will depend on significant investments in product development and marketing capacities. Production and processing facilities will also require sustained investments in higher quality and the food safety standards needed to ensure adherence with strict Australian regulatory requirements.

CHINA

Products: frozen fish fillet/steak, prepared/preserved fish

China's rapid growth and increasing urbanization is driving demand for fish imports to supplement domestic production and meet rising consumer demand. The country's increasing levels of urbanization and rising middle class are leading consumers to seek more convenient pre-packaged options while boosting demand within the food service industry. In 2012 China imported a total of over US$90 million worth of frozen/chilled fish fillets (HS 0304), alongside over US$30 million of prepared/preserved fish (HS 1604) from world markets. This represents a 0.4% share of world frozen/chilled fish fillet imports and a 0.2% share of global prepared/preserved fish imports. The Chinese market is highly price-sensitive, as reflected by an average unit value of US$1,767 per unit for exports of frozen or chilled fish fillets (HS 0304) from Myanmar. Exporters can access new opportunities in this growing market by focusing on achieving compliance with Chinese quality certification in domestic processing facilities, as well as the development of partnerships with experienced Chinese processors and marketers. Beyond distribution through traditional channels (brokers, wholesalers, retailers), opportunities for disintermediation exist through the use of web platforms such as Alibaba.

UNITED STATES

Products: frozen fish fillet/steak, prepared/preserved fish, processed crustaceans

In 2012 imports of frozen or chilled fish fillets/steaks (HS 0304) from world markets to the United States were valued at over US$4.9 billion, or 23.4% of world imports. The same year, United States imports of prepared/preserved fish (HS 1604) were valued at over US$1.8 billion, representing an 11% share of world imports. Imports of processed crustaceans (HS 1605) from world markets were valued at US$2.2 billion, representing 26.5% of world imports. The importance of the American market in these product categories underscores the value placed by American customers on convenience and ease of preparation. This highlights opportunities for further value addition by Myanmar exporters through the introduction of products such as fish burgers, breaded shrimp, etc. Operating within the American market will require adherence to strict food safety/quality standards (such as Food and Drug Administration, HACCP, GMP, etc.) as well as significant investments in marketing and product development to keep pace with consumer trends and other competitive forces. Similarly to other markets, the development of relationships with processors and/or distributors will also play a critical role in enabling successful market entry and growth in the United States.

STRUCTURAL IMPROVEMENTS TO THE VALUE CHAIN

Although the sector strategy will target a range of issues currently constraining export competitiveness, the sustainability of long-term development will require additional modifications to the sector's structure. A number of opportunities exist to improve the value chain, thereby increasing value addition and socioeconomic impact. The following section describes the strategic options that were identified by sector stakeholders as required to enhance the long-term performance of the sector.

Box 11: Structural improvements to the value chain

- Add value through the introduction of organic aquaculture.
- Rectify gaps in rural energy provision by introducing solar power.
- Strengthen linkages with the tourism sector.
- Strengthen linkages with the pulses, beans and oilseeds sector.
- Implement waste reuse processes.
- Protect ecosystems and trade with risk-based import systems.

ADD VALUE THROUGH THE INTRODUCTION OF ORGANIC AQUACULTURE

Organic production has been one of the most dynamic areas of food production in recent memory, and organic farmers have been able to demand significant price premiums over their traditional counterparts. The market for organic products was estimated to be US$62.9 billion in 2011, having grown over 300% from 1999 (US$15.2 billion).[74] Higher costs result from a number of factors, including limited supply, increased labour, more expensive inputs, limited economies of scale, complex post-harvest handling, certification fees, and relatively inefficient marketing and distribution.[75] While prices reflect the increased costs and risks of organic farming, the price premiums commanded have made it a profitable endeavour.[76]

Compared with other organic products, organic aquaculture has been slower to take root. Roughly a dozen countries currently maintain standards for organic aquaculture, and although this is miniscule in comparison to the standards governing organic agriculture, there are signs that governments are taking increased interest in solidifying the standards and regulations of the aquaculture market.[77]

The EU notes that organic salmon commands a 50% premium over traditional varieties and there are signs that organic aquaculture is emerging as a prime driver of opportunity and sector change.[78] By introducing organic practices, Myanmar's fisheries sector can leverage its current levels of market penetration and capitalize on increasing public demand for natural products. In addition to adding value above what is offered by current products and commanding higher prices, organic production is often associated with high quality. This will aid Myanmar in its effort to develop a strong brand and introduce its products into more demanding markets. Moreover, the environmental benefits of organic processes will enhance sectoral sustainability, reduce ecosystem contamination and contribute to environmental harm reduction. In sum, the introduction of organic aquaculture would be a strong step towards recognizing the sector vision for a responsible fishing sector that exports quality and value added products for sustainable socioeconomic development.

74. Willer, H., Lernoud, J. & Kilcher, L. (eds.) (2013). *The World of Organic Agriculture: Statistics and Emerging Trends*. Research Institute of Organic Agriculture (FiBL), Frick & International Federation of Organic Agriculture Movements (IFOAM). Bonn.

75. FAO (n.d.). Organic Agriculture FAQ. Available from http://www.fao.org/organicag/oa-faq/oa-faq5/en/. Accessed 13 February 2014.

76. Clark, S. & Alexander, C. (2010). *The Profitability of Transitioning to Organic Grain Crops in Indiana*. Purdue Agricultural Economics Report. Indiana: Purdue University.

77. Jenny Hopkinson (2013). Organic standards for farm-raised fish come slowly. *Politico*, 30 October.

78. European Commission (2010). New organic aquaculture rules a route to a more sustainable and profitable future for aquaculture, 30 June. Available from http://ec.europa.eu/fisheries/news_and_events/press_releases/300610/index_en.htm.

Structured efforts will be needed between MLFRD, the Ministry of Agriculture and Irrigation, and the Myanmar Scientific and Technological Research Department to promote the production and import of internationally accredited organic inputs; to promote the building of a traceability system to track organic production from field to aquaculture farm; and to strengthen the standards and accreditation scheme in Myanmar. It will also be essential to build the knowledge of organic production and processing for extension services, farmer field schools and key support institutions of the fisheries sector.

RECTIFY GAPS IN RURAL ENERGY PROVISION BY INTRODUCING SOLAR POWER

As noted previously, a key constraint to sector development is insufficient access to electricity in the rural areas where sector activity is concentrated. The lack of electricity in these areas makes it difficult for landing sites to maintain refrigerated storage and for ice plants to produce necessary quantities. As such, the inadequate cold storage mechanisms increase the risks of inconsistent quality, safety hazards and damaged goods. Gaps in energy supplies could be filled by equipping these facilities with solar power systems. In addition to facilitating key services, the clean energy could act as a model for future development, help Myanmar position itself as a pioneer in environmentally responsible production, and be leveraged in promotional and branding efforts.

STRENGTHEN LINKAGES WITH THE TOURISM SECTOR

There are a number of opportunities to leverage synergies between the fisheries and tourism sectors. Linkages should be strengthened in order to ensure that domestic fisheries products are well-integrated into the tourism value chain. Restaurants and hotels should be encouraged to source their fish from local domestic enterprises where possible. Other linkages could be developed with artisanal fishers through the promotion of tourist fishing outings and agritourism. In addition to strengthened integration, opportunities exist for cross-branding. Since a majority of tourists to Myanmar are interested in experiencing its culture, and as fish-based cuisine is such an integral part of that culture, this cuisine and its ingredients could be promoted in the context of cultural tourism.

STRENGTHEN LINKAGES WITH THE PULSES, BEANS AND OILSEEDS SECTOR

A key determinant of fishery product quality is access to adequate feed. Efforts should be made to increase dialogue with the pulses, beans and oilseeds sector in order to coordinate the production of adequate oilcake-based

feeds. Sector associations would be well-placed to discuss possible means of collaboration. Strengthened linkages would result in the fisheries sector acquiring access to a stable supply of quality inputs, while millers and feed producers would be able to upgrade capacities according to feed requirements. Such enhancements would not only provide them with a stable source of demand but would also encourage advancements in quality that could help them penetrate new markets.

IMPLEMENT WASTE REUSE PROCESSES

More effective waste reuse at landing sites, processing factories and farms would allow stakeholders to reduce costs through salvage while minimizing environmental harm. While some waste could be used for improved fertilizer production, the by-products from shrimp shell processing could be collected, dried, and exported to China as inputs for collagen production. Still other types of waste could be collected by feed processors for feed and fertilizer production. Some waste is being used, such as the slush from farms which is destined for agricultural fertilizers, as well as landing site waste, which is almost fully utilized. Volumes are quite small, however, and capacities for waste reuse, where they exist, must be enhanced for increased production.

PROTECT ECOSYSTEMS AND TRADE WITH RISK-BASED IMPORT SYSTEMS

Due to the use of imported fingerlings and post-larvae, and in anticipation of further diversification into the aquaculture of non-native species, Myanmar must enhance its impact assessment capacities through the implementation of risk-based import systems. The goal of such systems is to regulate the importation of inputs in a way that minimizes the risk of introducing dangerous pathogens into the local supply chain. As noted, diseases among imports, such as those found in marine shrimp post-larvae from Bangladesh, are not uncommon. Indeed, poor quality post-larvae are thought to be the source of the White Spot Disease outbreak that devastated intensive and semi-intensive shrimp production in 2004-2005.[79] The introduction of these diseases creates hazards for production reliability, quality and safety, as well as the local ecosystem. Risk-based import management would allow authorities to minimize such hazards in an efficient and cost-effective manner.

ROLE OF INVESTMENT TO MOVE INTO NEW VALUE CHAINS

Improving the fisheries value chain as envisioned by the sector strategy and PoA will require considerable investment. Public funds and donor aid will be important sources of this investment, particularly for infrastructure, the business environment, government capacity and guidance to the private sector. However, few factors are as fundamental to the success of a sector as its capital investment, which must be profit-driven to be sustainable in the long term. Therefore, the private sector itself will be the primary source of investment, and a successful sector strategy should mobilize private investment as both an integral part and an early driver of improvements to the value chain. In the medium-to-long term, the combination of concerted public support, motivated private investment, and the general air of hope for Myanmar's future should create enough confidence and momentum to stimulate a virtuous cycle of self-sustaining growth and development.

Myanmar is a least developed country and classified as being in a fragile or conflict-affected situation. It has a transition economy and a very weak financial sector. As such, domestic investment is unlikely to reach transformative levels for the fisheries sector in the foreseeable future. A comprehensive private sector development plan is needed for domestic enterprises, but in the short-to-medium term the role of foreign direct investment (FDI) will be especially important.

FDI can have a transformative effect on a developing country's home-grown, domestically oriented industry, and help it to achieve significant export growth. International investors may be able to introduce a wide range of assets otherwise unavailable to local enterprises, such as large amounts of capital, better inputs, technologies, skills, management practices, operational experience, economies of scale and international distribution channels, among others.

79. CBI (2012). *Myanmar Seafood Exports: Quick Scan of the EU Market Potential.*

Table 22: *Value chain segments needing FDI and examples of likely sources*

Value chain segments where FDI is needed and viable	Sample of leading companies with foreign affiliates in Asia	Source country	Regional locations with an existing presence
Integrated fishery-seafood producers	Maruha Nichiro Corp.	Japan	China, Thailand
	Nippon Suisan	Japan	China, Thailand, Viet Nam
	Thai Union Group	Thailand	Indonesia, Viet Nam
Cold chain logistics providers	DB Schenker	Germany	Bangladesh, Cambodia, China, India, Indonesia, Malaysia, Nepal, Pakistan, Philippines, Sri, Lanka, Thailand, Viet Nam
	CH Robinson	U.S.	China, India, Malaysia, Thailand, Viet Nam
	Hellmann Worldwide Logistics	Germany	Bangladesh, Cambodia, China, India, Indonesia, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Sri, Lanka, Thailand, Viet Nam
Fish and shrimp feed manufacturing and R&D	Charoen Pokphand	Thailand	Bangladesh, India, Indonesia, Malaysia, Myanmar, Viet Nam
	Cargill	U.S.	China, India, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam
	New Hope Group	China	Bangladesh, Indonesia, Philippines, Viet Nam
	12 other Chinese companies producing 1-10 MMT/year, including Guangdong Wen's Group, Cofco, and East Hope Group		
	7 other Japanese companies producing 1-10 MMT/year, including Zen-noh Cooperative, Marubeni-Nisshin, and Mitsubishi Nossan		
	7 other Asian companies producing 1-10 MMT/year, including Betagro (Thailand), San Miguel (Philippines), Zuellig Gold Coin (Malaysia), Japfa Comfeed (Indonesia), CJ Cheil Jedang (Rep. of Korea), Easy Bio System (Rep. of Korea), and Proconco (Viet Nam)		
Quality testing and certification	SGS	Switzerland	Bangladesh, China, India, Indonesia, Malaysia, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam
	Cotecna	Switzerland	Bangladesh, China, India, Indonesia, Malaysia, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam
	Intertek	U.K.	Bangladesh, China, India, Indonesia, Malaysia, Myanmar, Pakistan, Philippines, Sri Lanka, Thailand, Viet Nam
	NSF	U.S.	China, India, Malaysia, Thailand, Viet Nam

Sources: Undercurrent News (2013). Undercurrent news: world's 100 largest seafood companies, 11 September. Available from http://www.undercurrentnews.com/report/undercurrent-news-worlds-100-top-seafood-companies/; Food Logistics (2013). The top 100 3PL & cold storage providers for 2013, 23 August. Available from http://www.foodlogistics.com/article/11123003/third-party-logisticscold-storage-providers?page=10; WattAgNet.com (2012). Special report: top feed companies 2011–2012, 31 August. Available from http://www.wattagnet.com/Special_report__Top_feed_companies_2011-2012.html; Murphy, S., Burch, D. & Clapp, J. (2012). *Cereal Secrets: The World's Largest Grain Traders and Global Agriculture.* Oxford, United Kingdom: Oxfam; and company websites.

Types of investment needed and their likely sources

Expanding the sector's production volume, quality, efficiency, value chain operations and exports will require a proliferation of private companies engaged in establishment or supply of the following value chain elements:

- New intensive aquaculture sites
- Aquaculture technology and equipment, particularly for closed systems
- Fish and shrimp feed
- Technology for disease control and quality post-larvae (e.g. chemical disruptors, feed additives, bacteria-controlling pathogens)
- Refrigerated distribution
- Manufacturing of processed seafood (i.e. beyond basic freezing, chilling and filleting)
- Quality testing services.

The companies that may be ready to invest in these activities are integrated fishery-seafood producers, cold chain logistics companies, animal feed companies, and quality testing companies. Aquaculture equipment is likely to be imported by fisheries rather than manufactured in Myanmar for the foreseeable future. Table 22 presents a sample of leading FDI sources for these investments.

Myanmar's fisheries sector stakeholders, in particular the Myanmar Directorate of Investment and Company Administration, the numerous private sector associations, MLFRD and UMFCCI, should work to present proven investors with Myanmar's investment opportunities and, simultaneously, to advocate investment climate reforms that will enhance Myanmar's attractiveness. Table 22 presents a sample of companies which control large segments of the global markets in their fields. These are not the only potential investors, and smaller regional companies may be better poised to move quickly into Myanmar, given their proximity to and knowledge of the country. However, given the large resource endowments and geographic scope of Myanmar's fisheries sector, the world's leading players are likely to be involved in a scaling up which fully realizes the sector's potential.

Furthermore, most of the companies in Table 22 already have extensive presences in the region. Future investment projects in Myanmar might originate with their headquarters or with their regional affiliates. For companies with no presence in Myanmar, a first venture would likely take the form of a sales office. Although this does not create the jobs, technology spillovers or skill spillovers of a manufacturing project, for example, the possibility of a sales office should not be dismissed by investment promoters as being of low value. A first sales office is an opportunity for a foreign company to make tentative entry into a new market, learning the business landscape and achieving a level of comfort. Of more immediate importance, it can provide Myanmar's fisheries sector with valuable access to high quality inputs, such as quality feed and disease-preventing chemicals that are essential to the strengthening of the sector.

The sector's leading competitors for FDI

Myanmar's major competitors for FDI in these value chains are other low-and middle-income countries in Asia with a record of high production, be it for a domestic or export market. Table 23 presents these competitors for FDI.

Figure 18: *Possible evolution of a foreign investor's activities in a given location*

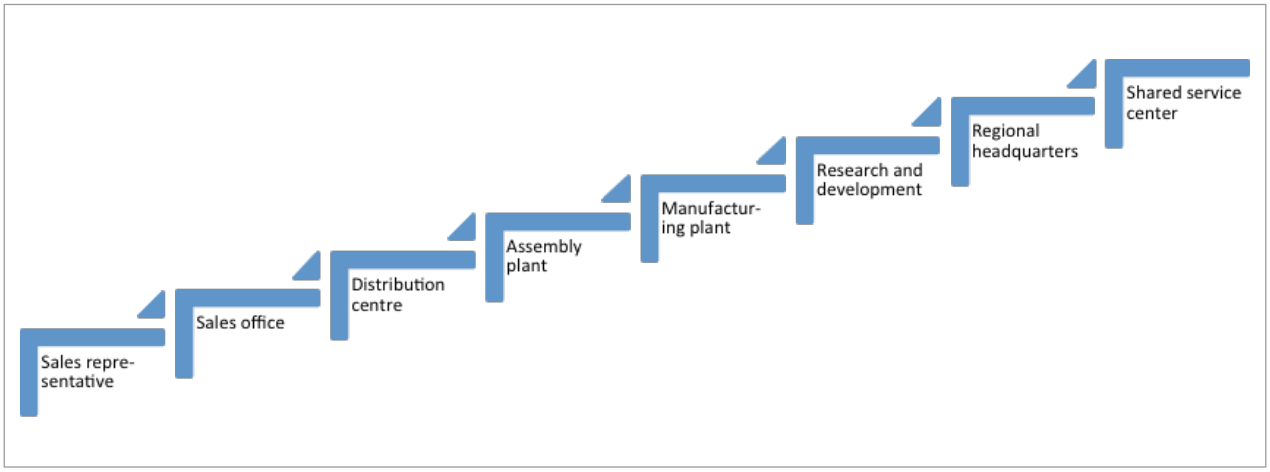


Table 23: *Leading low- and middle-income Asian producers of the sector's targeted exports*

Ranking by total of fishery capture and aquaculture	Tons produced in 2011	Global rank by 2012 FDI inflows in all sectors	Ranking by 2012 exports of HS-0303, 0304, 0305, 1604, & 1605	Exported value in 2012 (thousand USD)	Global rank by 2012 FDI inflows in all sectors	Ranking by export value per ton produced (proxy for value addition)	2012 export value divided by tons produced in 2011	Global rank by 2012 FDI inflows in all sectors
China	66,219,255	2	China	13,747,244	2	Thailand	2,075	35
Indonesia	13,651,379	17	Thailand	5,954,712	35	Viet Nam	597	36
India	8,879,499	15	Viet Nam	3,318,373	36	Pakistan	332	105
Viet Nam	5,555,000	36	Indonesia	1,910,331	17	Sri Lanka	264	109
Philippines	4,975,351	62	India	956,893	15	China	208	2
Myanmar	4,150,091	69	Philippines	585,782	62	Indonesia	140	17
Bangladesh	3,124,677	96	Malaysia	242,118	30	Malaysia	127	30
Thailand	2,870,200	35	Pakistan	197,284	105	Philippines	118	62
Malaysia	1,909,405	30	Sri Lanka	117,355	109	India	108	15
Pakistan	594,935	105	Myanmar	71,821	69	Bangladesh	19	96
Sri Lanka	445,101	109	Bangladesh	59,833	96	Myanmar	17	69
Production-FDI correlation (r2)		0.31	Export-FDI correlation (r2)		0.35	Value addition-FDI correlation (r2)		0.02

Sources: FAO; ITC calculations based on UN Comtrade data

Four countries lead the region in terms of both production and exports of fish and crustaceans: China, Viet Nam, Indonesia, and India. Thailand's high rank in export value is due largely to a degree of value addition, which other low- and middle-income countries in the region are far from matching. This strength is reflected in the fact that Thailand is the only non-high-income country in the world to have a seafood company, Thai Union Group, among the world's top 10.

Although Thailand is a major destination for FDI (36th in the world), the last column of Table 23 suggests that this is not necessarily correlated to its high level of value addition. This is fortunate for Myanmar, as it ranks last in the region by this measure. There is, however, a significant correlation between FDI inflows, on one hand, and both production and exports on the other. The low level of development of Myanmar's fish and crustacean sector, in combination with the country's large natural endowments, suggests that there is much room for production to grow and FDI with it.

From a sector-wide perspective China, Viet Nam, Indonesia, and India are Myanmar's largest competitors for FDI, but companies hoping for a first-mover advantage with low value-added projects, such as a large fish farm or a sales office for farming inputs, could be more likely to look at Bangladesh –depending on growth potential and the investment climate– as an alternative to Myanmar. Thailand is more likely a source of FDI for Myanmar than a direct competitor.

Critical factors for foreign investors in Myanmar's competitor locations

The World Bank Group's Enterprise Surveys has collected business data from 130,000 firms in 135 countries, from which indicators can be selected to approximate the competitiveness of these countries. Table 24 ranks Myanmar's competitors, from left to right, by importance in Table 23. Below each country, the table 24 presents the results of an enterprise survey, in which foreign investors in that country were asked to pick one of 15 issues as the biggest obstacle to doing business.

Although Enterprise Survey data on the biggest obstacles to doing business are available for Myanmar's major competitors (except Thailand), at the publication of this document, Myanmar's first enterprise surveys remain ongoing. When data becomes available around June 2014,[80] they can be used to compare its relative investment climate strengths and weaknesses, giving sector stakeholders an area on which to focus their investment climate reforms. Even just having such a reform process underway will add to the sector's attractiveness.

80. (World Bank Group, 2013)

Table 24: *Percentage of surveyed foreign investors citing an issue as the 'biggest obstacle' to doing business in countries competing with Myanmar for sector-related FDI*

	Group average	China	Viet Nam	Indonesia	India	Bangladesh
Practices of the informal sector	14.5	10.1	51.8	1.2	8.3	1.2
Political instability	13.1	1.0	1.3	26.4	0.0	36.7
Access to finance	12.9	18.5	2.6	15.7	13.9	13.8
Tax rates	10.5	19.9	2.3	1.2	27.8	1.4
Electricity	9.7	2.7	3.3	8.9	5.6	27.8
Inadequately educated workforce	8.2	14.3	15.4	1.9	5.6	4
Customs and trade regulations	7.0	11.5	5.5	8.3	8.3	1.4
Transportation	5.3	12.7	3.9	3.9	5.6	0.6
Access to land	4.9	3.8	2.8	9.3	5.6	2.9
Corruption	3.8	1.2	1.5	2.7	5.6	7.9
Labour regulations	3.0	1.5	0.3	4.3	8.3	0.4
Crime, theft and disorder	2.7	0.4	0.5	11.7	0.0	0.9
Tax administration	2.6	2.2	4.1	0.5	5.6	0.5
Business licensing and permits	1.4	0.2	2.5	4.0	0.0	0.5
Courts	0.5	0.0	2.2	0.2	0.0	0.0

Source: World Bank (n.d.) Enterprise Surveys. Available from /www.enterprisesurveys.org/. Accessed 15 April 2014.
Note: Pink shading indicates an obstacle which more than 10% of the surveyed foreign investors cited as the biggest.

When approaching foreign affiliates listed in table 22, Myanmar's investment promoters will be trying to persuade them to invest in Myanmar based on absolute advantages – such as a large market and abundant resources – and relative advantages, such as better tax rates than its competitor countries. Myanmar's investment promoters must distinguish themselves from the other specific locations being considered by an investor. In the absence of detailed, country-by-country cost and risk data, table 24 provides a rough basis for demonstrating relative advantages. It lists the obstacles to FDI from most-cited, (practices of the informal sector), to least-cited (courts) among Myanmar's competitors for FDI.

Looking at the group average, there is a clear top tier of four problems among Myanmar's competitors. If Myanmar could perform well in these areas, that would represent a compelling asset for attracting investors. 'Tax rates' is the one area in which Myanmar clearly outperforms its competitors. It beats all 10 countries in table 23 but Thailand in the Doing Business ranking for 'paying taxes', and it improved significantly over the last year, offering investment promoters a narrative of continuous enhancement of this existing strength. Most importantly, this issue was cited as the biggest obstacle by foreign investors in both China and India.

On the other hand, with respect to the other top-tier obstacles, Myanmar is a notably poor performer. These obstacles are unfair competition from the informal sector, political instability (or the perception thereof), and weak access to finance. For projects that put Myanmar in competition with Bangladesh, tax rates may not be a particular advantage, as they do not rate as a significant problem in Bangladesh. In fact, the two biggest obstacles in Bangladesh, political instability and electricity, are also major problems in Myanmar.

This reinforces the conclusions of the NES, which found that finance and electricity were particularly problematic for Myanmar. Making relevant reforms will not only strengthen the sector; it will give the sector two competitive advantages over its top competitors for FDI. Anticipated aid of US$1 billion from the World Bank for rural electrification should aid in this effort, and considerable power to reform the country's financial markets lies in the hands of the Government.

The preceding analysis provides a useful but rough indication of the relative attractiveness of Myanmar's fisheries sector and how its standing can be improved. However, MTDC and its stakeholders should commission a study to benchmark the competitiveness of the sector specifically. This study should evaluate specific costs and constraints for each of the investment types to be promoted in table 22, simulating the cost-benefit and risk analyses of potential investors. Armed with this information, the Myanmar Directorate of Investment and Company Administration – strengthened in line with NES recommendations and in partnership with the various private sector associations, MLFRD, UMFCCI, and other sector stakeholders – would be equipped to effectively target investors for the most competitive activities, and advocate investment climate reforms to make the others more competitive.

HOW TO GET THERE

The vision of the strategy of *An integrated and responsible fisheries sector, producing and exporting quality and value added products for the sustainable socioeconomic development of Myanmar* responds to the constraints, but equally to the ambitions, identified in the sector strategy. The following section explains the framework that will guide the implementation of the strategy. A detailed action plan setting out what needs to be done, and by whom, is presented at the end of this section.

The fisheries sector vision of becoming a driver of Myanmar's sustainable socioeconomic development will require sector performance to be built up through the implementation of a realistic and achievable roadmap. The following section explains the framework that will guide the implementation of the sector strategy. A detailed PoA indicating what needs to be done, and by whom, is provided at the end of the section.

STRATEGIC OBJECTIVES

There are five strategic objectives considered necessary for realization of the sector vision. These strategic objectives provide a coherent framework for the development of the fisheries sector over the next five years.

The first strategic objective aims to increase the long-term production and productivity of the sector through modernization of infrastructures, adequate financial support, and improved production and processing techniques. This will be achieved by:

- Improving production infrastructure;
- Ensuring access to adequate financing;
- Ensuring a stable energy supply;
- Ensuring a sufficient supply of post-larvae and fingerlings from hatcheries;
- Increasing the availability of feed and other inputs;
- Increasing the availability of quality raw materials for processing plants.

The second strategic objective will improve the safety and quality of the sector's products through improved quality management capacities, as well as the implementation of a quality management system across the value chain. This key objective shall be realized by:

- Enhancing farmer awareness of and adherence to GAqP;
- Promoting the adoption of GMP by processors;
- Strengthening the quality management system in order to ensure food safety and quality.

The third strategic objective will enhance the organization of the sector through increased dialogue and partnerships as well as the implementation of effective policies for the management of fisheries resources for sustainable growth. This objective will be realized by:

- Strengthening the policy and legislative framework;
- Facilitating the establishment of commercial linkages between value chain participants;
- Strengthening formal public–private dialogue geared at sector development;
- Revising the MSY framework in order to ensure sustainable resource management.

The fourth strategic objective aims to improve the development and innovation capacity of the sector through effective scientific research and data collection and investment in R&D. This objective will be met through:

- Building research capacities;
- Establishing comprehensive data collection and management systems;
- Enhancing R&D capacities for product development.

The fifth strategic objective aims to build the performance and branding of fishery products in order to compete successfully in international markets. This objective will be realized by:

- Improving transportation efficiency;
- Establishing a sector-specific export finance scheme;

- Ensuring the provision of adequate trade information and market intelligence data;
- Establishing a sectoral branding and promotional effort.

These strategic objectives are structured around a specific set of activities that are intended to address the wide range of issues confronting the fisheries sector. Independent, yet mutually supporting activities, will bolster specific areas of weakness. The coordinated resolution of such weaknesses, however, will serve as the foundation for value added interaction between functional areas. This, in turn, will lead to the realization of the strategic objectives and, ultimately, the sector vision.

Each of the strategic objectives relies upon a set of operational objectives. The operational objectives are intermediate achievements that must be reached in order for the strategic objectives to be met. On the most basic level, the operational objectives are realized through the implementation of various concrete activities, each of which serves to support a specific priority area within the competency of the relevant operational objective. Ideally, each activity will be translated into a project of its own. To this end, the "existing programmes or potential support" column in the PoA is provided so that donors may select activities that are in line with their own competencies, thereby facilitating the conversion of proposed activities into real-life initiatives.

IMPORTANCE OF COORDINATED IMPLEMENTATION

The broad range of activities, together with the complex nature of integrated intervention, requires careful implementation that efficiently directs resources and monitors results at both the micro and macro levels. To this end, the Myanmar Trade Development Committee (MTDC) was established in order to facilitate the public-private partnership in elaborating, coordinating, and implementing the NES. In particular, the MTDC is tasked with coordinating the implementation of activities in order to optimize the allocation of both resources and efforts across the wide spectrum of stakeholders. Within this framework, implementation of the fisheries strategy also falls within the purview of the MTDC, in close collaboration with the Myanmar Fisheries Federation.

Such efforts will involve directing donor and private and public sector organizations towards the various NES priorities in order to avoid duplication and guarantee maximum impact. Responsibilities will also include monitoring the results of activities and outputs, while at the same time recommending policies that could serve to enhance realization of the strategic objectives. With a 360 degree view of progress the Committee will be best placed to manage funding and provide regular reports to donors and stakeholders. Moreover, the MTDC will play a key role in recommending revisions and updates to the strategy so that it continues to evolve in alignment with Myanmar's evolving needs.

IMPLEMENTATION PARTNERS – LEADING AND SUPPORTING INSTITUTIONS

A number of institutions will play a key role in the implementation of the PoA for the fisheries sector, as illustrated in the TSI section and the PoA. These are institutions that have the overall responsibility for successful execution of the strategy, as well as support institutions that are active partners but not leading institutions. Each institution mandated to support the sector and export development of the fisheries sector is clearly identified in the strategy PoA.

THE **REPUBLIC OF THE UNION OF MYANMAR**
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FISHERIES
SECTOR STRATEGY 2015-2019

PLAN OF ACTION

The following action plan details all the activities to be undertaken over the next five years to achieve the vision of the strategy. The action plan is organized around strategic and operational objectives that respond to the constraints and opportunities identified in the document. The action plan provides a clear and detailed framework for the effective implementation of the Fisheries strategy.

Strategic objective 1: Increase the long-term production and productivity of the sector through modernization of infrastructures, adequate financial support, and improved production and processing techniques.								
Operational objective	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US$)
1.1 Improve production infrastructure.	1.1.1 Update and promulgate new laws in favour of more land to be used for aquaculture and ensure adequate enforcement by Union, Regional and State governments, relevant departments and delegated competent authorities such as the armed forces and police.	1	Farmers	» 10% of identified land in priority production allocated for intensive aquaculture	Regional/State General Administration Departments	DoF, MFF	Not available	500 000
	1.1.2 Have DoF/MFF elaborate a list of priority rural areas to be opened up as priority production zones by linking them to roads and electricity so that factories can move into them. This list is to be transmitted to the Ministry of National Planning and Economic Development, MLFRD, Ministry of Construction and Ministry of Electric Power in order to ensure these zones are prioritized in national rural development plans.	1	Farmers	» List registered with Ministries » Priority areas' development budgeted in Ministry budgets	DoF	Ministry of National Planning and Economic Development, MLFRD, MFF	ADB Power Distribution Improvement Project	50 000
	1.1.3 Lobby for the renovation of old roads and construction of new roads prioritized to the areas where fish farm areas and fish landing ports are far from processing plants. (Twantay to Yangon (Yangon Regional), Pyarpon/Bogalay to Yangon (Ayeyarwady Regional), Maungtaw, Yathaytaung, Buthitaung to Sittwe (Rakhine State)).	2	Whole value chain	» 100% of priority roads renovated	Ministry of Construction	Regional/State governments	ADB Maubin Pyarpon Road Rehabilitation Project, ADB – Greater Mekong Subregion trade corridors projects, build–operate–transfer systems, self-reliance	30 000
	1.1.4 Establish demonstration schemes on modern production technology to ensure effective adaptation/modernization of current technologies through collaborating with international and regional fisheries institutions such as FAO, SEAFDEC, NACA and other aquaculture-related institutions.	1	Whole value chain	» Demonstration scheme established and operational	MLFRD	Regional/State governments, MFF	FAO, SEAFDEC, NACA	2 000 000
	1.1.5 Establish incentives or investment schemes for modernization of processing and aquaculture technology development activities by collecting a certain percentage of commercial taxes or allocation of funds in a reserved fund. MFF could, as executive authority for the sector, support the allocation of incentives based on assessment criteria.	1	Producers	» Schemes established and operational	MFF	MPEA, MFFA		2 000 000
	1.1.6 Have MFF, MPEA and other associations under MFF elaborate a list of key inputs required to increase production and for which import duties should be lowered. Once the list is established, organize structured meetings between Customs and DoF or MFF to reduce or abolish duties on these products.	1	Producers	» List established » 2 meetings yearly held	MPEA	MFF		40 000
1.2 Ensure access to adequate financing.	1.2.1 Establish a credit guarantee scheme with adequate resources, to be implemented in commercial or trade banks with the objective of reducing the collateral requirements needed to access loans for the fisheries sector.	1	Entire VC	» Guarantee scheme established » Collateral requirements reduced	MoFR	Commercial banks, trade banks		5 000 000
	1.2.2 Elaborate and endorse a movable assets law that ensures movables such as cultured fish/shrimp in ponds, machinery, fishing boats and gear can be used as collateral in requesting credit.	1	Entire VC	» Movable asset law drafted and endorsed	MoFR	Regional/State governments, commercial banks, trade banks		100 000

Strategic objective 1: Increase the long-term production and productivity of the sector through modernization of infrastructures, adequate financial support, and improved production and processing techniques.								
Operational objective	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US$)
1.2 Ensure access to adequate financing.	1.2.3 Promote rural finance development of fishery communities by ensuring all fisheries-related communities are supported by the rural finance development policy and its sub-component on financial support to enhance income generation with nominal interest rates.	1	Producers	» Intervention zone of rural finance policy reaches fisheries communities	MLFRD	Ministry of Cooperatives, Regional/State governments		2 500 000
	1.2.4 Develop fisheries insurance mechanisms to provide relief measures against natural catastrophes and unforeseen disasters.	2	Entire VC	» Insurance scheme established	MoFR	Department of Insurance		10 000 000
	1.2.5 Establish and operate a fisheries development fund (production and processing) or specialized fisheries credit lines (long-term loans at favourable interest rates) to be made available to the fisheries sector through the commercial banking sector or a specialized funding organization.	1	Producers and processors	» Fisheries development fund operational	MLFRD	MLFRD, Commercial banks, MoC		5 000 000
	1.2.6 Lobby in favour of minimized exchange rate fluctuations to reduce decreasing returns on capital.	2	Entire VC	» Lobby conducted	UMFCCI	MoFR, MoC		10 000
	1.2.7 Develop and implement specific financial mechanisms to encourage the adaptation of farms into GAqP-compliant farms, modernization of ponds for intensive production and GMP upgrading of factories. Financial mechanism means loans, shares or some advanced partial payment in contract farming and manufacturing as incentives/initiatives to potential farms and factories to comply with/establish GAqP and GMP.	2	Entire VC	» Financial mechanism in operation (linked to dev. fund)	MLFRD	MoFR, MoC		1 000 000
	1.2.8 Establish property rights/ownership for fish/shrimp farmers which enable them to manage/manipulate (transfer, sell, buy, etc.) their farms as their own property as they currently only hold a permit to convert agricultural land into a fish farm and operate it. Ownership would permit, by title registration, rights of the Myanmar Fish Farmers Association transfer, sell and buy.	1	Producers	» Land titles available to fish farmers	Ministry of Agriculture and Irrigation	Regional/State governments		500 000
1.3 Ensure a stable energy supply.	1.3.1 Lobby in favour of setting up power production facilities (hydro, gas, solar, wind, tide, coal, nuclear etc.) to supply adequate and regular electricity to industrial zones, SEZs, landing sites and ice factories in **urban areas** though private and public partnerships.	1	Entire VC	» Lobby and position paper executed	Regional/State governments	MFF, Private/public enterprises, companies and agencies	ADB Off-Grid Renewable Energy Demonstration Project	50 000
	1.3.2 Promote, in line with current government initiatives, the importation of solar panels and technologies among members of MFF in order to establish solar-powered fisheries industries.	2	Entire VC	» 10% of MFF members import panels	MFF	Private/public enterprises, companies	ADB Off-Grid Renewable Energy Demonstration Project	200 000
	1.3.3 Lobby for the supply of Government electricity to give special priority to fish processing plants and cold storage in Special Economic Zones as the highest foreign currency-earning industry with easily perishable commodities.	1	Processors	» Reduction in power shortage	MFF	Ministry of Electric Power		50 000
	1.3.4 Cut the long procedures and channels in transportation, transaction and storage of fuel for fishing fleets in Yangon, through establishing new regulations by order of the Ministry of Energy.	2	Fishermen	» Reduction in procedures	Ministry of Energy	Yangon Regional Government		50 000
	1.3.5 Conduct an advocacy campaign and dialogue with the Ministry of Energy to establish a differentiated industrial fuel policy as a means to reduce the tax rate for industry development.	2	Entire VC	» Campaign completed	MFF	MoFR, MoC		50 000

Strategic objective 1: Increase the long-term production and productivity of the sector through modernization of infrastructures, adequate financial support, and improved production and processing techniques.								
Operational objective	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US$)
1.4 Ensure a sufficient supply of post-larvae and fingerlings from hatcheries.	1.4.1 Strengthen the capacity and financial resources of the disease testing lab of DoF by allocating more budget, donations and test fees; cost sharing; and collaborating with local and international organizations and institutions etc.	1	DoF laboratory, entire sector	» Important increase in budget allocation	MLFRD	MoFR, MFF	FAO, SEAFDEC, NACA	1 000 000
	1.4.2 Upgrade the performance and capacity of departmental and private hatcheries through adequate financial support and human resources development schemes. Also, ensure specialization of hatcheries: » Departmental hatcheries focus extensively on breeding of new domestic or introduced foreign species, evaluation and adaptation of modern hatchery technology and related research; » Private/public hatcheries focus mainly on mass production of fish, shrimp and other aquatic fauna and flora seeds.	2	Hatcheries	» Support mechanism established	MLFRD	MoFR MFF, MFFA, MSA	FAO, SEAFDEC, NACA	500 000
	1.4.3 Ensure advanced methodology is imparted to fish/shrimp hatcheries through extension services of DoF and MFF (or other institutes) in order to produce quality seeds in appropriate quantities. Also, ensure monitoring of production by extension services through DoF and MFF (or a competent third party).	2	Hatcheries	» Methodology transferred » Monitoring operational	MLFRD	MFF, MFFA, MSA	FAO, SEAFDEC, NACA	500 000
	1.4.4 Encourage the outsourcing of DoF extension services in shrimp and fish seed production to the private sector as a means to encourage the development of a service industry and private hatcheries business related to the fisheries sector and to reduce demand on DoF hatcheries.	2	Producers	» Outsourcing established	MLFRD	Regional/State governments, MFF		100 000
	1.4.5 Encourage the importation of chemicals and medicines to support the prevention and eradication of diseases by providing import rebates (no tax on imports of quality tested imports, under the guidance of and partnership with DoF) and reduced commercial tax for accredited chemical providers. Also encourage technological knowledge transfer of natural GAqP for disease prevention and curative measures through collaboration with regional and international aquaculture institutes.	1	Entire VC	» Import rebates established	MoFR	MoC, MLFRD, MFF	FAO, SEAFDEC NACA, United States Agency for International Development	30 000
	1.4.6 Ensure effective involvement of the private sector as a member, participant, partner or advisor in the formulation of technical development plans and projects by domestic (DoF, universities, non-governmental organizations), regional (SEAFDEC/NACA) and international (FAO, USAID) institutions.	*2*	Private sector	» P+P project design established	MLFRD	MFF	FAO, SEAFDEC, NACA, United States Agency for International Development	10 000
	1.4.7 Have Union, Regional and State governments prioritize aquaculture zones encompassing hatcheries, farms, ice plants, cold storage and feed mills to ensure effective development within their strategy to boost intensive production for processing plants and local markets.	2	Entire VC	» Aquaculture prioritized in local development plans	MLFRD	Regional/State governments, MFF		30 000
	1.4.8 Provide more training schemes to disperse technology and generate human resource development; acquire adequate budgets for R&D; and expand institutional relationships to ensure DoF has adequate provision of resources (technical, human, financial and inputs).	1	DoF	» Increased capacity and resources of DoF	MLFRD	MoFR, Ministry of National Planning and Economic Development		5 000 000

Strategic objective 1: Increase the long-term production and productivity of the sector through modernization of infrastructures, adequate financial support, and improved production and processing techniques.								
Operational objective	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US$)
1.5 Increase the availability of feed and other inputs.	1.5.1 Eliminate import taxes on inputs to produce fish and shrimp feed (wheat flour, soya cake, fish meal, feed additives, etc.) as a means to facilitate the production of higher quality feed in quantity.	1	Feed producers	» Import taxes on feed inputs eliminated	MoFR	MoC, Customs Department		50 000
	1.5.2 Increase collaboration between the Myanmar Aqua-Feed Association (under MFF) and the Myanmar Pulses, Beans & Sesame Seeds Merchants Association to ensure that feeds, ingredients and inputs respect the quality requirements for fish feed production, to be set in a charter by the Myanmar Pulses, Beans & Sesame Seeds Merchants Association and the Myanmar Aqua-Feed Association.	1	Feed producers	» Collaboration established	MFF	Myanmar Pulses, Beans & Sesame Seeds Merchants Association		30 000
	1.5.3 Ensure that two production lines for feed production (normal and organic) are operational and available in Myanmar, to ensure a diversification of production into the organic fishery sector.	2	Organic producers	» 2 feed production lines operational	MFF	Myanmar Aqua-Feed Association		500 000
1.6 Increase the availability of quality raw materials for processing plants.	1.6.1 Set up a joint venture with MFF, with DoF support, to establish a pilot integrated shrimp and fish farm to ensure quality and quantity consistency. Based on the success of this initiative, have the joint venture attract foreign direct investment with support from the Directorate of Investment and Company Administration. Use the pilot farm to attract potential buyers and foreign direct investment.	1	Entire VC	» Integrated farms piloted	MFF	DoF, MFFA, MSA		1 000 000
	1.6.2 Develop contract farming and processing through announcing partnership opportunities on international fisheries trade websites e.g. Fish Info & Services (FIS), INFOFISH, FISHSTAT or MFF/MPEA websites or at fish trade fairs.	1	Entire VC	» Increase in contract farming	MFF	DoF		30 000
	1.6.3 Provide incentives (lower taxes, subsidies, loans with low interest, etc.) in border areas (Myawady, Tachileik, Myeik, Kawthaung and Maw Taung with Thailand; Mu Se and Chin Shwe Haw with China; Sittwe and Maungtaw with Bangladesh; Tamu with India) to produce raw materials for local processing plants (Myeik, Kawthaung and Sittwe) to limit the impact of certain premiums/advantages from neighbouring countries.	1	Processors	» Reduction in produces exported through borders	MoFR	MLFRD, MFF, UMFCCI		2 000 000
	1.6.4 Implement quota restrictions on unprocessed fish and shrimps in border trade as a means of encouraging the provision of sufficient quantities of raw materials for national processing plants and creating job opportunities in fisheries in those areas.	2	Processors	» Reduction in produces exported through borders	MLFRD	Regional/State governments, MoC	Local processors	500 000
	1.6.5 Increase the availability (production and import) of inputs (pre-mixes, concentrates, additives, etc.) for increasing the quality and types of processed fisheries products through duty-free imports for national processing (local market and re-export) until adequate incentives for national inputs production are established and they can satisfy the demand of processors.	2	Processors	» duty free scheme for inputs established	MoFR	MoC	Importers, processors	200 000

Strategic objective 2: Improve the safety and quality of the sector's products through improved quality management capacities as well as the implementation of a quality management system across the value chain.								
Operational objective	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US$)
2.1 Ensure farmer awareness of and adherence to GAqP.	2.1.1 Increase the capacities of the DoF Institute of Fisheries to provide GAqP training to extension workers, trainers from private/public fish farming enterprises, departments, non-governmental organizations and targeted/selected fish farmers by increases in budget allocation, collaboration with institutes and training fees. Also, increase dissemination capacity through the development of modern dissemination techniques (online, mobile), radio/television, classrooms and publications.	2	Producers	» 60% of registered MFF producers trained in 4 years- » Institute resources increased	MLFRD	MoFR, MFF, MFFA, MSA		10 000 000
	2.1.2 Train and provide resources to DoF technicians to conduct and apply scientific research in GAqP and aquaculture technologies through increased participation in vocational trainings provided by regional and global technical partners.	1	DoF	» Increase research capacities	MLFRD	MFF, SEAFDEC, NACA		2 000 000
	2.1.3 Establish demonstration farms of MFFA (MFF) and MSA (MFF) to provide vocational training on GAqP to farmers and potential private trainers (multipliers) through establishing partnerships with DoF and regional and international aquaculture research and training institutes. Demonstration farms are also to serve as on-the-job training farmer field schools of aquaculture in order to transfer advanced aquaculture technology.	2	Producers	» Demo farm operational	MFF	DoF, MFFA, MSA	FAO, SEAFDEC, NACA	2 000 000
	2.1.4 Collect, translate and distribute GAqP guides (ASEAN GAqP, FAO Code of Conduct on Responsible Fisheries), manuals (translated aquaculture manuals) and posters in local languages.	2	Entire VC	» GaQP dissemination material widely distributed	DoF	MFF, MFFA, MSA		500 000
	2.1.5 Review and implement the Code of Conduct of MFF (already elaborated) to ensure GAqP is respected; enforce punitive/incentive measures through the establishment of a permit system for farms, traders and buyers/exporters or processors.	2	Entire VC	» Enforcement of code of conduct to all MFF members	MFF	DoF, MFFA, MSA		150 000
	2.1.6 Monitor production processes more closely through executing more certification and penalization on GAqP and GMP practices by DoF; definition and implementation of regulations by MFF against the Code of Conduct; and regular inspections by an authorized third party.	2	Entire VC	» Regular monitoring of production site by 3rd party	DoF	MFF, MFFA, MSA, MPEA		3 000 000
	2.1.7 Promote the consumption of high quality fisheries products in domestic market through trade fairs and exhibitions, publicity, media, advertising and shopping malls as a means to promote a general movement towards quality products and acquire more demand from domestic markets.	2	Entire VC	» Promotion campaign on yearly basis	MFF	MoC, DoTP, MPEA		250 000
2.2 Promote the adoption of GMP by processors.	2.2.1 Develop a quality water supply system by upgrading or replacing the current water supply system of fish production, landing sites, ice plants, processing plants, wholesale fish markets, feed factories etc. An advanced water sanitation system for the industry area includes drilling tube wells, extending the piping system from the main water supply, treatment systems and waste water management.	1	Production	» New water treatment scheme and distribution mechanisms operational	Union government	Regional/State governments		10 000 000
	2.2.2 Support adoption of advanced post-harvest handling technology/practices to fish farmers and fishing boats through extension services such as workshops, trainings, conferences, etc. of DoF and MFF in collaboration with international institutions in order to meet international standards, procedures and certification requirements.	1	Production	» Regular training of producers on post-harvest handling (link to GaQQ)	DoF	MFF, MPEA, SEAFDEC		500 000
	2.2.3 Implement a long-term training and certification programme for technicians, inspectors and trainers at DoF/Ministry of Industry and processing factories to be qualified on GMP/HACCP.	1	Trainers	» Accreditation of trainers completed and monitored	MLFRD	Ministry of Industry, MFF, MPEA		300 000

Strategic objective 2: Improve the safety and quality of the sector's products through improved quality management capacities as well as the implementation of a quality management system across the value chain.								
Operational objective	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US$)
2.2 Promote the adoption of GMP by processors.	2.2.4 Establish dialogue between private sector and training institutes (universities, vocational training institutes, etc.) to update vocational training curricula and programmes to ensure alignment with industry requirements, namely with GMP and quality management systems (food safety measures).	2	Entire VC	» Curricula and programmes updated	MLFRD	Ministry of Science and Technology, Ministry of Education, MFF		50 000
	2.2.5 Provide regular trainings to enterprises on GMP through the private sector (SGS and others) and ensure regular monitoring of processing facilities by DoF/Ministry of Industry (in collaboration with MFF).	2	Processors	» 2 GMP training annually » 2Monitoring per year	MLFRD	Ministry of Industry, MFF, SGS, private agencies		400 000
2.3 Strengthen the quality management system in order to ensure food safety and quality.	2.3.1 Produce more qualified personnel, post-graduate and diploma level, through training in local and international institutes (eg. DoF (Fish Inspection and Quality Control)), Medical Universities, MITA, SGS, SEAFDEC) to complete testing, inspection and certification processes of fisheries products.	1	Entire VC	» Increase in qualified QM certified technicians and managers	MLFRD	Ministry of Industry, MFF, MITA, Medical Universities, SGS, SEAFDEC		5 000 000
	2.3.2 Upgrade/establish disease diagnosis/fish health/fish feed laboratories (at central and regional levels) with up-to-date equipment to facilitate essential tests for fish health and international trade (e.g. chemical residues test for EU markets, water quality, safety of ready-to-eat and finished products, environmental contamination and pollution, hormone content). Initial focus should be on upgrading of DoF labs to meet more parameters than those currently accredited. As required, organize lobbying by MFF to government, through DoF and MLFRD or through parliament members.	1	Entire VC, DoF Lab	» Upgraded laboratories to test fisheries products » Important increase in budget allocation	MLFRD	MoFR, MFF	FAO, SEAFDEC, NACA	1 000 000
	2.3.3 Provide additional training facilities, with appropriate equipment and enough qualified manpower, on fish food inspection techniques to implement the drug residue monitoring plan at national level in order to comply with EU import requirements.	1	Entire VC	» 3 new training facilities established in priority production	DoF	MFF		900 000
	2.3.4 Provide special training to fishers on use of TED nets as a key requirement to increase exports to the United States.	2	Fishermen	» 2 trainings per year	MLFRD	MFF		300 000
	2.3.5 Train more inspectors from competent authorities, delegated institutions and organizations to execute inspections of fisheries operators and operations: » Fishing vessels and fishing gear: size, capacity, engine power, communication devices, lifeboats and equipment, maritime certificates, crew lists, log books, etc. Design, size and number of fishing aid equipment (nets, hooks and accessories, etc.); » Landing sites: sanitation, loading and unloading facilities, water supply, certification from the Port Authority and competent authorities; » Ice plants: capacity, refrigerant, ice boxes, containers, water supply and quality, sanitation etc.; » Processing plants: GMP, HACCP, ISO, capacity, sanitation, type of products, machines and equipment, quality (raw and finished products), water quality and waste water treatment, packing and storage, etc.; » Fish ponds: GAqP, size, species, farming methods, sanitation, water treatment, feed, environment impact, etc.	1	Entire VC	» 5 inspectors per competent authority/institution » 1-2 inspection of each operator per year	MLFRD	MoH, MoT, Ministry of Industry, Port Authority, SGS, private agencies, MFF		2 000 000
	2.3.6 Establish environmental monitoring laboratories and mobile teams to play a substantial role in sustainability of the fisheries industry and its community.	1	Producers	» Mobile labs established » Key production zones monitored 1-2 times a year	MLFRD	MFF		500 000
	2.3.7 Implement a trickle down system of aquaculture extension to train farmers on GAqP and the MFF Code of Conduct, as well as fish health management. This system is similar to farmer field schools but for fisheries.	1	Entire VC	» Trickle down system established and operational	MLFRD	FAO, SEAFDEC, NACA, MFF		1 500 000

Strategic objective 3: Enhance the organization of the sector through increased dialogue and partnerships as well as the implementation of effective policies for the management of fisheries resources for sustainable growth.								
Operational objective	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US$)
3.1 Strengthen the policy and legislative framework.	3.1.1 Develop a national 'responsible' fisheries policy and appropriate legislative framework, in line with international best practice (i.e. FAO Code of Conduct) and, in collaboration with the private sector, set long-term development goals for the fisheries sector in Myanmar. Use this fisheries strategy to provide some guidance.	1	Entire VC	» Policy drafted, endorsed and implemented	MLFRD	MFF		100 000
	3.1.2 As part of the fisheries policy and legislative framework, ensure that key incentives, in line with regional models, are defined and established for fisheries' development, such as development funds, tax rebate systems, special credit lines, etc., to attract domestic investment in the sector.	1	Entire VC	» Development measures integrated in policy	MLFRD	MoFR, Union, Regional and State governments		50 000
	3.1.3 As part of the fisheries policy and legislative framework, implement a delegation of power to competent authorities, (including Regional and State governments), for effective implementation and enforcement of fisheries laws.	2	Regional operators	» Decentralisation of powers defined and implemented	MLFRD	Union, Regional and State governments		500 000
	3.1.4 Strengthen law enforcement mechanisms such as inspection, execution and suing within administrative and jurisdiction power, to reduce the occurrence of 'informal arrangements' between parties being used to circumvent laws through delegating some law enforcement power to appropriate government organizations (e.g. armed forces, coast guards, the police force, etc.) by administrative mechanisms.	2	Entire VC	» Enforcement mechanism strengthened and implemented » Delegation of authority implemented	General Administrative Department	Union, Regional and State governments, Ministry of Defence, MLFRD		1 000 000
3.2 Facilitate the establishment of commercial linkages between value chain participants.	3.2.1 Encourage the establishment of contractual agreements between private operators through the provision of standardized contract templates to facilitate elaboration of contracts, and training on contractual procedures and rights.	2	Entire VC	» Model contract defined » 1-2 training per year on contract	MFF	Associations under MFF, private enterprises		150 000
	3.2.2 Strengthen the arbitration capacities of MFF to facilitate contract establishment as well as enforcement. Strengthen involvement of MFF in arbitration through facilitating elaboration of contract agreements between fisheries and other enterprises. A clause of contracts could indicate that arbitration is to be provided by MFF.	2	MFF	» Capacity building and resources provided to MFF arbitration centre	MFF	UMFCCI		400 000
3.3 Strengthen formal public–private dialogue geared at sector development.	3.3.1 Organize regular technical, financial and market potential dialogues between the private and public sectors by MFF, to encourage the setting up of public–private partnerships as a means to reduce the technical, human, and financial pressure on DoF.	2	Entire VC	» 2-3 meeting per year	MFF	Associations, private and public enterprises		100 000
	3.3.2 Establish a permanent and formal public–private committee (owners/directors/managers level) in charge of coordinating and monitoring initiatives for the development of the fisheries sector.	2	Entire VC	» Committee established » Capacities of committee built	MFF	Private/public enterprises	ITC	200 000
	3.3.3 Ensure the organization of regular and occasional meetings of public and private committee members to revise/discuss sector development strategy, trade issues, market trends, action plans etc.	2	Entire VC	» Minimum of 4 meetings per year	DoF	MFF, private/public enterprises		40 000
	3.3.4 Encourage, through DoF directives, the setting up of joint pilot initiatives between MFF and DoF as an initial step towards formalizing private and public partnerships for sector development.	2	Entire VC	» Pilot agreement between MFF et DoF established and implemented	DoF	MFF, Private/public enterprises		50 000

Strategic objective 3: Enhance the organization of the sector through increased dialogue and partnerships as well as the implementation of effective policies for the management of fisheries resources for sustainable growth.								
Operational objective	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US$)
3.4 Revise the MSY framework in order to ensure sustainable resource management.	3.4.1 Seek international technical support to revise/update the MSY in line with international best practice through the elaboration of a request for technical assistance sent jointly by DoF and MFF.	1	Entire VC	» MSY completed	MLFRD	MFF, FAO, SEAFDEC, NACA	Ecosystem Approach to Fisheries-Nansen project (Norwegian Agency for Development Cooperation, FAO)	
	3.4.2 Ensure all fisheries policies and legislations respect Myanmar fishing capacity as defined and determined in the updated MSY framework.	1	Entire VC	» MSY implemented and enforced » Policies aligned	MLFRD	Union, Regional and State governments, MFF		300 000
	3.4.3 Build, in collaboration with international institutions for their expertise (e.g. FAO), the monitoring, control and surveillance system of DoF to manage marine capture fisheries using modern techniques and equipment.	1	Entire VC	» MCS system operational	MLFRD	MFF		500 000
	3.4.4 Strengthen and expand the monitoring, control and surveillance system capacity to combat illegal, unregulated and unreported fishing, including during the closed season, through the allocation of more inspection boats, mobile teams and satellite vessel checking and tracing systems. In the beginning it can be mobilized with current capacity at intensive illegal, unregulated and unreported fishing areas, coupled with strong law enforcement and integrated efforts.	1	Entire VC	» Initial MCS system strengthened and expanded	MLFRD	Navy, Coast Guard, security forces, DoF, MFF	Local fisheries communities	500 000
	3.4.5 Build data collection and survey capacity to track progress in maintaining MSY through the implementation of a regular fishery surveying and sampling programme, implemented in collaboration with international/regional fisheries institutes.	1	Entire VC	» Capacities of MSY data collectors and analysts strengthened	DoF	MFF	FAO	300 000
	3.4.6 Encourage collaboration with international/regional partners (possibly ASEAN and Bay of Bengal Large Marine Ecosystem Project members, especially for transboundary issues) to combat illegal, unregulated and unreported fishing by implementing a national coastal security system.	1	Fishermen	» -Regional agreements signed	Union Government	ASEAN, Bay of Bengal Large Marine Ecosystem Project		200 000

Strategic objective 4: Improve the development and innovation capacity of the sector through effective scientific research and data collection and investment in R&D.								
Operational objective	Activities	Priority 1=high 2=med 3=low	Beneficiaries	» Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US$)
4.1 Build research capacities.	4.1.1 Establish under DoF/MFF, with technical assistance from or collaboration with international organizations and institutes, aquaculture research institutes with the capacity for genetic breeding as a means to reduce this major drawback inhibiting Myanmar's aquaculture development.	1	Producers	» Aquaculture institute established, financed and operational	DoF	MFF	FAO	500 000
	4.1.2 Develop partnerships with global fisheries research institutes and establish agreements to collaborate on research of mutual interest or specific assignments.	2	Producers	» 1-2 Partnerships established	MLFRD	International institutes	Bay of Bengal Large Marine Ecosystem Project on Transboundary Issues	50 000
	4.1.3 Recruit and train new researchers as well as train current researchers in fisheries science, including processing technology.	1	Entire VC	» 20-40 newly trained researcher yearly	DoF	MFF, MPEA		1 000 000
	4.1.4 Collect information, using existing global databases, concerning international target markets' preferred species, and conduct trials on their reproduction and propagation as a means to increase the potential to produce higher quality per unit value.	2	Producers	» 5-10 new species trials per year	MFF	MoC, DoTP		2 000 000
	4.1.5 Conduct trials to adapt local species (e.g. masher, catfish, eel and snakehead) to target market requirements and determine potential for exports. Once trial products are developed, conduct tasting/market tests through consumer test groups, trade fairs and exhibitions.	2	Producers	» 5-10 market trials per year	MFF	MoC, DoTP		600 000
4.2 Establish comprehensive data collection and management systems.	4.2.1 Develop collaboration agreements with global and national institutes to acquire systems, training and management support for enhanced data collection, analysis and dissemination systems.	2	Entire VC	» Collaboration agreements established	DoF	FAO, MFF		50 000
	4.2.2 Collect, compile and analyse fishery production, processing and export data on a regular basis (e.g. monthly/quarterly or annually in collaboration with MFF, the Ministry of Industry, Customs, MoC and other fisheries-related sectors and communities) by ensuring concerned ministries/departments/organizations have it in their mandate to provide data.	2	Entire VC	» Production, processing and export database improved, expended and utilised	DoF	Regional and State governments, MoC, Customs Department, MFF		250 000
	4.2.3 Develop reports and publications on the status of Myanmar Fisheries based on up-to-date and accurate information.	2	Entire VC	» Annual report and publication produced and distributed	DoF	MFF		100 000
4.3 Increase R&D capacities for product development.	4.3.1 Establish a food technology lab/research institute for the fish processing industry under DoF/MFF, capable of: facilitating food product development in line with market requirements; conducting fish food tests; and operating research labs at strategically important processing areas.	1	Processors	» Food tech lab established and operational in 2017	MLFRD	MoFR, MFF		300 000
	4.3.2 Upgrade the curriculum and educational capacity for food science and technology in the fisheries sector (fish processing and food development) at related universities and institutes through joint discussions between the Ministry of Education and MLFRD	1	Entire VC	» Curricula updated	Ministry of Science and Technology	Ministry of Education, Ministry of Science and Technology		60 000
	4.3.3 Establish a fund/budget, as part of fisheries development fund, for a specific R&D line to facilitate the development of R&D related to the fisheries industry.	1	Entire VC	» Special R&D line financed and established	MLFRD	Regional and State governments, MoFR		100 000

Strategic objective 5: Build the performance and branding of fishery products in order to compete successfully in international markets.								
Operational objective	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US$)
5.1 Improve transportation efficiency.	5.1.1 Establish a collaboration framework between MFF and logistics associations/organizations to ensure availability of refrigerated trucks (container-based) from warehouse to port and also for road exports (e.g. to China and Thailand).	1	Exporters	» Framework established and sustained	MFF	MoT		25 000
	5.1.2 Organize, in collaboration with Regional/State governments, ministries, and export sectors, an advocacy campaign to encourage the modernization of Customs procedures, such as opening times and administrative requirements, as a means of increasing the efficiency of exports.	1	Exporters	» Customs procedures eased for fisheries sector	MLFRD	Regional/State governments, MoFR, DoTP, MFF		80 000
	5.1.3 Lobby MoT for a reduction in tolls and bridge crossing costs for export sectors. Action can be jointly implemented with other key export sector associations	1	Exporters	» Preferential rate for export trucks implemented	MFF	UMFCCI, Regional/State governments, MoT, Ministry of Construction		30 000
	5.1.4 Lobby insurance agencies and MoFR for the setting up of transit insurance for cargo to avoid possible losses for exporters.	1	Exporters	» Transit insurance established	MFF	MoFR, UMFCCI		50 000
	5.1.5 Ensure continuation of negotiations through protocol or diplomatic channels with the EU by informing them that old regulations (249/2001) are no longer applicable for fisheries exports from Myanmar.	1	Exporters	» EU accepts new regulations	MLFRD	MoC, DoTP		70 000
5.2 Establish a sector-specific export finance scheme.	5.2.1 Organize, in collaboration with other export sectors, an advocacy campaign to review banks' and Customs regulations on TT versus letters of credit, since this procedure has become an impediment to export development of the sector	1	Exporters	» TT regulations amended	MFF	MoC, DoTP,		20 000
	5.2.2 Establish and develop export finance mechanisms (letters of credit, export insurance, export development fund, etc.) as a key factor to facilitate the development of fisheries exports from Myanmar.	1	Exporter	» mechanism established and financed	MoC	MoFR, banks		5 000 000
5.3 Ensure the provision of adequate trade information and market intelligence data.	5.3.1 Build the capacities of the current MFF Internet communication mechanism and formalize the information network between institutions (departments, public or private) to collect, analyse and disseminate market information to fisheries products exporters, processors, raw material suppliers and producers.	1	Entire VC	» Market information system of MFF enhanced	MFF	DoF. MoC-DoTP		100 000
	5.3.2 Have trade-related departments and organizations collect global market information and trends, trade policies and practices of importing countries in order to provide relevant and up-to-date market information to processors and exporters relating to new products and trends in global markets. Set up a commercial intelligence network to manage this flux of information	1	Entire VC	» Commercial intelligence network established	MoC	DoTP, DoF, MFF	FIS, INFOFISH	100 000
	5.3.3 Elaborate a guide to the various products and sub-products of the fisheries sector globally as a means to inform exporters of product development opportunities.	1	Processors and exporters	» Guide elaborated and disseminated	DoF	MoC, DoTP, MFF		20 000
	5.3.4 Build the capacity of fisheries exporters to collect and analyse trade information and be more aware of global trends through provision of structured training programmes on thematic issues.	2	Exporters	» 20-40 exporters trained per year	MFF	MPEA	CBI, FIS, INFOFISH	150 000

Strategic objective 5: Build the performance and branding of fishery products in order to compete successfully in international markets.								
Operational objective	Activities	Priority 1=high 2=med 3=low	Beneficiaries	Targets	Leading implementing partner	Supporting implementing partners	Existing programmes or potential support	Estimated costs (US$)
5.4 Establish a sectoral branding and promotional effort.	5.4.1 Promote the participation of exporters in international trade fairs with high quality, varied and branded packaging through the development of support mechanisms for cost sharing and the organization of joint missions to ensure exporters remain in regular contact with evolving trends.	2	Exporters	» Cost-sharing scheme established	MoC	DoTP, DoF, MFF, MPEA		250 000
	5.4.2 Increase the use of commercial attachés in target markets to collect fish trade information and promote Myanmar branded fisheries products in respective countries by MLFRD requests to the Ministry of Foreign Affairs. MFF/MPEA has to supply all the information to commercial attachés about Myanmar branded fisheries products, maybe with samples, through MoFR/MLFRD in order to disperse the information to relevant ministries – e.g. Trade/Commerce/Marketing – in target countries.	2	Exporters	» Commercial attachés trained » key institutions liaise with attachés on a bi-monthly basis	MoC	MLFRD, Ministry of Foreign Affairs	CBI	50 000
	5.4.3 Once an improved quality management infrastructure is operational, link with marketing companies to elaborate a brand for the sector based on specific attributes (environment, sustainability, etc.) of the sector and the quality assurance, variety and competitive price of the products.	2	Exporters	» Branding plan defined and implement	MFF	MoC, DoTP, DoF		100 000
	5.4.4 Mobilize international partners to increase the sector's participation in international trade fairs in foreign countries.	2	Exporters	» Partnerships with import promotion institution developed	MoC	MoC, DoTP, DoF, MFF, MPEA	CBI, ITC, etc	50 000
	5.4.5 Ensure the sector holds annual fisheries trade fairs in Myanmar.	2	Entire VC	» Annual Fair held	MoC	DoTP, DoF, MFF, MPEA		500 000

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APPENDIX 1 : MEMBERS OF SECTOR TEAM

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APPENDIX 2: MOFR DATA 2012

This appendix presents the data compiled by MoFR concerning fisheries exports in 2012. As identified in the strategy, issues with data collection make it difficult to use and compare national data with international sources. For this reason it is presented in this appendix to complement the data presented in the strategy. It should be noted that the differences in figures are caused by the use of a different time period for calculations.

IMPORT BY FISHERY PRODUCT TRADING COUNTRIES
(2012-2013) (IN US$)

Quantity - Metric Ton
Value - US$ in million

No.	COUNTRY	FISH		PRAWN		OTHER		TOTAL	
		QTY	VALUE	QTY	VALUE	QTY	VALUE	QTY	VALUE
1	China	37038.104	97.646	6073.713	25.984	47668.917	120.619	90780.734	244.249
2	Thailand	1215233.591	112.166	1513.392	8.44	14594.682	12.559	137631.665	133.165
3	Singapore	16276.679	32.991	1030.369	5.176	9277.429	11.581	26584.477	49.748
4	Kuwait	34499.334	49.116	8.842	0.017	7.750	0.020	34515.926	49.153
5	Malaysia	2896.768	6.509	1879.035	8.827	14512.536	30.342	19288.339	45.678
6	Japan	80.602	0.138	5168.261	31.986	1646.34	2.847	6895.203	34.971
7	Saudi	21386.151	30.819	15.043	0.035	337.641	0.952	21738.835	31.806
8	UAE	14587.366	17.788	431.116	1.248	124.114	0.388	15142.596	19.424
9	UK	6201.942	13.996	48.033	0.139	91.314	0.426	6341.289	14.561
10	Bangladesh	5825.649	6.838	604.211	3.277	3099.531	1.863	9529.391	11.978
11	Vietnam	130.332	0.419	213.565	2.535	687.873	1.434	1031.770	4.388
12	Australia	558.644	1.582	7.148	0.042	386.45	1.413	952.242	3.037
13	Bahrain	1577.075	2.045	2.768	0.005	3.010	0.008	1582.853	2.058
14	Italy	1021.009	1.536	0.06	0.001	9.975	0.027	1031.044	1.564
15	Canada	699.518	1.493	1.241	0.003	3.131	0.014	703.890	1.510
16	Hongkong	4.469	0.026	169.224	1.073	6.650	0.046	180.343	1.145
17	Qutar	809.063	0.965	7.563	0.010	2.880	0.008	819.506	0.983
18	USA	377.116	0.676	42.399	0.110	24.188	0.082	443.703	0.868
19	Korea	86.054	0.110	26.739	0.211	424.102	0.463	536.895	0.784
20	India	106.75	0.223	-	-	153.612	0.220	260.362	0.443
21	Pakistan	379.509	0.388	-	-	-	-	379.509	0.388
22	Indonesia	-	-	9.212	0.130	40.904	0.171	50.116	0.301
23	South Africa	120.319	0.204	5.736	0.019	5.897	0.014	131.952	0.237
24	Sweeden	104.301	0.143	-	-	-	-	104.301	0.143
25	Netherland	74.405	0.107	-	-	-	-	74.405	0.107
26	Jordan	52.1	0.064	-	-	3.860	0.005	55.960	0.069
27	Greece	24.333	0.033	-	-	-	-	24.333	0.033
28	Cyprus	23.79	0.032	-	-	-	-	23.790	0.032
29	Phillipine	-	-	10.26	0.017	-	-	10.260	0.017
		266464.973	378.053	17267.93	89.286	93112.786	185.502	376845.689	652.840

Source: Myanmar Ministry of Finance and Revenue (2012).

TOP TEN COUNTRIES IMPORTED FISHERY PRODUCTS FROM MYANMAR (2011-2012 TO 2012-2013)

Quantity - Metric Ton
Value - US $ Million

No.	2011-2012		
	Countries	Quantity	Value
1	China	92775.645	258.759
2	Thailand	136278.599	124.457
3	Malaysia	23325.904	53.623
4	Kuwait	45496.48	51.155
5	Singapore	15881.889	34.522
6	Japan	6839.415	30.361
7	Saudi	20771.696	28.610
8	Bangladesh	17296.858	23.124
9	UAE	16045.36	21.320
10	U.K	6275.849	13.845

Quantity - Metric Ton
Value - US $ Million

No.	2012-2013		
	Countries	Quantity	Value
1	China	90780.734	244.249
2	Thailand	137631.665	133.165
3	Singapore	26584.477	49.748
4	Kuwait	34515.926	49.153
5	Malaysia	19288.339	45.678
6	Japan	6895.203	34.971
7	Saudi	21738.835	31.806
8	UAE	15142.596	19.424
9	U.K	6341.289	14.561
10	Bangladesh	9529.391	11.978

Source: Myanmar Ministry of Finance and Revenue (2012).

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