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TRADE INFORMATION BRIEF

AQUACULTURE

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Participation in international trade has become one of the most important factors in increasing the prosperity of countries. Yet for many developing countries, perhaps particularly for those in Sub-Saharan Africa (SSA), trade is viewed primarily from a defensive perspective, with a focus on the disruptive effects of imports rather than on the opportunities presented by increased access to world markets. A key reason is the existence of information market gaps that are often associated with trade facilitation and development in developing countries – information on the export performance and potential of many developing countries remains incomplete.

The TRADE INFORMATION SERVICE series of market briefs aims to contribute to bridging this information gap for existing producers in the Southern African Development Community (SADC) who may not have the financial resources to generate a fully fledged market research process. The briefs are not intended to act as the detailed export market intelligence that successful exporting requires, but rather as a basic first-cut analysis of export prospects, to allow enterprises to make the decision on whether to initiate further market research.

Each Trade Information Brief will cover a product cluster of particular interest to members of SADC. The cluster may represent an existing key set of export products with potential for expansion, or a relatively new set where there is an indication of competitive advantage for the region.

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1. Introduction

This TIB showcases opportunities for SADC's producers in the aquaculture industry. Aquaculture is defined as "the cultivation of aquatic animals, such as fish or shellfish, or of plants, such as seaweed, in a controlled and sometimes enclosed body of water. The term includes use of either salt or fresh water. It is a form of agriculture, but under water" (hydroponic.search.com). When the author discusses fish production it is implied that it is aquaculture production that does not include the capture industry's production, unless it is explicitly stated. This TIB discusses aquaculture in a generic manner instead of in terms of production technology and species. According to the FAO (2006:10), "only production from freshwater aquaculture can be considered distinctive". Countries do not apply a common classification system to define if production originated from a brackish water or marine environment. As a result a fish produced under the same conditions may be considered mariculture in one country and brackish water aquaculture in another (FAO, 2006:10). In addition, "the wide diversity of aquaculture and aggregated reporting make it unwieldy and potentially misleading to conduct species by species analyses" (FAO, 2006:11).

The demand for aquaculture products continues to grow at an increasing rate because of great demand and limited supply. On the demand side three interrelated forces have created a market for fish products. Urbanisation in middle-income and higher income countries has changed consumers' food preferences, over the past decade, to demand healthier, easy to prepare less refined foods and reduced the consumption of starch based foods in their diet in favour of fruit, vegetables and protein rich foods. Economic development and growth, reflected in rising per capita incomes largely driven by the emergence of a large middle class, has given consumers' purchasing power to increase their relative consumption of protein rich foods in their diet. Furthermore, the consolidation of the retail food sector and its ability to create global supply chains to source better quality agricultural products at a cheaper price, making "exotic" goods available to the masses. On the supply side, the quantity of fish caught by the capture industry has steadily dropped as wild fish stocks are depleted due to over fishing.

Even though aquaculture production grew at an average annual rate of 9% from 1970 to 2004 to produce 60-million tons of fish, compromising 63% of total fish food supply, it has been insufficient to compensate for the decline in wild fish stocks, and as a result since 1993 the fishery industry's growth rate continues to fall (Josupiest, 2006). Therefore one should not interpret falling growth rates as a signal that the industry is not attractive, the opposite is true, falling growth rates indicate that the industry could be potentially lucrative as the decrease

is due to constrained supply. Another implication is that a supply side shortage creates an opportunity for aquaculture to become a more important part of the fishery industry. According to various projections, aquaculture production is expected to outstrip capture fisheries output by 2020. Based on FAO (2006) projections, aquaculture will need to produce 80 million tons of fish by 2050 to ensure that the current level of per capita fish consumption is maintained.

The trade of aquaculture products has a north-south bias. Developing countries export fish and developed countries import fish. The value of the export market in 2004 was approximately US$-71 billion and the main varieties of fish traded were shrimp, demersal species (tuna) and salmon. The majority of exports were destined for Japan, US, Spain, France, Italy, China and the United Kingdom (UK).

Asian countries dominate aquaculture production with respect to the volume of fish produced and its per unit value of production. The region's superior production capability stems from its access to relatively cheap raw materials compared to developed nations and its developed knowledge base allows the region to be a low cost producer. Over the past decade Asia has built on their competitive advantage to shift production towards producing higher value products for the export market. The growth of Asia's aquaculture industry and its presence in international markets is driven by China, which comprised 75% of the region's production and 43% of global production in 2004 (FAO, 2006).

Given Asia's dominant position of the industry it might seem that there are limited opportunities for other countries to enter into international markets. Over the medium term Asia's position as a net fish exporter could change. Consumers are developing new eating habits as their purchasing power improves and their cultural tastes become more "cosmopolitan" due to globalisation. It is expected that consumers' new diets will increase the demand for fish products at a faster rate than Asia can increase its production and as a result the region will become a net importer of fish products. Therefore over the long term developing countries prospects to gain a larger share of the growing international market are good. The important issue for other developing countries is to build their industries over the medium term to participate in international markets in the long-term. This TIB will argue that SADC's medium term strategy should focus on growing its regional market and then expanding into Sub-Saharan Africa.

This TIB discusses five topics that are divided into nine sub-sections. The first section of this TIB defines a common set of concepts and definitions necessary to engage in a debate about the prospects and nature of SADC's involvement in aquaculture. This section introduces the various types of aquaculture and farming systems and estab-

lishes a generic value chain. The second part of this paper investigates whether the global market for aquaculture is viable with respect to the value and volume of fish traded, and sustainable with respect to the extent of the market's growth rate and the pattern of growth. This section investigates both the value and growth in consumption, production and trade patterns on a regional and country basis. This knowledge is used to identify where prospective export opportunities lie for SADC's farmers. The third section gauges whether SADC's farmers can compete in a market by comparing the competitiveness, based on market prices, of its exports. This analysis is simplistic as its purpose is to highlight rather than explain trends. The fourth section provides exporters with information about gaining market access and placing their product into a market. This section highlights important tariffs and non-tariffs barriers and also provides information about marketing and distribution channels. The last section proposes strategies to improve the competitiveness of SADC's farmers.

2. Rationale for Selecting Aquaculture

Based on the following reasons, which will be explained in greater detail in this TIB, aquaculture was selected as a potential lucrative industry for SADC's producers:

- Aquaculture can be easily integrated into a farmer's primary agricultural activities;
- Aquaculture products can be sold at the farm gate or a local market and thus provide another source of income which diversifies a farmer's income stream;
- Aquaculture allows farmers to produce another commodity whose yield is not tied to the same set of circumstances as crop production and thus aquaculture decreases a farmer's exposure to risks arising from crop failure;
- Aquaculture encompasses a range of technologies of which the simplest is a pond production system that is ideally suited to rural areas, as it is relatively cheap and requires little capital investment and it is a labour intensive technology, opening up possibilities for rural employment;
- Aquaculture in rural areas can contribute to food security and improved nutrition as it allows rural communities to incorporate protein into their starch dominated diet;
- Aquaculture is not a new technology in SADC and Sub-Saharan Africa, non-commercial activities are relatively well developed and the commercial sector is developing rapidly and therefore increasing aquaculture activities throughout the region should not be a mammoth task;
- The market for aquaculture products is growing as supply is constrained by the availability of wild fish stocks while demand is potentially unlimited, in effect, this scenario has increased fish prices, in turn creating lucrative prospects for aquaculture fisheries, for example over the past five years the average fish price in sub-Saharan Africa rose above US$2/kg (FAO, 2006);
- Aquaculture activities are sustainable in the long term as consumers' demand for fish is growing at a faster rate than natural fish stocks can replenish themselves, even if the capture industry's activity is severely curtailed; aquaculture will become the dominant source of fish in the future;

- SADC has the resource base to pursue aquaculture considering the availability of water, land and climatic conditions: Potential cultivation of tilapia and African catfish in Southern Africa is large as only 5% of the possible 23% of its land areas is used (Hishamunda & Ridler, 8);

- Aquaculture has the potential to create a market for its product by stabilising fish prices over the long term as supply can be matched to demand, which contributes to growing per capita fish consumption;

- Aquaculture activities have positive spin-offs for the wider economy as exported products provide a source of foreign exchange and they contribute to increased food production, which improves food security;

- Aquaculture's value chain comprises a host of support services (hatcheries, seed nurseries, seed traders) and labour-intensive activities (constructing and repairing ponds and harvesting fish) that would have a multiplier effect on the local economy and create jobs for unskilled labour.

3. Definitions

3.1. Aquaculture Farming Systems

Aquaculture production can occur in three broad environments. According to the FAO (2006: 10) in 2004 production from mariculture, freshwater and brackish environments was 3.2 million tons (50.9% of the global total), 25.8 million tons (43.4% of total aquaculture production) and .4 million tons, (5.7% of global aquaculture output), respectively. Each production environment has its advantages, disadvantages and constraints. As a result a producer's decision to engage in any of the three forms of aquaculture must be considered on a case by case basis. Generally freshwater aquaculture is cheaper and a less risky endeavour than mariculture. Mariculture's success is tied to the market and the private sector's interest. It also requires comprehensive business and environmental planning (FAO, 2006:19).

SADC has access to water systems that fall into the above three categories, as a result the region has access to various opportunities, of which the majority have not been developed. Mariculture in SADC and other key African countries is entering into its preliminary phase. Countries have identified potential projects and tested their feasiblility from a biotechnological standpoint, but not whether they are economically feasible. According to Hecht et al (2006) these opportunities include the following projects: clams (Nigeria), mussels (Angola), mudcrab (Kenya and Tanzania), fish (South Africa, Kenya, and Nigeria) and pearl culture (Kenya)

Angola, Liberia, Mozambique, Nigeria, Tanzania, Kenya and Ghana experimented with mariculture to breed shellfish, but these projects were unsuccessful due to economic, market and environmental related reasons (FAO, 2006). The lesson learnt from the above countries' experience is that the state, in partnership with donors, should not invest in expensive R&D without the interest and backing of the private sector.

Various aquaculture technologies exist from simple earth ponds to complex intensive tanks with recirculation systems. These systems have different features and functionality (refer to Figure 1). Generally complex systems allow a farmer to exercise greater control over his environment and thus produce higher quality fish. However these systems tend to require greater initial capital investment and deeper technical skills to operate and maintain. Thus choosing an aquaculture system is about managing a trade-off between available capital, skills and the quality of fish demanded by a farmer's potential market. Therefore even though SADC's farmers and producers might not have access to capital to purchase sophisticated technology this should not hamper their

ability to compete provided they match their technology to the requirements of the type of fish products demanded by their consumer base. In essence the most sophisticated production system is not always the best option.

Figure 1: Different Production Systems

	Extensive tanks Deep sea cages	Semi to intensive Cages or tanks	Intensive tanks in recirculation
Replacement water quality	No control	No control	Total control
Water temperature	No control	No control	Total control
Bacteria and Parasites	No control	Difficult control	Possible control
Soluble wastes	No control	Difficult control	Good control
Particulate wastes	No control	Difficult control	Good control
Predators and pests	No control	Difficult control	Total control
Fingerlings	No to total control	Total control	Total control
	Natural conditions	Difficult control	Global control

Source: Blancheton and Hough and Varadi

In SADC the dominant aquaculture production technology is earth ponds (Ayinla & Jamu; 2003). This technology is dominant in Africa because of historical practices. Aquaculture was initially introduced into Africa by donor organisations as part of their rural upliftment programmes that targeted non-commercial, subsistence farmers. These programmes applied the same technology to an area irrespective of its environment based on the assumption that cheap, simple technology is the preferable option. This erroneous assumption caused agencies to promote identical technology in countries despite different climatic conditions. In general ponds should be placed in high rainfall areas. Past experience indicates that Malawi and Zambia are not good candidates for pond based aquaculture production systems, for example (Hecht et al, 2006).

Commercial aquaculture activities in the SADC region, and Africa in general, are relatively new and entrepreneurs are testing various production technologies. Cage culture is popular among the commercial sector because it lends itself to intensive production practices and it is a flexible technology that can be used in lakes or reservoirs. A draw back of this technology is that it is relatively costly to establish and requires substantial upfront capital outlays to purchase formulated feeds and intensive land-based hatcheries. The following countries are either planning or have initiated cage based projects: Nigeria, Ghana, Côte d'Ivoire, Cameroon, Uganda, Zambia, Malawi, Madagascar and Kenya.

3.2. Types of Farming Activity

At its most primary level farming activity falls into two categories: subsistence or commercial activities. The distinction between these activities "relies primarily on the existence or absence of a business orientation and how factors of production, such as labour, are paid" (Harrison, 1997 cited in Ridler, 2001: 4). The above farming methods have access to different inputs that are used in a different manner, produce different quality goods destined for different markets and are exposed to different risks and contribute to society in a different manner. The above farming activities should be viewed as complementary systems required to create an aquaculture industry that contributes to rural farmers' livelihood by providing food and a cash crop and improves SADC's economic development through commercial farmers' ability to export value-added products.

In principal non-commercial aquaculture has the potential to provide rural farmers with direct and indirect benefits. Direct benefits include access to a rich source of protein that can be incorporated into a farmer's diet and access to another revenue stream from growing a cash crop. The indirect benefits of aquaculture arise when a farmer integrates aquaculture into his/her traditional farming activities to mitigate the risk of crop failure (FAO, 2000). During times of drought a pond can be used to store water and/or irrigate crops and water livestock in the dry season (FAO, 2000). The pond could also provide an alternative growing environment for plants during the dry season which would allow land to lie fallow improving its fertility (FAO, 2000).

Aquaculture was introduced into Africa in the 1950s. As a result it is a foreign technology and thus operating an economically viable pond based aquaculture system would require farmers to invest initially in gaining substantial knowledge about the system. For farmers to be enticed to invest in acquiring knowledge to manage an unfamiliar production system and purchase fertiliser, fingerlings and feeding, the prospect of increased household consumption provides insufficient motivation (FAO, 2000:17). This implies that a small scale farmer's primary motive for engaging in aquaculture is not consumption but making a profit.

For aquaculture activities to be sustainable in rural areas they must be profitable. The sector's potential profitability can be influenced by its institutional and managerial arrangements. According to Hecht et al (2006:37), 'the only community-based operations that have worked in general are those where the community collectively develops the basic infrastructure (e.g., roads, canals), but production systems (ponds, cages) are individually owned and managed". Furthermore for rural aquaculture to be sustainable it must feed into a larger market, which therefore requires the development of a healthy commercial aquaculture industry.

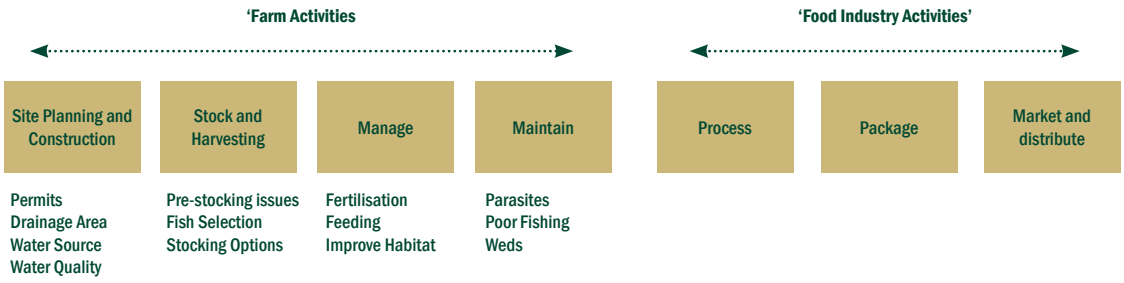
Increased demand and limited supply is expected to increase fish prices, however the extent of price increases will vary across the board. Prices for exotic fish will increase more than “standard” varieties; however the technology and costs incurred to produce exotic fish are relatively higher. This will create a two tier market. Commercial farmers will focus on producing “gourmet fish” which will leave a gap in the market for rural producers to supply low-value fish to the domestic rural and peri-urban population. This has the potential to create jobs in the rural areas that employ semi-intensive and primary production methods and also stabilise fish prices to ensure that fish products are affordable for the domestic population. For this to occur a commercial domestic industry must be in place as it will provide rural farmers with the infrastructure to supply these markets. China’s aquaculture system followed the above developmental path, which could serve as an interesting case study for SADC’s producer association to explore. The development of Madagascar’s aquaculture industry is another interesting case study as it highlights the importance of using commercial aquaculture to create momentum to develop the sector.

4. Market's Supply Side

4.1. The Value Chain

Aquaculture spans three environments and includes a range of fish species. To simplify the analysis and also draw attention to the most important supply-side issues, this section focuses on the generic value chain for aquaculture and the potential bottlenecks that face farmers in SADC. At the highest level of abstraction the value chain for aquaculture comprises the following farming activities: select the type of environment (mariculture, freshwater or a pond environment), plan the manner in which the site will be laid out, prepare the site for activities by constructing necessary facilities/infrastructure, stock the environment with fish, harvest the fish, manage the project and maintain the environment to function at its optimal level (refer to Figure 2).

Figure 2: Generic Value Chain for Aquaculture



SADC has access to vast waterways, land to construct ponds and good climatic conditions and as a result the region can complete the first stage of the value chain. Bottlenecks start to emerge in the second and third phase of the value chain. The region does not have access to quality fingerlings. This problem has a historical dimension as government extension services were responsible for producing fingerlings, which crumbled when donors decided to pull their funding. SADC countries that have managed to resurrect their aquaculture industry have developed commercial hatcheries. Although these hatcheries show promising results, if aquaculture is to become widespread there is a lucrative market opportunity for the private sector to supply fingerlings.

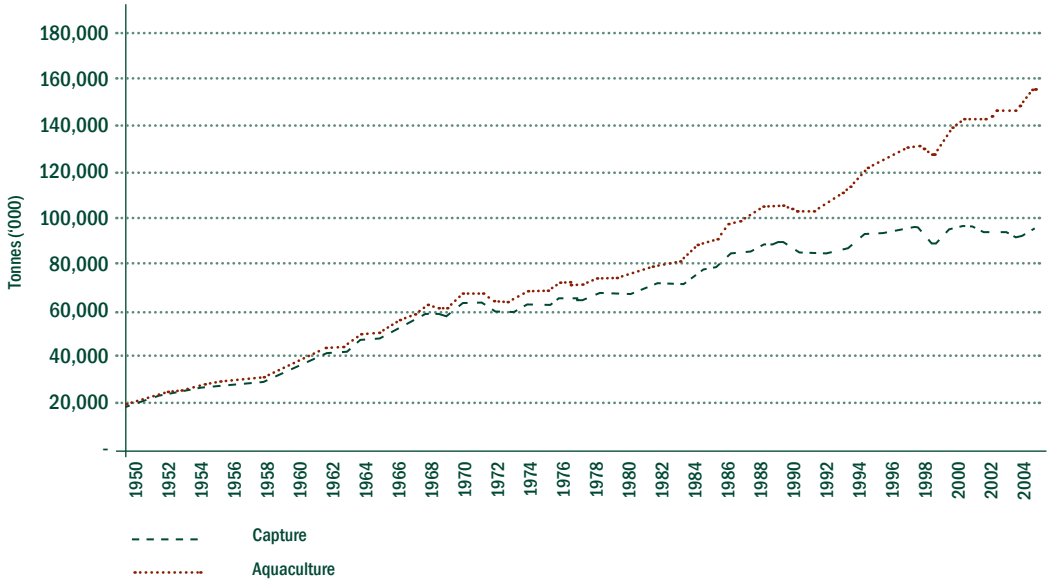
Another problem is the quantity and quality of feed produced in the region. In SADC formal and informal fish feed manufacturers exist in South Africa, Zambia, Malawi and Madagascar (Hecht et al, 2006). Out of these countries only a South African manufacturer produces good feed that is stable when it is placed in water. Furthermore importing feed from manufacturers in Sub-Saharan Africa is not a viable option due to poor quality products. The fact that SADC's aquaculture farmers are reliant on a single animal feed manufacturer exposes the industry to operational risks. Farmers have no choice but to import feed that is subject to tariffs. Considering that feed accounts for 60% of a farmer's total production costs, this supply-side bottleneck exposes farmers to exchange rate risk and increases their production costs. In the short-term to alleviate this situation "what is needed is a greater degree of government lobbying by commercial farmer associations together with other users of animal feeds such that import surcharges on animal feed raw materials are radically reduce or abolished" (Hecht et al, 2006) .Another strategy is to view this bottleneck as an opportunity for the private sector to produce feed for a growing, profitable market.

4.2. Production Patterns

Aquaculture has the potential to provide producers with numerous profitable business opportunities throughout its value chain that extends beyond producing fish. To grasp the magnitude of these business opportunities it is useful to gauge aquaculture's performance compared to the capture industry's performance (refer to Figure 3). Although aquaculture's contribution to total fish production is relatively small, approximately one third in 2004, it is growing at an exponential rate (refer to Figure 4). During the 1950s less than one million tons of fish was farmed compared to 59.4m tons by 2004 that had an estimated value of US$70.3bn (FAO, 2006:5).

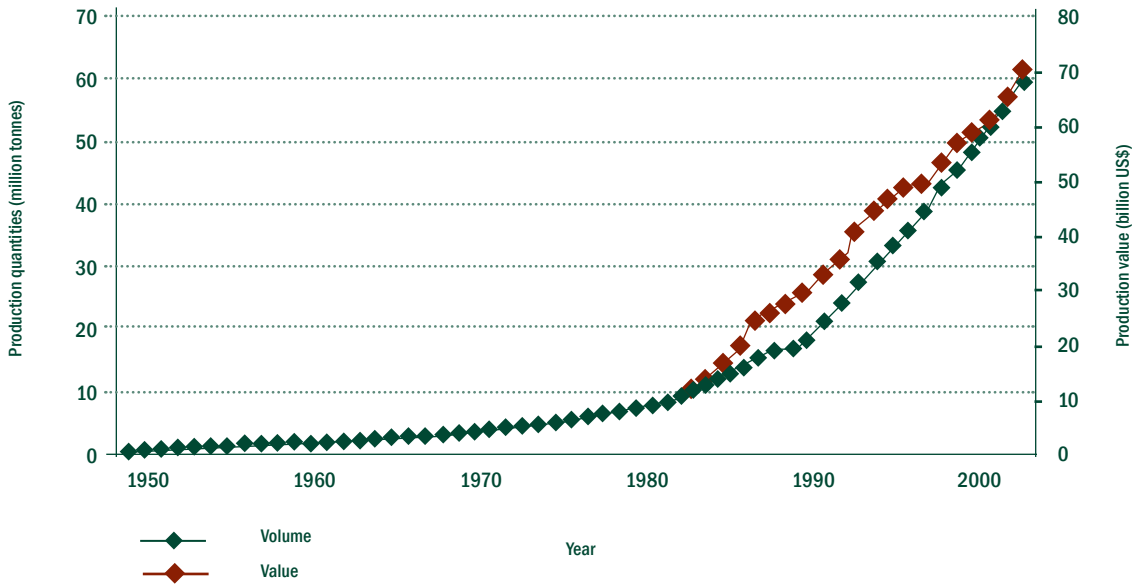
Referring to Figure 3 it appears that 1998 signalled a turning point for aquaculture's performance compared to the capture industry, as aquaculture's production increased while the capture industry's production decreased. Since 1998 aquaculture's production continues to gain momentum. This suggests that aquaculture can be termed a growth industry. Literature demonstrates that a company's ability to establish its presence in a growth industry is tied to gaining a first mover advantage. In this type of market, a producer's ability to capitalise on the benefits derived from participating in a growth market is linked to one's ability to take advantage of market timing. For SADC's farmers this implies that they should investigate the benefits derived from entering into a growing versus a mature market and then build capacity to take advantage of the relevant market.

Figure 3: Aquaculture compared to the Capture Industry's Production Levels



Source: FISHSTAT PLUS

Figure 4: Trend in Global Aquaculture Production from 1950-2004



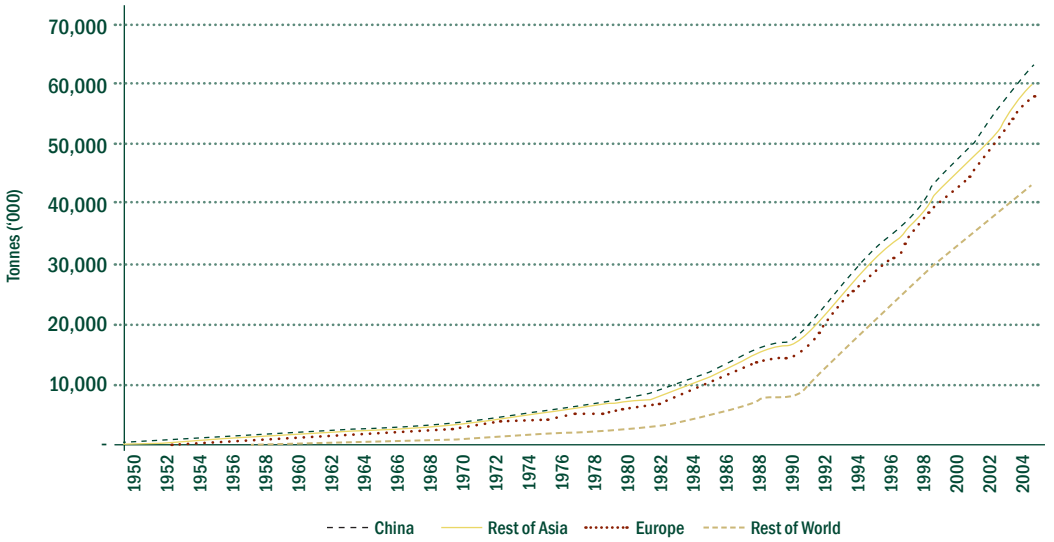
Source: FAO, 2006:6

4.2.1. Global and Regional Trends

The development of global aquaculture since the 1980s with respect to the value and volume of production is largely concentrated in Asia and the Pacific Rim, especially China (refer to

Figure 5). This region's dominance stems from its ability to capitalise on its first mover advantage of introducing intensive, commercialised aquaculture as a mass farming system, and the region's ability to sustain this advantage by constantly improving its productivity (FAO, 2006).

Figure 5: Trends in World Aquaculture Production from 1950-2004



Source: FISHSTAT PLUS

Table 1: Aquaculture Production per Region

	Tonnes			Percentage of
	1996	2000	2004	Total 2004
Asia	30,750,215	41,604,222	54,842,028	91.60%
Europe	1,673,823	2,059,266	2,195,262	3.67%
America, South	556,125	743,992	1,142,048	1.91%
America, North	567,302	711,176	971,128	1.62%
Africa	136,838	408,104	569,519	0.95%
Oceania	111,832	133,905	149,738	0.25%
Total Production	33,796,135	45,660,665	59,869,723	100.00%

	US$'000			Percentage of
	1996	2000	2004	Total 2004
Asia	38,944,646	46,423,112	57,845,275	80.71%
Europe	3,887,190	4,684,583	5,635,174	7.86%
America, South	2,008,761	2,636,119	4,527,215	6.32%
America, North	1,273,377	1,675,332	2,031,197	2.83%
Africa	293,925	968,054	888,067	1.24%
Oceania	387,766	478,646	742,815	1.04%
Total Production	46,795,664	56,865,847	71,669,742	100.00%

Source: FISHSTAT PLUS

In 2004 China produced 41.3m tons of fish, comprising 69.6% of global production (refer to Table 2). The remaining 30% of global production is dispersed among other countries, of which the majority are from Asia. Asia, excluding China, farmed 13.5m tons of fish, equating to 21.9% of global production (FAO, 2006). Given the region's dominance it is not surprising that eight out of the world's top 10 producers are from Asia and the Pacific region.

Table 2: Top 10 Aquaculture Producers

	Tonnes			Percentage of
	1996	2000	2004	Total 2004
China	22,208,495	32,444,211	41,327,242	69.03%
India	1,758,739	1,942,204	2,799,304	4.68%
Philippines	1,007,677	1,100,902	1,717,028	2.87%
Indonesia	881,098	993,727	1,468,612	2.45%
Japan	1,349,405	1,291,705	1,260,810	2.11%
Thailand	556,155	738,155	1,259,983	2.10%
Viet Nam	308,288	513,517	1,228,617	2.05%
Korea, Republic of	897,041	667,883	952,856	1.59%
Bangladesh	379,087	657,120	914,752	1.53%
Chile	323,115	425,058	685,135	1.14%
Top 10 Production	29,669,100	40,774,482	53,614,339	89.55%
Other	4,127,035	4,886,183	6,255,384	10.45%
Total Global Production	33,796,135	45,660,665	59,869,723	100.00%

	US$'000			Percentage of
	1996	2000	2004	Total 2004
China	21,171,062	28,317,045	35,994,890	50.22%
Japan	5,018,823	4,450,571	4,241,820	5.92%
India	1,872,489	2,511,179	3,784,411	5.28%
Chile	829,187	1,266,241	2,758,615	3.85%
Viet Nam	648,071	998,818	2,458,589	3.43%
Indonesia	2,179,811	2,268,270	2,162,850	3.02%
Thailand	1,902,618	2,513,846	1,705,033	2.38%
Norway	997,222	1,384,660	1,681,283	2.35%
Bangladesh	776,236	1,039,102	1,363,180	1.90%
Myanmar	744,248	781,368	1,231,230	1.72%
Top 10 Production	36,139,766	45,531,100	57,381,901	80.06%
Other	10,655,899	11,334,748	14,287,842	19.94%
Total Production	49,795,665	56,865,848	71,669,743	100.00%

Source: FISHSTAT PLUS

On an average annual growth basis the aquaculture industry's production grew by 8.8% from 1950-2004 (refer to Table 3). On closer inspection it is interesting to note that particularly high periods of growth were evident during 1950-1960 and 1990-2000. The former period of acceleration coincides with the mass commercialisation of aquaculture and the latter represents producers' efforts to intensify their production practices in response to increased fish prices.

Table 3: Region's Average Annual Growth Rate of Production (Percentage)

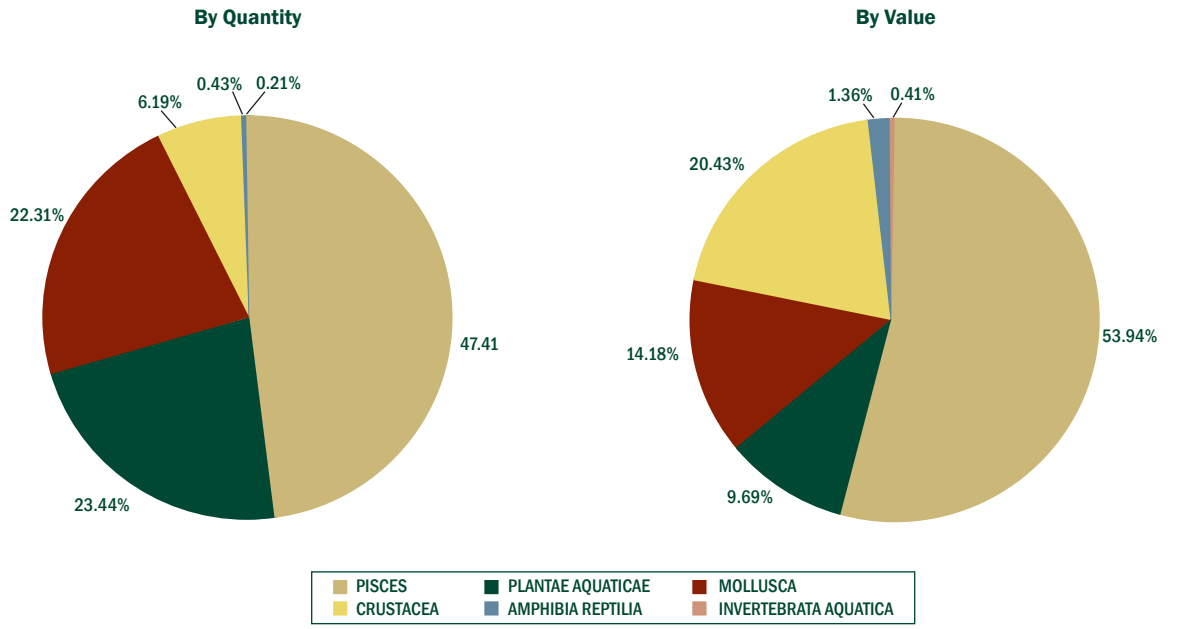
Region	1950-2004	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000	2000-2004
China	12.4	27.6	4.0	7.5	11.6	15.1	6.2
Rest of Asia and the Pacific region	7.4	10.1	7.6	9.2	6.4	3.4	9.1
Western Europe	4.9	4.3	6.1	4.4	5.5	5.6	2.0
Latin America and the Caribbean	21.3	16.2	21.1	37.0	23.3	14.2	11.4
North America	4.7	5.2	4.8	0.0	7.6	5.0	6.5
Near East and North Africa	10.8	8.7	2.8	14.5	11.7	17.7	9.2
Central and Eastern Europe	2.4	3.8	4.5	5.3	6.5	-8.2	4.3
Sub-Saharan Africa	10.7	19.8	5.9	5.2	10.5	13.1	9.9
Total	**8.8**	**12.3**	**5.7**	**7.6**	**8.6**	**10.5**	**6.8**

Source: FISHSTAT PLUS

Given regions' divergent growth rates it becomes apparent that not all regions benefited from these growth accelerations over the 1950-2004 period. The big winners in descending order were Latin America and the Caribbean with 21.3%, China with 12.4%, Near East and North Africa with 10.8% and Sub-Saharan Africa with 10.7% (FAO, 2006:6). Latin America and the Caribbean's high growth rate is due to the respective government's structured, sequenced development programme and producers capitalising on their late starter status to reduce the need to engage in experimental learning. The industry was developed during the early 1970s to grow shrimp and salmon in Ecuador, Chile and Brazil (FAO, 2006). Another aspect of their success lies in Latin American producers' ability to access capital to increase their production to take advantage of exponentially, expanding demand in key markets. The industry's first growth phase from 1970-1980 took advantage of the world's demand for shrimp, the second phase during the late 1980s was the development of an Atlantic salmon industry in Chile and the third phase in the 1990s was Brazil's expansion of its shrimp production capacity (FAO, 2006).

At its broadest level aquaculture production can be grouped into 6 taxonomic groupings (refer to Figure 6). In 2004 the top four contributors to total aquaculture production, in terms of volume, are fish, plants, molluscs and crustaceans; whereas with respect to value the top performers in 2004 were fish, crustaceans, molluscs and plants (FAO, 2006). This simple trend highlights that certain taxonomic groupings are more valuable to cultivate than others as they are destined for different markets. Generally crustaceans, mostly shrimps, are an export crop that is imported by developed countries, mostly in the EU, to be consumed as a delicacy. Countries produce a range of fish, which includes low quality fish, such as cyprinids and tilapia, for domestic consumption that is not destined for the export market.

Figure 6: Global Aquaculture Production per Taxonomic Grouping in 2004



Source: FAO, 2006:11

Regions tend to specialise in producing certain varieties of fish. South Asia, China and the majority of South East Asia produce cyprinids, while East Asia farms high-value marine fish. If Asia and the Pacific Rim's activities are combined then its domination of the global market becomes apparent. With respect to its share of global production this region's aquaculture industry's share of global production per species is 99.8% of cultured aquatic plants, 97.5% of cyprinids, 87.4% of penaeids and 93.4% of oysters (FAO, 2006)

In Western Europe salmonids are the preferred species and its production accounts for 55.6% of the world's farmed salmonids. Norway is the region's largest Atlantic salmon producer followed by the United Kingdom. Central and Eastern Europe's main farmed species is carp.

North America's aquaculture industry is primarily driven by the United States of America's (US) activity which accounts for 80% of the region's output. In the US 47.1% of its total production comprises channel catfish, while in Canada the dominant species is Atlantic and Pacific Salmon (FAO, 2006).

In Latin America and Caribbean region, over the last decade, the production of salmonids has overtaken shrimp as the top aquaculture species group due to disease outbreaks in major shrimp producing areas and the rapid growth of salmon production in Chile.

4.2.2. Sub-Saharan Africa

In Sub-Saharan Africa, aquaculture production is concentrated in Nigeria (catfish, tilapia), Madagascar (black tiger shrimp), Tanzania (seaweed), Mozambique (shrimp), Namibia (shrimp) and South Africa (abalone). In 2004 fish produced from aquaculture in Sub-Saharan Africa comprised 1.6% or 93,500 tons of total production (FAO, 2006). In 2004 eighty percent of the region's production was produced by its top six producing countries that have the distinction of being the only countries in the region whose production exceeds 5,000 tons per annum (FAO, 2006). The region's largest producers In terms of volume and value in 2004 were Nigeria, Madagascar, South Africa, the United Republic of Tanzania, Uganda and Zambia. Nigeria's leadership position is due to the fact that it has the most developed fish farming industry in the region.

In 2003 non-commercial farming activities contributed 35% and 21% to the region's fresh and brackfish water fish production, in terms of value (Hecht, Halwart & Subasinghe, 2006). Although these activities' contribution to fish supply in the region is relatively small, its contribution to the livelihood of communities and families is large and thus it should not be ignored (Hecht, Halwart & Subasinghe, 2006). It should be noted that in 2003 non-commercial farming activities did not include mariculture production.

4.2.3. SADC

Different parts of the region specialise in producing certain types of fish. SADC member states in the south-west and west part of the region produce demersal and small pelagic fish varieties. Demersal fish are the most important commercial species, on average 500,000 metric tons (MT) is produced per annum. Approximately 1.25m MT of small pelagics (anchovy, pilchard, ground herring) are caught by trawlers annually in the western and southern regions of SADC, representing about 45 % of SADC's total marine catches. In the south-east/eastern region, prawn and tuna are the most valuable resources. Prawn landings in Mozambique and other countries add up to approximately 50,000 MT per year. The region's inland resources include main commercial species such as Nile perch, small pelagics (dagaa, kapenta), tilapia and catfish. Freshwater fish catches amount to 725,000 tons annually, or 26.5% of the total production (Eurofish, 2006:48).

SADC countries tend to produce "commodity" type fish products or rudimentary processed products as their processing capabilities are limited. Manufactures' primary motive for creating a processed product is to circumvent logical problems arising from transporting a fresh product due to poor cold chain management. This is in contrast to other manufacturers in developing countries who create processed products

to tap into the highly lucrative convenience food market. Given this focus, processing activities in SADC tend to be simple and rely on traditional methods such as drying, salting and smoking. Higher-value fish products, such as fresh fish, chilled or ground or frozen, canning, fish meal and oil, are mostly produced by South Africa and Nambia.

SADC's production of aquaculture products contributes negligibly to global production (Table 4). In 2004, Madagascar was the region's largest producer and South Africa was the second largest producer of aquaculture products in terms of volume and value. These two countries' production in terms of value comprised 66% of SADC's production, but 44% in terms of volume. This indicates that these countries produce a higher quantity species than other SADC countries. Another implication is that certain types of aquaculture activities tend to be more profitable. Mariculture can be very lucrative. Madagascar produces prawns destined for international export markets while Tanzania produces seaweed. Tanzania's total production is 26% lower than Madagascar with respect to volume, but approximately 2717% lower in value. In the region, with the exception of South Africa, Madagascar and Mozambique, mariculture is both underdeveloped and under explored. Policy-makers have acknowledged that a gap exists in the market to supply high value aquaculture products. A proposal is being complied to establish a Western Indian Ocean Aquaculture Association and sector development initiatives are underway in the BCLME[1] countries of Angola, Namibia and South Africa (Hecht et al; 2006:41)

In terms of value both Mauritius and Madagascar managed to grow their production capacity from 2000-2004. Mauritius achieved a higher growth rate than Madagascar, but it is off a substantially lower base and if this is taken into consideration then Madagascar is SADC's top performer. Madagascar's phenomenal growth in production can be attributed to the government's restructuring of the sector, which created room for the private sector to invest and channel activities. These reforms where not grandiose, they included relatively simple measures, such as privatising fish stations and leaving fingerling supply to the private sector. A viable commercial sector created spin-offs that promoted the development of small-scale fishing activities in the country. If Madagascar's production continues to grow it will not only be the largest producer in SADC, but also the largest producer in Sub-Saharan Africa by 2010, outstripping Nigeria's production.

SADC's production capacity should increase in the future in terms of value and volume. The value of production should increase at a faster rate than volume, however, as SADC's commercial farmers are focusing their efforts on farming "exotic" fish varieties (seafood, such as prawns and abalone), which are traded at a premium compared to commodity fish products (i.e catfish). Madagascar, Mozambique and Tanzania have identified and zoned areas for prawn farming, while in Zambia there are plans to expand the production of niloticus cage cul-

1 The BCLME Programme is designed to improve the structures and capacities of Namibia, Angola and South Africa to deal with the environmental problems that occur across the national boundaries, in order that the Benguela Current Large Marine Ecosystem may be managed as a whole (accessed on 18th October at www.bclm.org).

Table 4: SADC's Aquaculture Production (Value and Volume)

	US$'000			Average Annual	Percentage
	1996	2000	2004	Growth 00-04	Share 2004
Madagascar	10,661	170	35,215	279.49%	36.10%
South Africa	7,629	27,720	32,410	3.99%	33.22%
Zambia	14,447	13,785	8,717	-10.83%	8.94%
DRC	720	6,996	7,419	1.48%	7.60%
Zimbabwe	560	5,193	6,205	4.55%	6.36%
Mozambique	56	4,577	3,081	-9.42%	3.16%
Mauritius	1,293	1	2,089	703.93%	2.14%
Tanzania	1,348	954	1,250	6.99%	1.28%
Malawi	266	1,313	1,008	-6.39%	1.03%
Namibia	102	596	163	-27.64%	0.17%
Swaziland	179	170			
Total SADC	37,261	61,473	97,556	12.24%	
World Total	46,795,664	56,865,847	71,669,742.40	5.95%	
SADC's Share of Total	0.08%	0.11%	0.14%		

	Tons			Average Annual	Total Share
	1996	2000	2004	Growth 00-04	2004
Madagascar	5075	7280	8743	4.68%	26.06%
South Africa	3403	4108	6012	9.99%	17.92%
Tanzania	3200	7210	6011	-4.45%	17.92%
Zambia	4770	4240	5125	4.85%	15.28%
DRC	600	2076	2965	9.32%	8.84%
Zimbabwe	170	2151	2955	8.26%	8.81%
Malawi	240	530	733	8.44%	2.18%
Mozambique	4	0.5	538	472.73%	1.60%
Mauritius	165	87	350	41.62%	1.04%
Namibia	67	70	117	13.70%	0.35%
Lesotho	14	8	2	-29.29%	0.01%
Swaziland	93	69			
Total Volume	17801	27829.5	33551	4.79%	100.00%

Source: FAO FISHSTAT PLUS

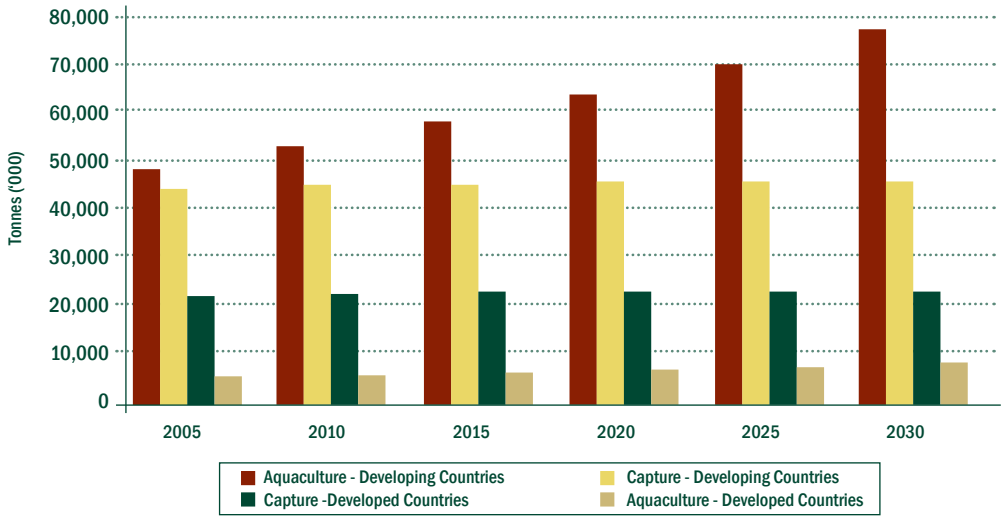
ture in Lake Kariba (Hecht et al., 2006). In Namibia US$3.78m was invested in an aquaculture facility at Grootfontein to produce catfish and tilapia. It is estimated that 75% of its production will be exported (Eurofish, 2006). A study conducted by the FAC (2006) identified "opportunities for small-scale prawn farmers in Madagascar and Mozambique and mussels and oysters in South Africa" (Hecht et al, 2006).

4.2.4. Future Trends and Developments

Experts predict that the fish industry's volume of output will continue to increase and that aquaculture's percentage of global production, in terms of volume, will overtake the capture industry's share by 2020 (refer to Figure 7). Another interesting feature is that aquaculture production will be located in developing regions. As a result aquaculture has the potential to provide a source of revenue and food security for developing countries. Furthermore, approximately 40% of fish products

are traded internationally and thus fish has the potential to become a more important cash crop than cotton, coffee and sugar (Asche & Khatun; 2006:1). It is estimated that by 2030 developing countries will account for 80% of global fish production, of which fish products produced by the aquaculture industry will account for the bulk of developing countries' production, roughly 76 million tons by 2030 (FAO, 2004). Fish production in developed countries will also increase but at a slower rate than developing countries as a result developed countries production should comprise 10% of global production by 2030 (FAO, 2004).

Figure 7: Future Trends in Global Fish Production



Source: Helga Josupeit and Nicole Franz (2004)

Data illustrates that the production of fish will increase, however an important issue is whether the mode of production will significantly change. Product development will become driven by customer demand resulting in producers moving towards producing high value species and also diversifying the range of species they produce. Furthermore, consumers will demand better quality products resulting in a host of stricter health and quality standards, which in turn will cause bureaucrats to pay particular attention to designing and enforcing traceability regulation. Based on a literature review, it would appear that production systems will become more complex and intensive to cope with these challenges and thus technology will play a greater role in the industry's development. In addition, on the supply side, the lack of availability of production sites will become a problem which will have a geographical effect on the location of production activities

5. Consumption

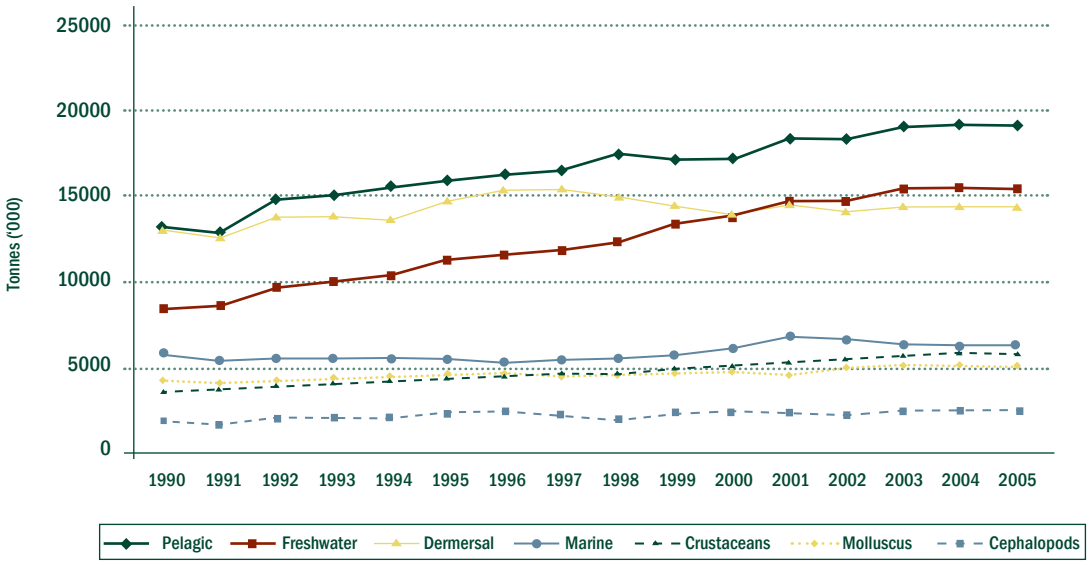
This section analyses the general demand for fish products and as a such the figures include both the capture and aquaculture industries' activities. This approach was adopted as this section's aim is to gain an understanding of the potential demand for fish products, in terms of volume, and also where this demand originates from. On average consumers regard "natural" and "farmed" fish as perfect substitutes and therefore only taking into consideration the demand for farmed fish would bias the analysis in terms of the type of fish demanded and the market's size.

5.1. The Global Market

The total consumption of fish, on a volume basis, steadily increased from 1992-2005 to achieve an annual average growth rate of 2% over the period. If this growth rate is considered out of context it appears to be insignificant, however this is not the case. First, the industry's production base is large and thus single digit growth does not imply a limited increase in volume. During 1992 consumers demanded 54.5m tons of fish which increased to 68.8m tons in 2005, representing an increase of 14.3m tons. Second, these figures provide a conservative picture as they represent volume and not value. The demand for fish has outpaced the supply of fish due to poor fishing practices and over fishing, causing prices to increase at a faster rate then consumption. Therefore if an analysis is based on value it will benefit from two forces: an increase in volume and prices.

Analysing the demand for fish products provides one with information to form a general idea about the market's growth path. However this information is inadequate to understand consumers' demand patterns. This analysis requires one to investigate the type of fish products demanded by consumers and where these consumers reside to form an understanding about a market's shape and its location. According to FAO the fish market is broken down into seven taxonomic groupings: Pelagic, Freshwater, Dermersal, Marine, Crustaceans, Molluscus and Cephalopods. From 1990-2005 consumers consumption of the above fish varieties has increased, but at different rates off substantially different bases (refer to Figure 8).

Figure 8: Global Demand for Fish from 1990-2005



Source: FAOSTAT

The increase of consumers' consumption of fish from 2000-2005 was driven by three fish types: crustaceans, freshwater and pelagic species (refer to Table 5). It is interesting to note that these species dominate aquaculture production. Based on the breakdown of each species' percentage contribution to global consumption, it becomes evident that the market's size may vary, but its composition is stable. This is due to the fact that customers' preference for a certain type of fish has a cultural bias based on initial geography. However initial affiliations are being slowly eroded as consumers are exposed to exotic foods through their travel experiences and the rise of large supermarket chains whose global supply chains place exotic food within consumers' reach.

Table 5: Growth in the Global Consumption of Fish Products (Volume)

Fish Type	Average Annual Growth 00-05	Percentage of Total 2000	Percentage of Total 2005
Pelagic	2.08%	27.22%	27.86%
Freshwater	2.31%	21.77%	22.53%
Dermersal	0.65%	21.94%	20.92%
Marine	0.54%	9.68%	9.18%
Crustaceans	2.88%	7.92%	8.42%
Molluscus	1.53%	7.56%	7.53%
Cephalopods	-0.22%	3.91%	3.57%
Total	1.61%	100.00%	100.00%

Source: FAOSTAT

Table 6: Largest Consumers of Fish Products (Volume)

Fish Type	Largest Consumers in 2005 ('000Tonnes)						Emerging Comsumers			
Pelagic	Japan	12.25%	Indonesia	11.07%	Philippines	7.77%	Iran	Chile	Côte d'Ivoire	Croatia
Freshwater	India	17.91%	Bangladesh	10.55%	Indonesia	6.96%	Myanmar	Venezuela	Niger	Bosnia and Herzegovina
Dermersal	US	16.80%	Japan	7.96%	Korea (Rep.)	6.02%	Nigeria	Angola	Chile	Belarus
Marine	Japan	14.86%	Myanmar	13.23%	Viet Nam	11.88%	Bangladesh	Mozambique	Benin	South Africa
Crustaceans	US	27.80%	Japan	18.42%	India	6.34%	Venezuela	Netherlands	Ukraine	El Salvador
Molluscus	Japan	25.52%	US	22.34%	France	8.11%	Russian Federation	Netherlands	Greece	Turkey
Cephalopods	Japan	32.72%	Korea (Rep.)	12.75%	Italy	8.36	Ukraine	Pakistan	Ghana	Chile

Source: FAOSTAT

Data shows that Japan and the US are the world's primary consumers of fish products (refer to Table 6), although Japan's absolute and per capita fish consumption is the largest in the world. The country is the top consumer of four of the seven fish types and is placed second in two other categories.

Table 6 also indicates that certain markets demand is more widespread than others, which will affect an importer's market strategy and his/her ease of entry into a market. The market for crustaceans and molluscus is the most top-heavy market as two countries (the US and Japan) comprised 50% of global consumption in 2005. Whereas the market for pelagic fish is the least top-heavy as the top two consuming nations comprised 34% of global consumption. This table is important as it highlights which countries are the world's largest consumers of fish products, which is the starting point to assess which countries will be the world's dominant importers. The next question to answer is whether these countries satisfy their demand through domestic production or imports, which in turns leads to questions regarding the nature of a country's imports. These issues will be explored in Section 6.

Table 7: SADC's Consumption of Fish Products (Volume)

	1000 tonnes			Average annual	Percentage	Percentage
	1995	2000	2005	Growth 00-05	Total 2000	Total 2005
Freshwater	575	552	574	0.79%	43.34%	40.44%
Dermersal	157	136	206	8.57%	10.72%	14.51%
Large Pelagic	374	376	384	0.44%	29.50%	27.05%
Marine	185	167	206	4.30%	13.14%	14.55%
Crustaceans	13	26	31	4.07%	2.02%	2.21%
Molluscus	6	9	12	6.07%	0.71%	0.85%
Cephalopods	6	7	6	-5.30%	0.57%	0.39%
SADC's Total	1,316	1,273	1,419	2.20%	100.00%	100.00%
World Total	58,949	63,560	68,852			
SADC % of World	2.23%	2.00%	2.06%			

Source: FAOSTAT

5.2. SADC

Fish consumption in the region, with respect to volume, is negligible compared to the world's consumption of fish (refer to Table 7). A positive development is that the consumption of fish in the region is growing, although off a small base. In 2005 freshwater and large pelagic fish accounted for 67% of the region's consumption. These types of fish are preferred over other varieties as they are indigenous to the region. Also, the consumption of freshwater fish is greater than any other varieties as the majority of the countries in the region are landlocked states, but have access to great lakes.

Although the consumption of fish has increased with respect to volume consumed, the region's per capita consumption of fish has steadily declined, but imports have increased. This situation illustrates that consumers' consumption of fish is constrained by the supply side's ability to produce fish. The market for aquaculture products is generally poorly developed, except in urban and peri-urban areas, though sophisticated market chains exist for mariculture products" (Hecht, Halwart & Subasinghe, 2006: X1). In SADC the largest consumers of fish are Mozambique, Mauritius and Angola, with the domestic market consuming the majority of their production.

6. Trade

Over 40% of fish production is traded across borders and fish exports exceed that of meat, dairy, cereals, sugar and coffee. The majority of traded fish and fish products are from aquaculture production, which is mostly practised in rural areas and concentrated in developing countries. As a consequence trade in fish products presents an opportunity to help rural communities (FAO, 2006).

Trade in fish products in terms of value increased by 7% on an average annual growth basis from 1985 to 2004. In 1976 global trade in fish products was worth approximately US$ 9bn but by 2004 it had increased to US$ 76bn representing an increase of 744% . Over the same period, the volume of fish products traded on international markets grew by 266%. Over the period the value of trade increased at a faster rate than the volume of trade. This is due to consumers increased demand for fish resulting in a relative drop in supply compared to demand and developing producers concentrating on farming "luxury" fish products, such as shrimp or salmon .

Trade activity has a geographic dimension. On average developing countries are net exporters and developed countries are net importers of fish and fish products (refer to Table 8). Trade flows are also influenced by climatic conditions which affect the type of fish that a region can produce. Developing countries have a competitive advantage in supplying tuna, small pelagic species, shrimps, prawns, molluscs,

Figure 9: Global Trade in Fish Products from 1976-2004

Source: FISHSTAT PLUS

Table 8: Trade in Fish Products (Volume and Value)

					Average annual	Percentage
		1996	2000	2004	Growth 00-04	Total 2004
Developed Countries	Export Quantity	12,352,777	13,171,883	14,628,901	2.66%	49.18%
Developed Countries	Export Value	26,986,117	27,562,404	37,053,256	7.68%	51.66%
Developing Countries	Export Quantity	10,911,296	13,280,595	15,116,284	3.29%	50.82%
Developing Countries	Export Value	26,073,947	28,088,396	34,675,355	5.41%	48.34%
Developed Countries	Import Quantity	15,537,954	17,669,385	19,089,838	1.95%	64.24%
Developed Countries	Import Value	48,335,128	50,598,643	61,887,078	5.16%	81.09%
Developing Countries	Import Quantity	7,137,756	8,873,616	10,625,867	4.61%	35.76%
Developing Countries	Import Value	9,665,730	10,382,553	14,432,589	8.58%	18.91%

Import Value is quoted in US$'000 and Import Quantity is quoted in tonnes

Source: FISHSTAT PLUS

catfish, tilapia, rock lobsters and cephalopods because these species grow faster in warmer water and thus are better suited to tropical and sub-tropical areas. As a result developing countries are the dominant exporters of the above fish varieties. While developed countries tend to export demersal species, herring, mackerel and salmon as these are cold-water species.

Trade patterns indicate that higher value species are destined for the export market, either intra or inter regional trade, while lower-value products are destined for the domestic market. A large majority of aquaculture products are produced for the export market. Therefore trade is one of the main drivers causing producers to invest in more intensive production systems and effluent treatments to capitalise on trading in higher value species that have better margins (FAO, 2006:23)

6.1. Imports

6.1.1. Regional Import Patterns

In 2004, as a region, Europe was the largest importer of fish products in terms of value, comprising 42% of global imports, and the second largest importer with respect to volume (refer Table 9). Europe's impressive performance was largely driven by European Union (EU)[2] member states' imports, which has the world's biggest trade deficit in fish and fishery products (Brans, 2006). In 2004 the EU's imports comprised 92% of Europe's total imports (FAO, 2006), and it was the

2 In 2004 the European Union comprised 25 member states, which were Belgium, Czech, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Hungary, Malta, Netherlands, Austria, Poland, Portugal ,Slovenia, Slovakia, Finland , Sweden and the United Kingdom. On the 1st January 2007 the European Union accepted Bulgaria and Romania as member states in effect creating the EU 27.

world's largest importer of fish, seafood and aquaculture products, comprising 39% of global imports. Eighty-two percent of these imports was unprocessed, commodity based fishery products (Brans, 2006). In 2004 Norway was the EU's largest supplier of fish and fishery products, accounting for 19.8% and 14% of the EU's imports in terms of volume and value, respectively (Brans, 2006). Other major suppliers to the EU in 2004, listed in descending order, were Iceland, China, U.S., Argentina, Morocco, Thailand, Russia, Faroe Isles and India. In 2004 the EU's largest importing member states, in terms of value, were Spain, France, Italy, United Kingdom, Germany and Denmark.

The second largest importer of fish and fishery products in 2004, in terms of value, was Asia, accounting for 35% of global imports. Asia's imports were fuelled by consumption in China, Korea and Thailand. Asia is also the world's largest importer in terms of volume. The difference between Europe and Asia's imports with respect to volume is 959,789 tons; however the difference with respect to value is US$5.6bn. This differential illustrates that these regions import different types of goods. Asia tends to import low quality products, while Europe imports high quality products.

North America is the world's third largest importer of fish products in terms of value and volume. The region tends to import high-value fish products. For a more detailed breakdown of regional imports refer to the appendix.

Both Europe and Africa posted strong growth rates from 2000-2004 for imported fish products. Furthermore both these regions' average annual growth rates hide huge discrepancies between intra-regional growth rates. Europe's demand for fish products is fuelled by Eastern European countries that achieved a 20% growth rate and former USSR countries that achieved a 28% growth rate compared to the EU's 10%. Africa's growth in fish exports was largely driven by Eastern Africa and Northwestern Africa that achieved a 29% and 26% annual average growth rate, respectively, from 2000-2004.

Table 9: Region's Imports of Fish Products (Value)

	US$'000			Average annual	Percentage
	1996	2000	2004	Growth 00-04	Total 2004
Europe	21,876,798	22,047,082	32,308,439	10.02%	42.33%
Asia	24,948,839	24,218,497	26,655,641	2.43%	34.93%
America, North	8,663,895	12,421,170	14,322,817	3.63%	18.77%
Africa	1,084,103	959,347	1,433,518	10.56%	1.88%
Oceania	642,524	674,710	305,580	7.63%	1.19%
America, South	784,699	660,390	693,672	1.24%	0.91%
Total Imports	58,000,858	60,981,196	76,319,667	5.77%	100.00%

Source: FISHSTAT PLUS

6.1.2. Countries' Import Patterns

The largest importers of fish products in 2004 by country were Japan and the US, respectively, with a 28% and 22% share of global imports (refer to Table 10). Approximately 50% of Japan's imports, with respect to volume, were for shrimp, tuna and marlin, salmon, trout, crab, processed eels, cod, Pollock roes and processed shrimp (Hayash, 2006:4). Since 1998 Japan's largest supplier of fishery products is China (Hayash, 2006). Japan's ability to generate sufficient supply to satisfy domestic demand has steadily declined since 1964. In 2004 Japan's domestic fishery industry supplied 55% of its domestic consumption (Hayash, 2006), but as its supply side capacity continues to decline. Japan's imports of fish products will increase. The health of its fishery industry has deteriorated due to rising fuel costs and the lure of urbanised living is reducing the supply of labour in fishing villages (Hayash, 2006). This market could provide lucrative opportunities for SADC's producers.

In 2004 five European countries were represented among the top 10 importing nations and 11 European nations were included among the top 20 importing countries of fish and fish products. It is apparent therefore that on a collective basis, Europe is the largest market for imported fish products.

Annual average growth rates in mature markets such as Japan, the USA and the majority of European countries do not rise above 10%. The emerging markets for fish products tend to be former eastern block, Asian and South American countries. Based on their average annual growth rates from 2000-2004, the following countries are considered to be emerging markets: Lithuania, Chile, Mauritius, Romania, Croatia, Seychelles, Slovenia and India. It should be noted that the majority of emerging markets tend to be in Eastern European countries. Consumption in these countries tend to be tied to the income effect and the fact that these countries are not large fish producers, except for Russia that farms specialised luxury fish products.

The rise in imports among Asian countries, especially China and Thailand, will affect trade patterns. Asia is the world's largest producer and one of the largest consumers of fish products. The region's large domestic consumer base initially gave producers access to a market that allowed them to develop their productive capacity to supply international markets. However Rising levels of per capita income have changed the population's diet, however, which now include a higher percentage of protein rich foods and as a result domestic demand is increasing at a faster rate than growth in supply capacity. The implication is that these countries' ability to supply export markets is constrained. Furthermore other global leaders in fish production such as South America and India are facing a similar situation to Asia and as a result the amount of fish these countries can export is also limited. This creates a situation where established markets will probably have to diversity their trading partners to include "non-traditional" fish exporters. This opens up an opportunity for SADC's producers to supply these countries' export markets.

Table 10: Top 20 Countries' Imports of Fish Products (Value)

	US$'000			Average annual	Percentage
	1996	2000	2004	Growth 00-04	Total 2004
Japan	6,701,242	15,742,561	14,830,080	-1.48%	27.59%
United States of America	4,748,692	10,553,850	12,078,689	3.43%	22.47%
Spain	724,338	3,372,480	5,238,660	11.64%	9.75%
France	1,532,886	3,018,121	4,216,736	8.72%	7.84%
Italy	1,274,912	2,555,491	3,919,082	11.28%	7.29%
China	112,646	1,820,699	3,167,656	14.85%	5.89%
United Kingdom	1,227,987	2,209,877	2,843,021	6.50%	5.29%
Germany	1,124,101	2,282,399	2,830,918	5.53%	5.27%
Denmark	609,031	1,860,058	2,368,838	6.23%	4.41%
Korea, Republic of	128,742	1,398,606	2,258,711	12.73%	4.20%
China, Hong Kong SAR	624,726	1,970,395	1,928,618	-0.53%	3.59%
Netherlands	389,314	1,172,233	1,850,165	12.09%	3.44%
Canada	433,087	1,409,101	1,567,651	2.70%	2.92%
Belgium	427,918	1,038,537	1,530,953	10.19%	2.85%
Sweden	333,934	711,688	1,303,654	16.34%	2.43%
Portugal	256,694	862,407	1,264,862	10.02%	2.35%
Thailand	283,658	826,699	1,254,617	10.99%	2.33%
Russian Federation		198,505	770,068	40.34%	1.43%
Australia	238,140	563,482	730,745	6.71%	1.36%
Norway	105.217	612,890	681,941	2.66%	1.27%
Top 20 Total	18,184,577	44,814,142	53,752,391	4.65%	100.00%
Others	7,203,847	16,167,054	22,567,276	8.70%	
Total World Imports	25,388,424	60,981,196	76,319,667	5.77%	

Source: FISHSTAT PLUS

6.2. Exports

6.2.1. Regional Export Patterns

In 2004 the largest regional exporters of fish and aquaculture products were Europe and Asia with a 37% and 33% share of the market, respectively (refer to figure 11). In 2004 the EU comprised 68% of Europe's exports, with its biggest exporter being Norway. The EU's main export destinations in 2004 were Nigeria, Russia, China, Egypt, Japan, Ivory Coast, Seychelles, Thailand, U.S. and Morocco (Brans, 2006). Asia's aquaculture producers focus on exporting high value species (marine shrimps, tilapia, catfish and seaweed) to a few developed countries, mainly the EU, US and Japan. China is the region's largest exporter of aquaculture products, while Thailand and Indonesia are viewed as the second largest aquaculture exporters in Asia followed closely by Viet Nam. These two regions dominate the global export market in respect to value and volume. Given the sheer relative value of the EU and China's exports, combined with the fact that both these exporters managed to grow their exports by 27% and 31%, respectively, on an annual average basis from 2000-2004, one can conclude that their dominance of global exports markets should continue over the medium-term. This does not preclude SADC from exporting their

Table 11: Region's Exports of Fish Products (Value)

	US$'000			Average annual	Percentage
	1996	2000	2004	Growth 00-04	Total 2004
Europe	18,787,612	18,803,284	26,500,666	8.69%	36.95%
Asia	17,194,460	19,169,122	24,013,533	5.79%	33.48%
America, North	7,446,544	7,822,161	9,313,260	4.46%	12.98%
America, South	5,294,365	5,226,585	6,547,098	5.79%	9.13%
Africa	2,514,466	2,742,838	3,245,741	4.30%	4.53%
Oceania	1,822,617	1,886,810	2,108,313	2.81%	2.94%
Total	53,060,064	55,650,800	71,728,611	6.55%	100.00%

Source: FISHSTAT PLUS

products, but implies that SADC producers' strategy should consider serving the African regional market and specialised markets that demand specialised products. For a more detailed breakdown of regional imports refer to the appendix.

Countries specialise in producing certain fish varieties due to climatic conditions as a result the composition of the top 20 exporters is fairly mixed and represents countries from diverse regions. The export market can roughly be divided into four tiers. The first tier is China that has a 9% share, the second tier of 5-6%, the third tier of 2-4% and the fourth tier of below 2%. The export market for fish products is less concentrated than the import market. The top 20 exporters comprise 50% of the market, while the top two importing countries account for 50% of imports. This type of market structure has the potential to create a very competitive market for suppliers as they are numerous and geographically diffused which could weaken their relative bargaining power against buyers.

The largest exporter of fish is China, which is also the world's largest producer (refer to figure 12). In 2004 China was the world's largest exporter with a 9% share of global exports and was also the fastest growing exporter, achieving a 16% average annual growth rate fro 2000-2004. China's position as the world's leading exporter is a relatively new development which occurred in 1999/2000. Its dominant position can be attributed to "increasing production and the development of its fish processing industry, based on competitively priced labour and production costs" (Asche et al, 2006:17).

Potential emerging exporters based on their average annual growth rate from 2000-2004 are The Netherlands, Sweden, Belgium, Malaysia, Poland, Brazil, Greece, Korea, Turkey, Croatia, Uganda, Maldives, Mauritius and Madagascar. To assess whether these countries will become SADC producers' competition depends o the type of fish they export. It is logical to assume however that given climatic conditions, European countries would not produce the same products and thus not be direct competitors. In addition it is encouraging that both Mauritius and Madagascar have managed to grow their fishery industry, despite already increasingly prevalent competitive conditions.

Table 12: Top 20 Countries' Exports of Fish Products (Value)

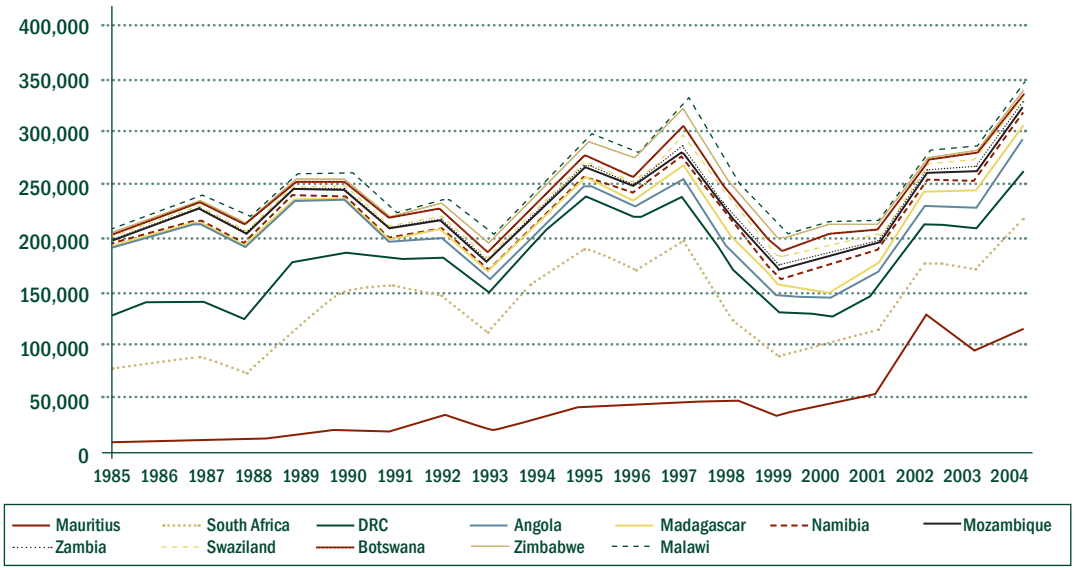
	US$'000			Average annual	Percentage
	1996	2000	2004	Growth 00-04	Total 2004
China	2,955,499	3,706,339	6,779,909	16.30%	9.45%
Norway	3,434,073	3,550,369	4,170,996	4.11%	5.81%
Thailand	4,120,443	4,384,437	4,053,351	-1.94%	5.65%
United States of America	3,263,358	3,118,839	3,693,079	4.32%	5.15%
Denmark	2,715,111	2,765,888	3,576,980	6.64%	4.99%
Canada	2,306,452	2,835,295	3,506,676	5.46%	4.89%
Spain	1,472,136	1,615,229	2,581,893	12.44%	3.60%
Chile	1,768,410	1,858,390	2,547,235	8.20%	3.55%
Netherlands	1,488,695	1,351,828	2,468,384	16.24%	3.44%
Viet Nam	503,552	1,484,283	2,408,502	12.86%	3.36%
United Kingdom	1,316,075	1,269,848	1,833,866	9.62%	2.56%
Taiwan province of China	1,778,588	1,762,576	1,809,403	0.66%	2.52%
Iceland	1,425,898	1,236,612	1,782,756	9.58%	2.49%
Indonesia	1,705,767	1,610,291	1,687,554	1.18%	2.35%
France	1,015,648	1,108,596	1,543,762	8.63%	2.15%
Russian Federation	1,686,162	1,525,104	1,528,172	0.05%	2.13%
Germany	1,064,947	1,110,897	1,430,341	6.52%	1.99%
Peru	1,121,565	1,129,350	1,389,162	5.31%	1.94%
India	1,121,977	1,417,853	1,368,844	-0.88%	1.91%
Korea, republic of	1,624,582	1,489,803	1,246,055	-4.37%	1.74%
Top 20 Total	24,027,729	26,670,897	35,787,005	7.63%	49.89%
Others	29,032,335	28,979,903	35,941,606	5.53%	50.11%
Total Exports (Value)	53,060,064	55,650,800	71,728,611	6.55%	100.00%

Source: FISHSTAT PLUS

6.3. SADC Trade

Since 2001 South Africa and Mauritius have been the region's biggest importers of fish products. On average the behaviour of SADC's largest importers has been erratic and volatile compared to other member states' imports, barring Angola and the DRC that have experienced civil unrest. South Africa's import behaviour follows a boom and bust behaviour producing peaks and troughs. The most pronounced of these boom-bust cycles occurred in 1997/1998. A positive trend is that since 2002 South Africa's imports have dramatically increased. Mauritius took over South Africa's status as SADC's leading importer in 2000. This is due in part to South Africa's fall in imports in 1997 and its inability to achieve its 1993-1997 import level. If a regional trade hub is to be developed the fact that the region's primary importers' propensity to import is erratic could be problematic. Producers' ability to access finance at a reasonable rate hinges on their ability to convince banks that a stable market exists for their product. Maybe one of the issues that a producer association could investigate is the nature of South Africa and Mauritius' imports and a way to stablise their trade patterns.

Figure 10: SADC's Imports per Country (US$'000)



Source: FISHSTAT PLUS

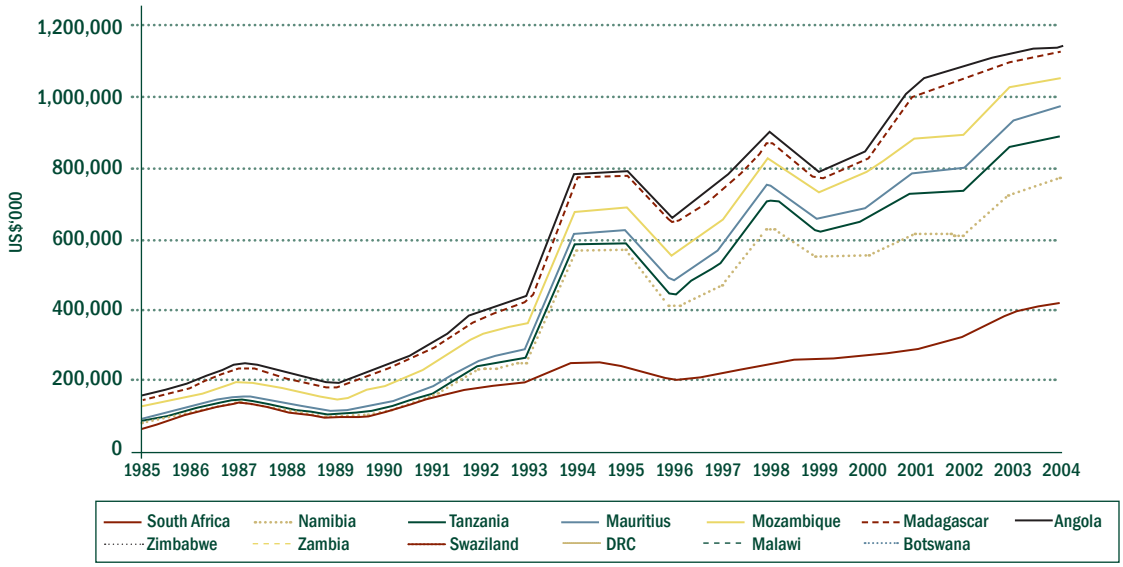
In 2004 Mauritius and South Africa comprised approximately 63% of the region's imports and the other member states accounted for the remaining 37% (refer to Table 13). Over the 2000-2004 period the average annual growth of SADC's imports was 13% which is greater than the growth rate achieved by the global import market. This is a positive development as SADC's propensity to import fish products has steadily increased, coinciding with the region's ability to increase production.

Table 13: SADC Countries' Imports of Fish Products (Value)

	US$'000			Average annual	Percentage
	1996	2000	2004	Growth 00-04	Total 2004
Mauritius	44,168	41,885	117,233	29.34%	33.47%
South Africa	126,823	60,296	104,911	14.85%	29.65%
DRC	51,231	26,217	45,437	14.74%	12.97%
Angola	10,668	16,336	32,225	18.51%	9.20%
Madagascar	5,345	6,745	14,190	20.43%	4.05%
Namibia	7,605	24,214	10,457	-18.93%	2.99%
Mozambique	8,513	8,177	9,422	3.61%	2.69%
Zambia	1,596	1,700	4,941	30.57%	1.41%
Swaziland		8,859	4,574	-15.23%	1.31%
Botswana	5,082	11,300	3,477	-25.52%	0.99%
Zimbabwe	18,001	8,621	3,378	-20.88%	0.96%
Total	279,032	214,350	350,245	13.06%	100.00%
World Total	25,388,424	60,981,196	76,319,667	5.77%	
SADC Share of Total Trade	1%	0%	0%		

Source: FISHSTAT PLUS

Figure 11: SADC's Exports per country 1985-2004



Source: FISHSTAT PLUS

This demonstrates that imports are not replacing domestic capacity but rather that demand outstrips supply indicating that SADC's potential producers have access to a growing domestic market. Although the market for fish products in SADC is growing, it is off a small base as SADC's imports comprise less then 1% of global imports.

The turning point in the profile of SADC's exports was 1993 when South Africa and Namibia started to vie for the position of SADC's dominant exporter. In 1993 Namibia's exports significantly increased to topple South Africa's position as SADC's top exporter. Namibia held its position from 1993 to 2001, but was overtaken by South Africa in 2002 due to a combination of its poor performance and South Africa's growing export capability. Since 2000 smaller exporters, such as Madagascar, Tanzania, Mauritius and Mozambique have started to emerge.

In 2004 Namibia was the largest exporter of fish and fishery products in terms of volume, but South Africa was the largest exporter with respect to value (refer to Table 14). Namibia exports 90% of its fish, which mostly comprises low value ground frozen fish. South Africa's sophisticated processing industry allows it to export value added products that are mostly destined for the region. SADC's primary export destinations are the EU, Japan and the US.

The majority of SADC's aquaculture exports are mariculture products, mainly shrimps, abalone and seaweed. Shrimps are exported frozen from Madagascar and Mozambique, while seaweed is exported dry from Tanzania, Madagascar and Mozambique. South Africa exports 80–85% of its abalone exports live while the remainder is canned.

Table 14: SADC Countries' Exports of Fish Products (Value)

	US$'000			Average annual	Percentage
	1996	2000	2004	Growth 00-04	Total 2004
South Africa	201,620	272,550	419,420	11.38%	36.74%
Namibia	198,906	283,931	351,630	5.49%	30.80%
Tanzania	41,344	99,012	117,569	4.39%	10.30%
Mauritius	42,190	36,659	84,202	23.11%	7.38%
Mozambique	68,692	103,716	77,501	-7.03%	6.79%
Madagascar	100,682	37,783	72,972	17.89%	6.39%
Angola	3,922	10,839	11,945	2.46%	1.05%
Zimbabwe	880	4,308	2,480	-12.89%	0.22%
Zambia	399	465	1,874	41.69%	0.16%
Swaziland	5,082	2,585	1,398	-14.24%	0.12%
DRC	1,351	586	446	-6.60%	0.04%
Malawi	424	143	78	-14.06%	0.01%
Botswana	92	35	43	5.28%	0.00%
SADC's Total	660,502	852,612	1,141,558	7.57%	
World's Total	53,060,064	55,650,800	71,728,611	6.55%	
SADC's Share of the Worlds	1.24%	1.61%	2.15%		

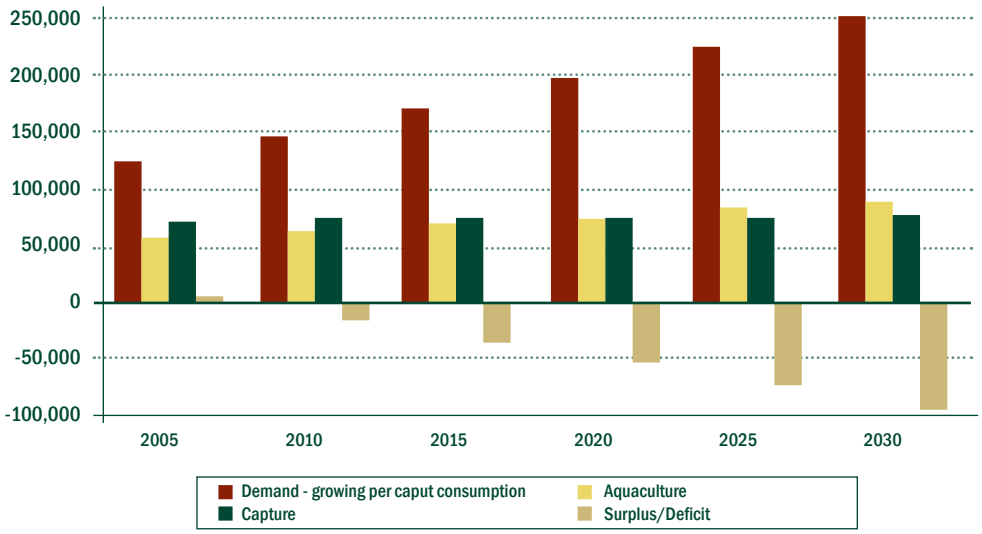
Source: FISHSTAT PLUS

Products from commercial aquaculture are mostly destined for international export markets; however this strategy often places the region at a relative disadvantage due to the cost and extent of transportation networks. Despite this disadvantage some SADC countries have been successful in penetrating specialised markets: Mozambique and Madagascar (shrimp) and Namibia (oysters). Small-scale community farmers mostly satisfy demand in local markets. Both the extent of demand and consumers' willingness to pay for fish and seafood products in Africa has been underestimated and thus the value of the local market has also been undervalued. For some medium scale commercial producers supplying the regional market could be a more profitable activity than exporting their products internationally. Although the African market has vast potential, in theory, to unlock this value investments must be made to develop distribution systems, especially cold chains.

According to the Eurofish (2005) in 2004 approximately 250,000 tons of fish products were exported within the region, representing 9% of the region's annual production of 2.7m tons. Intra-regional trade is hampered by inadequate infrastructure (transport facilities, storage and distribution) required to trade large volumes of fish (Eurofish, 2005). Apart from logistical problems, the region lacks banking systems required to manage the flow of transactions across borders. Foreign exchange services are lacking and export credit facilities are poorly developed (Eurofish, 2005: 53).

Intra-regional trade between SADC states is also limited due to supply side bottlenecks. Trading conditions between SADC states should improve due to the harmonisation of tariffs and trade agreements that is perceived to be the first step to build a free trade area and in time launch a common currency.

Figure 12: Trade Outlook for Fish Products (1000mt)



Source: Helga Josupeit and Nicole Franz (2004)

6.4. Trends and Developments

Demand for fish will be driven by population growth and the fact that global per capita income is also increasing. A wealthier population tends to include a higher percentage of fresh vegetables and protein in their diets than a poorer population. On the supply side, fish stocks are decreasing and as a result the amount of fish that capture fisheries can supply is tapering off. This situation creates a market for aquaculture to supply the emerging shortfall between supply and demand.

Experts predict that Asia's consumption of fish will be greater than its supply and as a result Asia will become a net importer of fish. However, developing countries in the region should still retain their position as a net exporter, but export levels will decline as a greater proportion of production will be consumed by the local market (FAO, 2006). This development would not only affect supply, but also trade patterns. The international demand for fish products is expected to be greater than the amount of products supplied to the market, creating a 92m ton deficit in 2030 (refer to Figure 12). Asia's consumption of fish is expected to grow at a faster rate than its production capacity. Given that Asia is the second largest exporter of fish to the world and many of its trading partners are the among the top fish consuming nations in the world, less fish will be available for trade to developed countries (FAO, 2006). Experts predict that South-South trade should increase.

7. Marketing Activities

Various types of marketing channels exist as a producer's marketing activities are affected by the type of good he/she produces, scale of operations, an end-user's product requirements, geographic location of a market and the distance between production centres, ports or export exit points (FAO, 2006). If the above factors are taken into consideration, a multitude of marketing channels exist. For example, considering only the geographical dimension presents a seller with various marketing channels. If a commercial farmer sells his/her product to be consumed by a final user in a domestic peri-urban or urban centre, goods flow from producer to buyer to wholesaler to retailer to consumer. When a producer's product is destined to be consumed by an end-user in a foreign market, the marketing chain tends to be more complicated, especially if the exported product is a high value, niche agricultural product such as fish, prawns or abalone. These marketing chains tend to have the following structure: producer, a producer's marketing division, a collective marketing company, a foreign agent or buyer, an exporting company, a wholesaler or direct to retail market.

Another factor to consider is that a producer's marketing activities are also shaped by his/her supply side capabilities. Small-scale producers sell their goods at the farm-gate and /or the nearest population centre. "For the local market, rural sector supply chains are oriented from the producer to the selling point, while at the national level the processor and intermediaries are introduced" (FAO, 2006:21). Large commercial producer's marketing activities tend to be more complicated as they have the resources, and thus the option to integrate forward into the supply chain into more profitable "value-added" activities. Large commercial producers often process their own products and transfer them to a "broker", even in the country of destination, or place them directly into markets to be redistributed by supply centres, chain stores and supermarkets (FAO, 2006:21).

The different options presented above have two important implications for small scale produces. First, small-scale producers can pursue numerous marketing channels. This broadens the scope of marketing activities from a mechanical objective of delivering a product to placing one's product in the most lucrative market. For example, a small-scale producer's decision to target only the local market might be the simplest logistical option and the most risk averse decision, but not the most profitable one. A study compiled by the FAO (2006) found that fish prices tend to be higher in densely populated areas than rural areas.

"In the periurban domain, prices were 48% higher, the number of buyers was three times greater, and the average purchase per customer was nearly double that of the rural domain. In response to these structural differences, producers in the peri-urban domain sold 300% more fish per harvest, were 72% more productive per unit area, and had 11 times the production scale of producers in the rural domain".

Rural farmers are dispersed among the region and their market is geographically scattered, which creates a situation where economies of scale and the formation of markets are hampered. Second, improving the likelihood that non-commercial fish farmers' activities in rural areas will be sustainable over the long term is tied to concentrating activity in an area by creating a "hub" or improving their access to infrastructure to tap into the demand in peri-urban and/or urban markets. This situation "represents an opportunity for lead agencies to zone areas for aquaculture concentration, using bio-physical, demographic, marketing and socio-economic parameters, a good example is the proposed Namaqwaland Mariculture Park in South Africa" (Britz et al., 2005 in Hecht et al; 2006). Another strategy that rural farmers could use to tap into a larger market is to create producer associations that form forward linkages into traders supply chains.

Another aspect of marketing activities concerns the manner in which a product is packaged and labelled. Consumers heightened awareness of health issues and bureaucrats' usage of non-tariff barriers to protect domestic producers from imported goods has shifted responsibility onto producers to prove that their production processes are tightly controlled. To demonstrate to consumers that a producer's product satisfies quality standards; products it must bear the appropriate labels (refer to Table 15).

Mandatory product labelling standards should not affect SADC's ability to compete in global markets, and could be used as a strategic asset to gain access into the EU's market. Madagascar, Mozambique and South Africa have implemented processes to satisfy regulatory labelling requirements, while the United Republic of Tanzania has developed legislation for labelling.

Table 15: EU's Labelling Requirements

Description	Regulation	Website
Defines labelling requirements for fresh, chilled or frozen fishery and aquaculture products (products that fall under Chapter 3 of the EU Tariff Schedule) intended for the retail sector.	Regulation 2065/2001	http://www.useu.be/agri/seafood2.html.
Applies to processed food products. Under the directive, the labelling of potential allergens that falls within its list of 12 groups is mandatory, one of these groups includes fish and products thereof and crustaceans and products thereof.	Directive 2000/13/ECDirective 2003/89/EC	http://www.useu.be/agri/label.html.
Establishes requirements for materials and articles intended to come into contact with food.	Council Regulation 1935/2004	http://www.useu.be/agri/packaging.html.

Source: Brans, 2006:13-16

An emerging labelling trend is driven by consumers' desire to purchase environmentally friendly products. As a result supermarkets chains and trading companies prefer stock products that are deemed to be environmentally friendly by an accredited association and carry a label bearing the authenticity of this claim. At the moment a gap exists in the market and labelling standards have not been formulated, providing an opportunity for parties to make unsubstantiated claims. The possibility that this situation could be exploited has caused the European Union to investigate this issue. For more information access the following GAIN report E35221 "Eco-Labelling Scheme for Fisheries Products" at http://www.useu.be/agri/seafood.html.

8. Tariff and Non-Tariff Barriers

Countries use tariffs barriers and non-tariffs barriers (NTBs) to protect domestic farmers from imported goods. Tariffs increase the price of imported goods compared to domestic goods, thereby giving domestic producers a relative price advantage. NTBs usually take the form of strict sanitary and phytosanitary measures or adherence to stringent, certification measures such as 1SO 9000 certification. Non-tariff barriers potential to hinder exporters' ability to sell their products into foreign markets is greater than tariff barriers. Non-tariff barriers increase a producer's costs throughout the supply chain due to the complexity of the processes that he/she must adhere to and the bureaucratic cost of ensuring that procedures are documented. These measures tend to have a disproportionate negative affect on developing farmers' ability to compete compared to farmers in developed regions. Farmers' access to infrastructure in developing regions is limited and farming operations in developing countries tend to be on a smaller scale increasing the unit cost of compliance. According to Dey et al (2005), emerging trade patterns in fish products indicate that food safety regulations, Hazard Analysis and Critical Control Point (HACCP) processes and technical barriers to trade inflate costs throughout the value chain and as a result tend to exclude small-scale producers and processors from the export supply chain. The South African Bureau of Standards is an accredited HACCP certifier, which makes it simpler and cheaper for SADC's farmers / manufacturers to satisfy non-tariff barriers.

The existence of non-tariff barriers does not imply that farmers in developing countries cannot compete, but rather that they have to combine their resources through associations and then apply them in a focused manner. Collective organisation and the pooling of resources among SADC's farmers/ producers could be an effective strategy to reduce the burden of ensuring that activities along the supply chain meet regulatory standards. Small-scale producers could also form associations that approach the government and the private sector to help them address complex issues related to food safety and traceability regulation.

Excellent examples of developing countries that have managed to build a globally competitive industry with relatively limited resources are Madagascar and Mozambique. These countries farm prawns using intensive aquaculture production methods. Companies in this sector have the capacity to participate in functions throughout the value chain and thus produce, process, pack and export their products to specialised markets. Furthermore companies' "processing and packing facilities are HACCP compliant and a product is inspected for quality by state departments and in many instances by the buyers" (Hecht et al, 2006).

A comprehensive discussion of tariffs would be complicated and lengthy, as it tends to be specific and technical in nature. Instead of discussing the specifics, this TIB highlights which countries have preferential access to the largest fish importers' markets. For detailed information a potential exporter can follow the link s provided throughout this section to gain specific tariff information. On a generic level the following websites are useful starting points for tariff information:

- European Taxation and Customs Union: http://ec.europa.eu/taxation_customs/common/databases/index_en.htm
- United States International Trade Commission: http://www.usitc.gov/tata/hts/bychapter/index.htm
- Asia Pacific Economic Cooperation (APEC) Tariff Database: http://www.apectariff.org/
- Export Helpdesk for Developing Countries: http://export-help.cec.eu.int/ (Information about the EU)

This section provides an overview of the non-tariff barriers applied to products imported into the EU and US for human consumption. A detailed discussion of NTBs is beyond this TIB's scope, however additional information can be obtained by following the provided web links.

8.1. Tariffs

8.1.1. European Union

Tariffs placed on fish products fall into two chapters: chapter 3 discusses fresh, chilled and frozen fish and chapter 16 covers processed fish products. Detailed information can be accessed through the following websites

- http://www.europa.eu.int/comm/taxation_customs/dds/en/tarhome.htm
- http://www.useu.be/agri/customs.html.

The EU's imports of fish products are subject to quotas (refer to appendix for greater detail). However the growth of the region's food processing industry combined with falling fish stocks has caused bureaucrats to re-evaluate its quota system. The outcome of this process was that "the in-quota tariff only applies when the customs value of the imported product is at least equal or higher than the reference price fixed by the EU" (Brans; 2006:14). As part of its obligations under the Uruguay agreement, the EU agreed to open up its tariff quotas for certain fish products (refer to appendix for greater detail).

The EU has granted certain countries and regions preferential access. Since the EU's inception, Africa, Caribbean and Pacific (ACP)

countries' fish products have enjoyed a 0% duty. The following countries in SADC are part of the ACP: Angola, Botswana, Democratic Republic of Congo, Central African Republic, Lesotho, Madagascar, Mauritius, Malawi, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe. SADC's exporters could use these countries' status to gain preferential access to the EU. Under the proposed Economic Partnership Agreements (EPAs) system, the practice of treating all developing nations the same will be phased out and instead developing countries will be grouped according to their proximity and shared interests. Although the ACP countries enjoy preferential treatment, the relative advantage of this treatment is being eroded by the liberalisation of the trading system and Lesser Developing Countries' privileges. The Andean community and Central American countries have various preferences. For example, Mexico and Chile enjoy a 66% tariff reduction on all fishery product exports to the EU; in some cases the Mexican tariff is zero. The GSP system (Generalized System of Preferences) grants various countries that are part of the SGPA (Bangladesh, Solomon Islands, Maldives), SGPE (Sri Lanka) and SGPL (India, Indonesia, PNG, Thailand, Malaysia, Sri Lanka) preferential access to the EU. Most SADC member states qualify for reduced duties under the SGPL preferential access agreement.

8.1.2. Japan

Detailed information can be accessed at http://www.apectariff.org.tdb.cgi/ff3235/apeccgi.cgi?JP

Japan has signed a Free Trade Agreement with Mexico (2005) and a Singapore Economic Partnership Agreement with Singapore (2002) (Josupiet, 2006). Both these countries are not significant exporters of fish products and thus it does not have a large impact on SADC producers' relative competitiveness. The following agreements are in the process of being finalised: An Economic Partnership Agreement with the Philippines and a FTA with Thailand, Indonesia and Chile (Josupiet, 2006). The pending agreements have the potential to affect SADC's producers potential to enter into the Japanese market as these signatory countries are low cost producers, have an established aquaculture industry and are pursing an aggressive export strategy.

8.1.3. United States

- Detailed information can be accessed at http://www.usitc.gov/tata/hts/bychapter/index.htm

The US has concluded general free trade agreements with the following countries: Israel (1955), Chile (2003), Australia (2004), Central Dominican Republic (2004), Jordan (2000), Singapore (2003), Bahrain (2004) and Morocco (2004) (Josupiet, 2006) . Out of these countries only Chile is a significant producer and exporter of aquaculture prod-

ucts. Given that Chile is a low cost producer of salmon and has a tariff advantage in the US market, it appears that SADC's producers would be at a disadvantage competing against Chile in the US market. Australia's free trade agreement with the US improved the fortunes of its fishery industry as all Australian seafood exports enter the US market duty-free; no longer attracting a 6% tax for frozen fish meat through to 35% for canned tuna. Australia's experience demonstrates the importance of gaining preferential access to a large market .

The US is discussing free trade agreements (FTAs) with the following countries/ regions: Andean countries, Panama, Southern Africa Nations Plan and Thailand (Josupiet, 2006).

8.2. Non-Tariff Barriers

According to Brans (2006; 10) "imports of fish and fishery products into the EU are subject to official certification based on the EU's recognition of the exporting country's competent authority". This implies that an exporting country must have a body which is responsible to ensure that domestic producers' activities throughout their production chain have satisfied the EU's prescribed controls. If a country wishes to export fish products to the EU its public health and control systems must match the EU's standard. Countries authorised by the EU to export fishery products and molluscs are published in Commission Decision 97/29/EC, and in Commission Decision 97/20/EC, respectively. Before a product enters the EU it must pass an approved border expectation post, based on the principles laid down in regulation 882/2004. General inspections include "documentary check (health certificates), identity check (visual inspection to ensure consistency between certificates and product) and physical check (inspection of the product) (Novel; 2006, 11).

A mixture of consumer pressure due to health scares emanating from the Bovine spongiform encephalopathy (BSE), commonly known as mad cow disease, scandal, and bureaucrats' ability to capitalise on a situation that allows them to protect the public good and domestic producers' market share has led to product traceability become a mandatory part of the EU's food system. At present this regulation is applied in its watered down form, as the "requirement for traceability is limited to ensuring that businesses are at least able to identify the immediate supplier of the product in question and the immediate subsequent recipient" (Novel,2006:13). Although it is not law, it is common practice that importers ask their trading partners to furbish traceability details along their supply chain.

All food products destined for the EU must satisfy a host of hygiene standards and in addition to these regulations molluscs and fishery products are subject to specific rules (Novel:2006, 10). Table 16 provides a brief description of these regulations. For greater detail one should refer to the following websites and/ or documents about food hy-

giene and control standards and a working paper on "Guidelines for the interpretation of Decisions 2003/804/EC (mollusks) and 2003/858/EC (fish) on harmonized certificates for the import of aquaculture animals from third countries:

- http://europa.eu.int/comm/food/international/trade/interpretation_imports.pdf
- http://www.useu.be/agri/foodsafe.html
- http://europa.eu.int/comm/food/animal/liveanimals/aquaculture/guidelines_certificates_aquaculture.pdf.
- www.useu.be/agri/pesticides.html.

Goods cannot be imported into the US unless they satisfy Standard Sanitary Operation Process and Hazard Analysis and Critical Control Points standards . An article found at http://www.ffa.int/system/files/FFA_Fisheries_Trade_Study_2007_Part_3.pdf is a good starting point to understand The Food and Drug Administration's (FDA) approach to sanitary and phytosanitary measures. . For more detailed information refer to the following website http://www.oceansatlas.org/ and http://www.cfsan.fda.gov/~lrd/haccp.html.

Table 16: EU's Non-Tariff Barriers

Description	Directive
Establishes specific rules for the organization of official controls on products of animal origin intended for human consumption.	Regulation 854/2004
General controls performed to test whether producers have complied with food and feed law, animal health and animal welfare rules.	Regulation 882/2004
General regulation on the hygiene of foodstuffs, which includes HACCP practices.	Regulation 852/2004
Specific regulation on hygiene and labelling requirements for live bivlavle molluscs, fishery and processed products.	Regulation 853/2004
Regulation 2074/2005 lays down implementing measures for certain products under Regulations 853/2004 and Annex III to Regulation 2074/2005 relates to fishery products.	
New hygiene rules pertaining to health conditions governing the production, processing, distribution and importation of food products of animal origin, including aquaculture products. It outlines general principles for certification. Certificates must be signed before the consignment leaves the control of the competent authority in the country of origin otherwise the EU will not accept the goods.	Directive 2002/99/EC
General controls performed to test whether producers have complied with food and feed law, animal health and animal welfare rules.	Regulation 882/2004
Lays down rules for microbiological criteria for foodstuffs and includes requirements to test molluscs for e coli and fishery products for histamine.	Regulation 2073/2005
Stipulates animal health conditions and certification requirements to import live fish, their eggs and gametes intended for farming, and live fish of aquaculture origin and products thereof intended for human consumption.	Commission Decision 2003/858/EC
Describes the animal health conditions and certification requirements for imports of molluscs, their eggs and gametes for further growth, fattening, relaying or human consumption, and provides a list of countries from which EU member states are authorised to import live molluscs.	Commission Decision 2003/804/EC
Establishes maximum levels for certain contaminants in foodstuffs.	Commission Regulations 221/2002
Sets tolerances for heavy metals, such as lead cadmium and mercury.	Council Directive 96/23/EC.
For countries exports to be accepted into the EU, exporting countries must submit their residue monitoring plans to the EU. Addresses the monitoring of residues of veterinary drugs and other chemicals in animal and animal products, including aquaculture.	
Defines general provisions for traceability covering all food and feed operators, which is limited to ensuring that businesses can identify the immediate supplier of the product in question and the immediate subsequent recipient. Although the regulation does not apply to third countries, EU importers must comply with the traceability requirement.	Regulation EC/178/2002, GAIN report E35012 "EU Traceability Guidelines

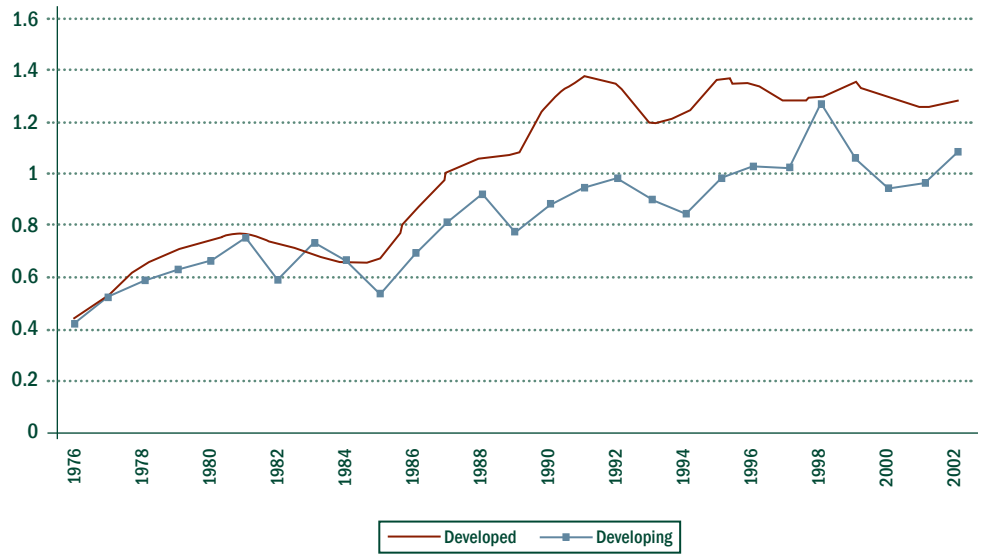
Source: Brans, 2006:10-13

9. Prices

Consumer preferences determine whether a cultured fish product is a perfect substitute for a wild fish product of the same species. Even if these products are not perfect substitutes, a greater reliable supply of cultured fish will affect fish prices. During the 1980s the supply of wild fish stocks started to decline due to intensive fishing activities in response to consumers' adoption of low-fat, healthier diets that increased the demand for fish products. Increased demand and falling supply caused fish prices to increase during the late 1980s (refer to Figure 13). Rising fish prices makes aquaculture activities more attractive to investors, which in turn increases the supply of fish, eventually lowering fish prices.

Based on Figure 13 it appears at the global level that the rise of aquaculture activities has started to lower the price of fish. At this stage of the market's development two possibilities are likely. Either the supply side stabilises as high cost producers are "forced" out of the market or medium scale operations invest in infrastructure to supply high-value species. Both these factors stabilise the supply of fish for the domestic market, ensuring that prices recover, although at a lower level. The above stylised facts regarding the manner in which a market's development occurs is unfolding in Asia. This should reduce the relative price disparity between developing and developed countries' exported fish products.

Figure 13: Average Price of Fish Exports (Unit Value US$/kg)



Source: Josupeit, 2005 (Unit value is defined by dividing the total value of trade by total quantity)

The implication for SADC's producers is that a two-tiered market exists, comprising a domestic and international market. The products supplied to these markets vary in quality and price and thus by definition the activities and investments made to serve these markets will also differ, however the extent of this difference is unknown. A strategy for SADC's commercial producers could be to invest in the required technology to export high quality, higher priced niche fish products destined for the EU, Japan and the USA.

Small-scale farmers could provide commodity-based fish products for the domestic peri-urban and urban market. Aquaculture production is in its infancy in SADC and as a result domestic fish consumption is restricted by the availability of wild fish stocks. Furthermore domestic demand has not been met by large-scale imports due to logistical problems. The domestic market's relative inaccessibility and limited demand tends to detract from its attractiveness as a potential import market for large-scale exporters. If the region's aquaculture industry is underdeveloped and importers' ability to access the market is poor then domestic fish prices should be relatively higher than the global average price, as the supply of fish is constrained. This bodes well for SADC's producers as they have access to a relatively lucrative uncontested market. Also producers can develop their operations and skills in line with the domestic market's development instead of initially trying to compete in highly competitive global markets.

Another issue to bear in mind is also the level of price volatility. The emergence of aquaculture as a commercialised venture that employs intensive production systems is relatively new. As a result one would expect that technological innovations would be relatively frequent and have a substantial effect on production costs. Improvements in productivity will lower production costs, which should result in greater production, eventually lowering prices. A pattern of boom-and-bust cycles will emerge when production is greater than productivity growth. As the market matures and improvements in technology become less frequent and have a less significant effect these boom bust cycles will become less frequent and prices should stabilise.

10. The Way Forward

10.1. Legal and Institutional Issues

Governments in SADC member states have acknowledged in principle that aquaculture is a viable sector that could generate economic benefits for commercial and small scale rural farmers. However the various governments' ability to translate their support for the sector into legislative and regulatory frameworks has been lacklustre. Incomplete and non-existent sector specific legislation and regulation has resulted in the aquaculture industry's operations falling under general regulations, under various government departments. Furthermore countries' legislation only covers medium to large-scale commercial aquaculture activities (Hecht et al, 2006). This situation creates loopholes for producers to misuse resources that reduces a project's sustainability, and also, complicates entrepreneurs' ability to start-up their operations. Both these outcomes illustrate that a complete body of legislation and regulation is required to guide the sector's growth. In the region, only Namibia has a specific Aquaculture Act, Zambia has a draft act and South Africa is developing an act. The sector is also poorly regulated in the region. Madagascar's commercial aquaculture industry is regulated. Both Mozambique and South Africa have developed regulation for their mariculture industry.

Another problem that hinders the development of a thriving aquaculture sector in the region is the sequencing of creating policy and then developing strategies to achieve a policy's goals (Hecht et al 2006). Without strategies and plans, the sector's development is stunted. Government involvement does not imply that the private sector must wait for the government to lead the sector's development. Success in the private sector can be used as leverage to place the sector's development on the various governments' agenda. Therefore the development of an institutional framework to guide the sector's development need not be a top down driven process, if producers form associations they could lobby the various governments to place the topic on their agenda. Also countries in SADC can learn from other member states (Angola, Zambia, Madagascar, Malawi) that have recently formulated national aquaculture development strategies or master plans, and perhaps, participate as observers to the planning process underway in the Democratic Republic of Congo and Mozambique.

Although the various governments' development of sector specific policies, strategies and plans has been slow, an encouraging sign is that these frameworks are shaped by a new mindset that envisages government's role as supporting activities instead of controlling them. This does not imply that the government abdicates its responsibility,

rather its role is to create tangible and intangible assets that have positive externalities and/or spill over effects that are necessary for the industry's promotion. This shift in mindset is apparent in the policies developed by the Madagascan, Mozambican and Malawian governments. Under their policies, the respective governments created appropriate conditions for private sector investment to be channelled into aquaculture. The various governments' initiatives focused on supporting private sector investment by providing infrastructure, a legal and investment framework, a research platform, monitoring and evaluation of activities throughout the supply chain, zoning production activities, policy formation and participating in private-public partnerships.

10.2. Management Issues

The basic premise underlying the arguments presented in this subsection is that commercial farmers and non-commercial farmers require different types and level of support to initiate and grow their activities. Commercial farmers require government to play a supportive role by getting "the basics right", such as providing a legislative and regulatory framework and access to basic infrastructure. These assets allow commercial farmers to channel their funds into profitable ventures. In contrast rural, small-scale farmers require a participatory government that mobilises public and private resources and creates opportunities for them to tap into the economy's resource pool. This section explores ways in which the government and the private sector can provide opportunities for small-scale producers to improve their productivity and access to markets. It is important to stress that for small-scale rural activities to be viable; an efficient commercial sector is required. According to a FAO study (2006: 25) small producers are important for development and employment in poor rural areas; [however] it is the big industry that leads the way in competitive and sustainable exports and increasing consumption in important local markets. As a result government's participation in managing the sector must be careful not to crowd out commercial producers by balancing the need to support small and medium producers, while taking into consideration big businesses' interests.

Small-scale farmers' operations tend to be geographically scattered from each other and distant from large markets. As a result one of the key problems facing small-scale farmers is inadequate access to supply inputs throughout the value chain and their inability to tap into sufficiently large, stable markets. To solve this problem requires farmers to combine their "fragmented" supply-side resources and create a marketing function to ensure that fish is delivered to larger markets at a cheaper price. The formation of producer groups or associations could be used to pool and access resources through high volume purchases of inputs, lower marketing costs and improve small-scale farmers' ability to access credit, which is perhaps one of the most important

considerations as it is the precursor to other activities. The formation of small-scale farmers' aquaculture associations in the region is limited, and as a result this potential resource is inadequately utilised throughout SADC. A notable exception is Madagascar, where lead agencies have used farmer associations to build their sector. This represents an opportunity for other SADC countries to learn from Madagascar's experience.

South Africa, Madagascar and Zambia have industrial aquaculture associations, whose focus is on marketing and research activities. The dearth of producer associations represents an opportunity as farmers' stand to benefit from forming these associations and farmers in the region have vast experience in forming similar market-oriented associations for other agricultural products such as cocoa, coffee, horticulture products, milk, and tobacco.

Aquaculture is a relatively new technology in the region. This implies that support services are required to diffuse the technology throughout the region, and to improve farmers' ability to adopt this technology and then move from non-commercial to commercial scale farming requires. The in vogue paradigm to provide support services is "an on-farm, participatory approach model" which requires institutional and donor support in addition to suitable qualified and trained personnel (Lightfoot and Noble, 1993; Brummett and Noble, 1995). Given the region's skill shortage this approach may seem overly complicated. However the region could draw on the knowledge and experience of emerging/progressive farmers, specifically in Ghana, Côte d'Ivoire, Uganda, Malawi, Kenya (Hecht et al, 2006:38).These farmers represent a valuable human resource that could form part of a regional R&D knowledge support network (Hecht et al , 2006:38).

Benefits derived from support services are below their potential level due to these programmes limited scope. Support services focus exclusively on improving farmers' supply side capability, but ignore their demand side capabilities, such as marketing, processing, cold chain management and the creation of value-added products. Industry experts argue that to foster the growth of small-scale aquaculture it is vital to connect rural producers to urban markets and create zones where aquaculture activities are concentrated. Therefore support services' scope should be broadened to include the industrial restructuring of activities and assist in the creation of markets.

10.3. Financial Issues

A major problem facing commercial and small-scale farmers is their inability to access finance. Bankers continued exposure to agricultural projects improves their ability to understand these project's cash flows and risks, which reinforces their perception that these projects are less

risky than “comparable” aquaculture projects. Aquaculture is a fairly new activity and as a result banks access to information to assess a project’s risk is limited. This has created a situation where banks, on average, prefer to finance other agricultural projects compared to aquaculture projects. As a result farmers’ interest in pursuing aquaculture opportunities, relative to traditional activities, is dampened as they know that it is more difficult to raise financing. To address this gap in the market, “lead agencies must promote aquaculture to lending institutions and assist farmers to develop bankable business plans (Hecht et al, 2006: X).

10.4. Technology Issues

Technology improvements can be made across the entire value chain to address economic and social bottlenecks that hinder the spread of aquaculture activities throughout the region. On the social front, technology can be used to spread the production of aquaculture into rural areas. This would require stakeholders to investigate which type of production technology could be easily introduced into rural areas given these farmers’ skills. This analysis should take into consideration that a production system must be relatively simple and require small capital investment. According to the FAO (2006) floodplain, lagoon and small water body based aquaculture is a good option to develop farming activities rural areas. These types of technology should be reviewed and refined to improve production control and management.

Technology’s ability to increase production efficiencies and intensities to produce more fish using less land, water and financial resources is equally important to rural and commercial farmers as the issues that affect both types of farmers are materially the same. However the scope of methods employed to address issues and the ability to gain from introducing these methods are different. This provides an opportunity for rural farmers to benefit from the research conducted by the private sector. Commercial farmers are under pressure to improve the quality of their fish products sold to peri-urban and urban consumers. This pressure has caused commercial farmers to invest in better production technology, such as re-circulating aquaculture tank systems, explore the genetic enhancement of fish, improve their broodstock and hatchery management practices and develop better fish feed. Rural farmers will not benefit from all the above developments, especially those concerning production systems, as ponds are likely to be the main aquaculture production system in rural areas. However rural/small scale farmers will benefit from commercial farmers’ strategies to improve the nutrition and health of their fish through the development of both supplementary and natural feed and fertilization programmes.

As mentioned and explained in this paper both small-scale, rural farmers and commercial farmers primarily engage in aquaculture to make profits. Profitability is a function of reducing supply side costs and increasing one's access to a market. Technology can play a role in creating new markets for fish products. The development of transportation networks allows producers to access inland areas where consumers have not historically consumed fish products.

11. Conclusion

The global demand for fish products from 1950-2004 has grown at a steadily increasing rate; however the supply of wild fish has decreased over this period due to over fishing. “The UN Food and Agriculture Organization estimates that as much as 75% of global marine fish stocks are now fully exploited, over-exploited or depleted, confirming a consistent decrease since 1974 in marine fish stocks with little or no potential for further exploitation” (Asche et al, 2006: VI). The gap between supply and demand has increased fish prices, creating lucrative opportunities for aquaculture production. This has led to aquaculture becoming a global industry as 180 counties are involved in aquaculture production. Approximately 80% of the world’s aquaculture activities occur in developing countries of which the majority takes place in Asia, predominately in China. In 2004 Asia accounted for 92% and 81% of the world’s production with regard to volume and value, respectively. The rapid commercialisation of aquaculture and the emergence of intensive production systems has created a stable supply of high quality fish that allows producers to invest in logistical systems, which in turn opens up new markets for fish products, thereby increasing the demand for fish.

The important issue is whether the industry’s growth will continue. There is a time lag between prices and increased production. High prices encourage producers to enter the market, which results in over investment and excess production, causing prices to fall. The rate at which market prices decline due to increased production is dependant on a market’s ability to absorb excess demand. This is a function of a market’s growth and the degree of substitutability between fish products and other sources of protein rich foods and within fish species. Based on this assumption, prices will decrease faster in isolated markets, irrespective whether they are domestic or export orientated. As a result SADC’s producers should not neglect to purse export opportunities in the region and Sub-Saharan Africa.

Over the medium term fish prices are likely to decline due to supply increasing at a faster rate than demand because the type of fish varieties that are economically produced will increase. On the supply side, producers can maintain their profitability by either reducing costs or improving productivity. Changes in producers’ relative productivity will determine where aquaculture production is located both between and within regions (Asche et al, 2006). On the demand-side, interspecies competition will become more widespread. Both these market developments will affect the intensity of competition between producers. Global aquaculture production is expected to increase, but the production of specific countries, regions or species may be reduced

(Asche et al, 2006). Increased product substitution could be used by SADC's producers to capitalise on their competitive advantage to gain market access and to win market shares. However to benefit from this situation, in an environment of greater competition, SADC's producers will need to consolidate their resources by forming associations. These associations should pay particular attention to bottlenecks regarding infrastructure and production structures that hinder producers' ability to export their goods.

Aquaculture is an attractive industry for developing countries as fish is a highly tradable commodity. It is estimated that 40% of fish produced is traded internationally, and in particular, seafood is the most tradable commodity in the world (Asche et al, 2006: VI). Developing countries export fish products to developed countries. In 2004 China, Norway and Thailand were the largest exporters of fish products and the largest importers were Japan, US, Spain. The extent of developing countries participation in international trade and the contribution it makes to their economies is significant. Fish exports comprise 20% of agricultural and food-processing exports which is larger than the combined trade in tropical beverages, nuts, spices, cotton, sugar and confectionery (Asche et al, 2006: VI). It is interesting to note that developed and developing countries export different fish products. Developing countries tend to export tuna, small pelagic species, shrimps and prawns, molluscs, grouper, snapper, catfish, tilapia, rock lobsters and cephalopods, while developed countries export demersal species, herring, mackerel and salmon (Asche et al ;2006:VIII).

Developing countries' access to markets is affected by tariff and NTBs. On average tariff barriers have been gradually reduced but non-tariff barriers have steadily increased. These NTBs include Hazard Analysis and Control Point based strategy, risk assessment, consumer information and protection, labelling and traceability. Experts argue that NTBs increase the complexity of production and thus disproportionately impact developing countries' ability to export product compared to their developed counterparts. As a result developing countries tend to be "locked out" of international markets due to their lack of resources that impeded their ability to satisfy a host of complex processes. This trend can be broken if a developing county pools its resources and then dedicates them to improving a particular commodity's supply chain. Madagascar's ability to obtain international accreditation for its shrimp industry is an excellent example.

SADC has a competitive advantage in aquaculture production due to its expensive waterways, abundant land and subtropical climate. During the 1970s donor organisations poured substantial resources into promoting the diffusion and adoption of aquaculture activities throughout Africa. These initiatives were largely unsuccessful because they focused solely on developing non-commercial, rural activities and thus by definition excluded the private sector. Past experience illus-

trates that creating a sustainable aquaculture industry in SADC is dependant on developing and growing commercial and non-commercial activities simultaneously, ensuring that activities in both markets are interlinked. The manner in which Latin American countries grew their aquaculture industry could provide SADC's producers, retailers and food processors with ideas to develop a sector growth strategy. The basis of their sector development model was that commercial and non-commercial activities do not compete against each other in markets but rather co-operate to serve their respective markets. Large and medium sized commercial farming entities' operations were structured to produce high-value exotic species in a processed, sophisticated format for selected export markets. These markets tend to be those where Latin American countries enjoy tariff privileges and/or are geographically close (e.g. North America). Small and medium sized producers formed associations to pool their resources to supply the local urban and peri-urban market or markets in neighbouring countries with good quality, processed fish products ranging from gutted fish to convenience meals for supermarket chains (FAO, 2006).

The impact that intra-regional trade can have on the development of SADC's aquaculture industry has not been fully exploited. Sub-Saharan Africa is a net importer of fish products. SADC producers' ability to export fish products has short-term benefits but the opportunity cost of pursuing international export markets at the expense of supplying markets in the region and Sub-Saharan Africa has not been adequately investigated. In principle SADC could generate surplus foreign exchange, which would stimulate economic activity, by exporting higher quality fish products and importing lower quality products for domestic consumption. However the benefits from increasing exports compared to stimulating local economies by creating a national and regional market has not been fully explored.

Intraregional trade has two positive spin-offs for SADC's producers. It allows producers to serve a larger consumer base which allows them to benefit from economies of scale. Although lowering the cost of production is important, it is not the only issue to consider. Intra-regional trade between African countries would allow producers, processors and retailers to share tangible and intangible resources to build supply chains that have the capacity to fulfill strict NTBs. Also, focusing exclusively on international export opportunities can have a detrimental effect on "Africa's food security because it diverts policy-makers' attention, research and management effort, and donor support away from the small scale fisheries which supply local, provincial or national markets and focuses these limited resources on the export-oriented industrial or semi-industrial fisheries" (FAO, 2006:50).

For SADC member states to take advantage of intraregional and international trade opportunities, the industry's supply and demand side capabilities should be strengthened. This requires the develop-

ment of programmes that tackle the following broad issues. First, increase the private sector's involvement in the sector, in particular, in its role as steering resources to improve supply-side efficiencies. These initiatives could include the production of inputs, research and extension programmes. Second, identify the most potentially lucrative opportunities taking into consideration product and market aspects. Third, redefine the government's role from managing the sector to facilitating and monitoring activities. In this capacity government should "ideally support research, provide information and provide proper quality control" (Globalfish; 2007). Fourth, encourage stakeholders throughout the value chain to form associations to assume a greater role in shaping the sector's development by consolidating their resources and diffusing information.

13. Appendix

Table 17: Regional Imports of Fish Products (Value)

	US$'000			Average annual	Percentage
	1996	2000	2004	Growth 00-04	Total 2004
European Union (25)	20,198,929	20,478,842	29,722,343	9.76%	38.94%
Other developed	17,533,117	15,932,208	15,083,405	-1.36%	19.76%
North America developed	8,340,764	11,962,951	13,646,340	3.35%	17.88%
China	3,836,817	4,383,768	5,643,132	6.52%	7.39%
East and Southeast Asia	3,208,564	3,368,084	5,139,758	11.15%	6.73%
Western Europe, others	1,001,349	1,058,640	1,274,132	4.74%	1.67%
Former USSR area in Europe	552,497	401,454	1,074,180	27.90%	1.41%
Oceania developed	560,318	625,921	816,859	6.88%	1.07%
South America	784,699	660,390	693,672	1.24%	0.91%
Near-East (Asia)	356,258	438,093	686,874	11.90%	0.90%
Western Africa	545,128	449,266	679,774	10.91%	0.89%
Central America	144,208	228,280	415,550	16.16%	0.54%
Eastern Europe	159,243	138,928	290,315	20.23%	0.38%
Caribbean	170,474	220,497	247,625	2.94%	0.32%
Eastern Africa	107,165	86,227	236,695	28.72%	0.31%
Central Africa	135,751	103,823	165,290	12.33%	0.22%
Near-East (Africa)	133,237	181,016	142,687	-5.77%	0.19%
Southern Asia	81,555	95,377	122,817	6.52%	0.16%
Oceania developing	82,206	48,789	88,721	16.13%	0.12%
Northwestern Africa	23,258	34,122	85,460	25.80%	0.11%
Former USSR area in Asia	24,131	30,481	32,035	1.25%	0.04%
Southern Africa	12,741	44,597	18,701	-19.53%	0.02%
North America developinjg	8,449	9,442	13,302	8.95%	0.02%
Total	58,000,858	60,981,196	76,319,667	5.77%	100.00%

Source: FISHSTAT PLUS

Table 18: Regional Exports of Fish Products (Value)

	US$'000			Average annual	Percentage
	1996	2000	2004	Growth 00-04	Total 2004
European Union (25)	11,693,024	11,922,886	18,150,934	27.24%	25.31%
East and Southeast Asia	9,497,796	10,385,641	11,498,800	-14.28%	16.03%
China	4,953,054	5,547,623	8,635,848	30.67%	12.04%
North America developed	5,569,810	5,954,134	7,199,755	-4.08%	10.04%
Western Europe, others	5,254,626	5,239,694	6,640,236	1.73%	9.26%
South America	5,294,365	5,226,585	6,547,098	0.27%	9.13%
Southern Asia	1,686,802	2,086,975	2,096,275	-24.55%	2.92%
Oceania developed	1,650,746	1,673,061	1,764,283	-19.55%	2.46%
Former USSR area in Europe	1,758,923	1,586,239	1,598,399	-24.23%	2.23%
Other developed	957,038	1,113,257	1,547,128	13.97%	2.16%
Central America	1,296,827	1,357,694	1,468,894	-16.81%	2.05%
Northwestern Africa	862,350	1,069,494	965,700	-34.70%	1.35%
Western Africa	823,824	597,125	743,531	-0.48%	1.04%
Eastern Africa	392,767	469,988	704,512	24.90%	0.98%
Near-East (Asia)	277,911	282,365	585,657	82.41%	0.82%
North America developing	339,550	268,615	419,281	31.09%	0.58%
Southern Africa	202,634	290,546	358,482	-1.62%	0.50%
Oceania developing	170,871	213,749	344,030	35.95%	0.48%
Caribbean	240,357	241,718	225,330	-31.78%	0.31%
Eastern Europe	83,607	61,608	138,918	100.49%	0.19%
Former USSR area in Asia	20,911	18,668	41,424	69.90%	0.06%
Central Africa	19,793	28,837	37,547	5.20%	0.05%
Near-East (Africa)	11,478	14,298	16,549	-9.26%	0.02%
Total Global Exports	53,060,064	55,650,800	71,728,611	3.89%	100.00%

Table 19: Quota Tables

Description	Quota Quantity (MT)	Rate of Duty (%)
Tunas (for the canning industry)	17,250	0
Herrings	34,000	0
Silver hake	2,000	8
Fish of the genus Coregonus	1,000	5.5
Fish of the genus Allocyttus and of the species Pseudocyttus maculates	200	0
Cod of the species Gadus morhua and Gadus ogac	25,000	0
Shrimps of the species Pandalus borealis, shelled, boiled, frozen, but not further processed	500	0

Description	Quota Quantity (MT)	Rate of Duty (%)
Cod livers and fish livers of the species Boreogadus saida, fresh or chilled, for processing	300	0
Cod and fish of the species Boreogadus saida, salted or in brine, for processing	10,000	0
Tubes of squid, frozen, with skin and fins, for processing	30,000	3.5
Squid, frozen whole, tentacles and fins, for processing	1,500	3
Herrings, Excl. livers and roes, for processing	20,000	0
Loins of tunas and skipjack, for processing	4,000	6
Herrings, spiced and/or vinegar-cured, in brine, for processing	6,000	6
Shrimps and prawns of the species pandalus borealis, cooked and peeled, for processing	7,000	6
Cod, excl. livers and roes, fresh, chilled or frozen, for processing	50,000	0
Hake, frozen, for processing	20,000	0
Blue grenadier, fillets and other meats for processing	15,000	0
Rock lobster, frozen for processing	1,500	6
Southern blue whiting, frozen fillets and other meat processing	2,000	0
Alaska Pollack, frozen for processing	10,000	0
Anchovies, salted or in brine, for processing	2,00	0
Surimi, frozen, for processing	30,000	0

Source: Brans, 2006:14

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TRADE AND INDUSTRIAL POLICY STRATEGIES (TIPS) &

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