

A PROFILE OF THE SOUTH AFRICAN AQUACULTURE MARKET VALUE CHAIN

2012

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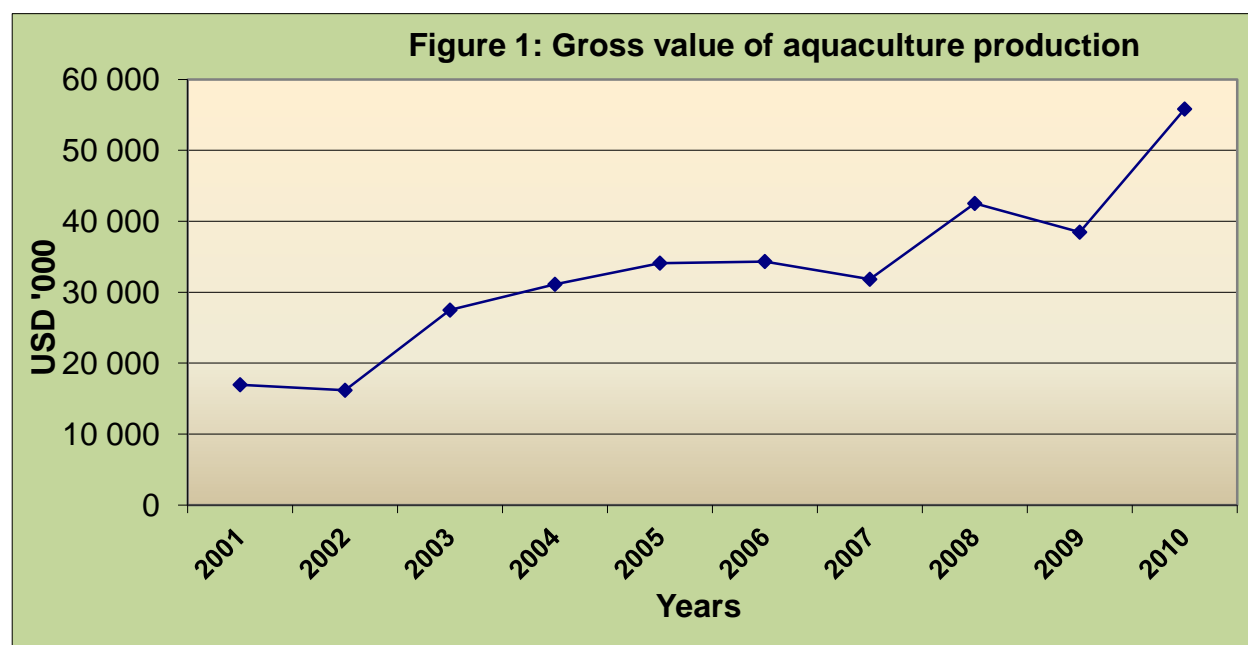
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1. DESCRIPTION OF THE INDUSTRY

Aquaculture in South Africa consists mainly of freshwater species such as Rainbow trout, brown trout, Koi carp, crocodiles, Ornamental fish, African catfish, Mozambique and Nile tilapia, Marron and Waterblommetjies; and marine species such as abalone, white prawns, oysters, seaweeds, Spanish & Brown mussels, Dusky & Silver Kob; yellow tail, Atlantic Salmon, Clownfish, White Margined Sole, West & East coast rock Lobster, Scallop and Blood Worm. Freshwater species are generally farmed in re-circulating systems, earth ponds or raceways whereas the marine molluscs are farmed on raft or long-lines, and abalone are produced in tanks through which marine water is pumped. The technology and services are well established for species such as trout, crocodiles, catfish, abalone, prawns, oysters, mussels while still lacking for species such as eel, tilapia, cob, tuna and seaweed. Abalone is the big success story of South African aquaculture. This species is highly priced in south-eastern Asia and the wild population has been radically reduced through poaching.

The gross value of production of aquaculture is dependent on the quantity and species produced and prices received by farmers. The trend in the gross value follows mainly the pattern of prices since the industry is characterized by volatile prices. The gross value of aquaculture production is illustrated in Figure 1.



Source: FAO

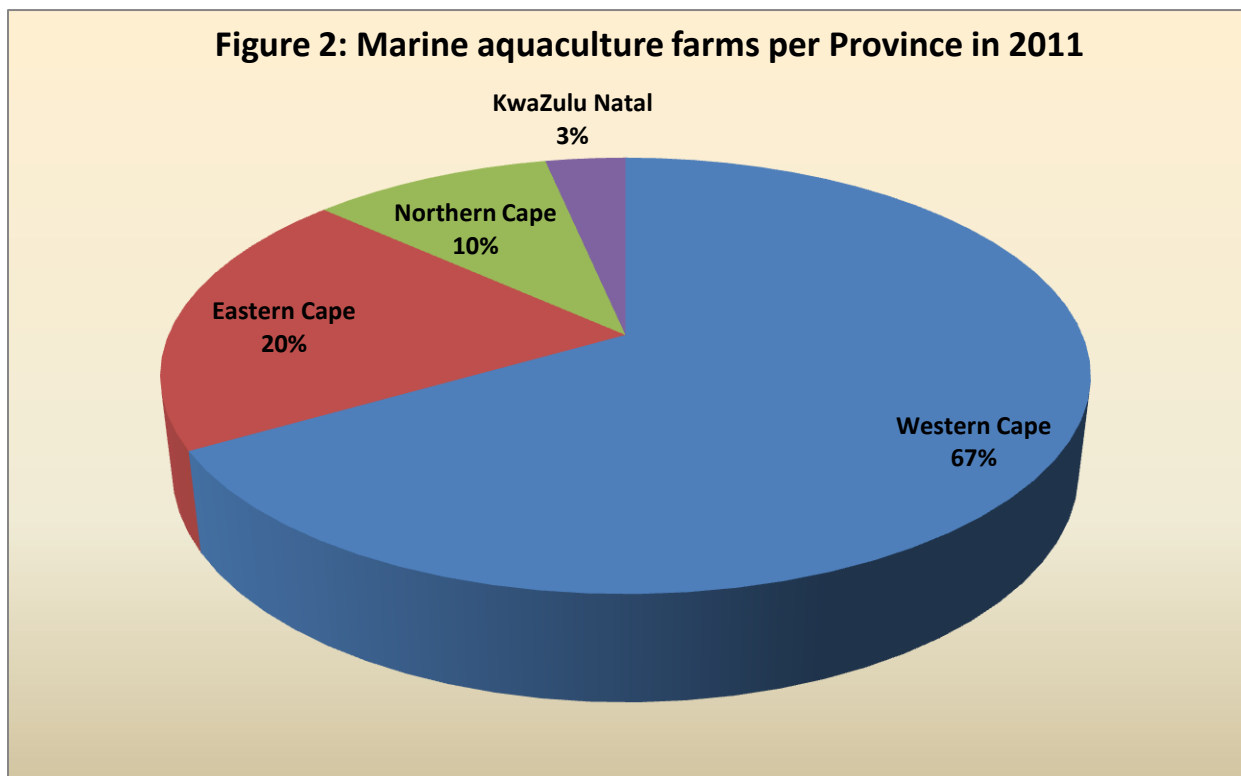
The gross value of aquaculture production has been moving at an increasing trend with minor decreases experienced in 2002, 2007 and 2009. This might be due to the decline of price of aquaculture products. It experienced a new peak of 43 421 000 US\$ in 2010. Generally there is an increase of 229% during 2010 compared to 2001. There were some major declines during 2002 and 2007;

1.1. Production areas

Aquaculture in South Africa is divided into freshwater and marine aquaculture. Freshwater fish culture is severely limited by the supply of suitable water. The most important areas for the production of fresh water species are at Limpopo, Mpumalanga Lowveld and Northern KwaZulu–Natal. Trout is farmed along the high mountain in Lydenburg area, KwaZulu–Natal Drakensberg and the Western Cape. Other freshwater species cultivated on a small scale include catfish, freshwater crayfish and tilapia species.

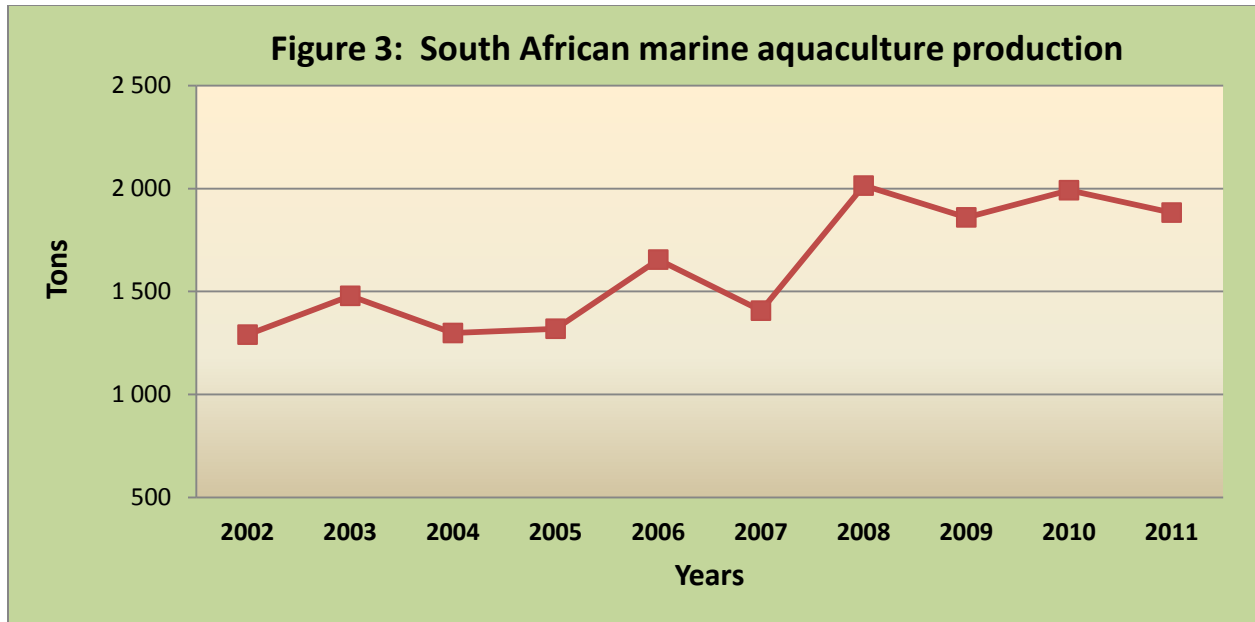
Marine aquaculture is a fast developing sector, with a focus on mussels, oysters, abalone, seaweeds and prawns. Of these, mussel farming is the best established. Abalone culture is now well established, centered in the Hermanus area on the Cape south coast. There is also an experimental offshore farm (cage culture) off Gansbaai for salmon.

Figure 2 below shows the share of marine aquaculture farms per province.



Source: Aquaculture Technical Services

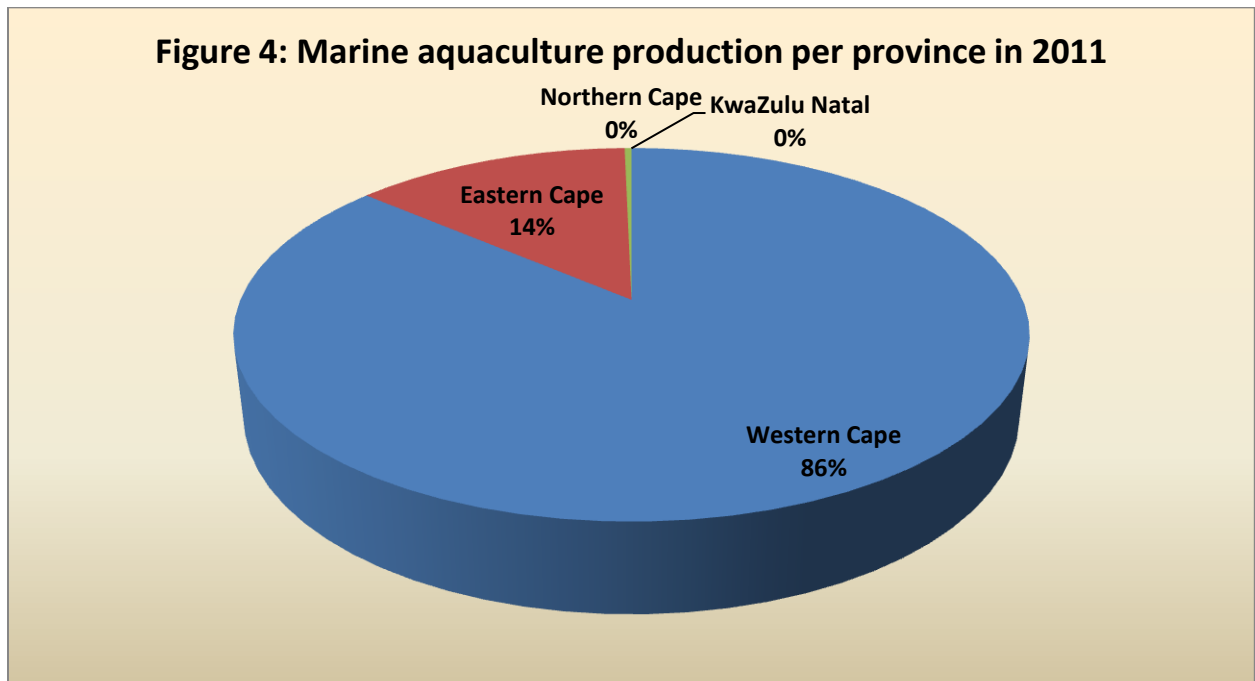
Figure 2 above shows that Western Cape has most farms of marine aquaculture accounting to 67% of South African marine farms, followed by Eastern Cape by 20%, Northern Cape by 10% and KwaZulu Natal by 3%.



Source: Aquaculture Technical Services

Production of aquaculture has been fluctuating during the periods 2002 to 2011. Aquaculture production reached the peak in 2008. There is an increased of 46% of aquaculture products produced during 2011 compared to 2002 but it decreased by 3% relative 2008 which was the highest. The slight decrease in 2009 was due to the non operational of finfish and prawns farms.

The following figure show the production of marine aquaculture per province.



Source: Aquaculture Technical Services

Figure 4 above clearly shows that marine aquaculture production dominated in the Western Cape accounting for 86% with its tonnage making up 1 624 tons, followed by Eastern Cape with 14% (253 tons) and Northern Cape and KwaZulu Natal accounting for less than a percent.

1.3. Employment

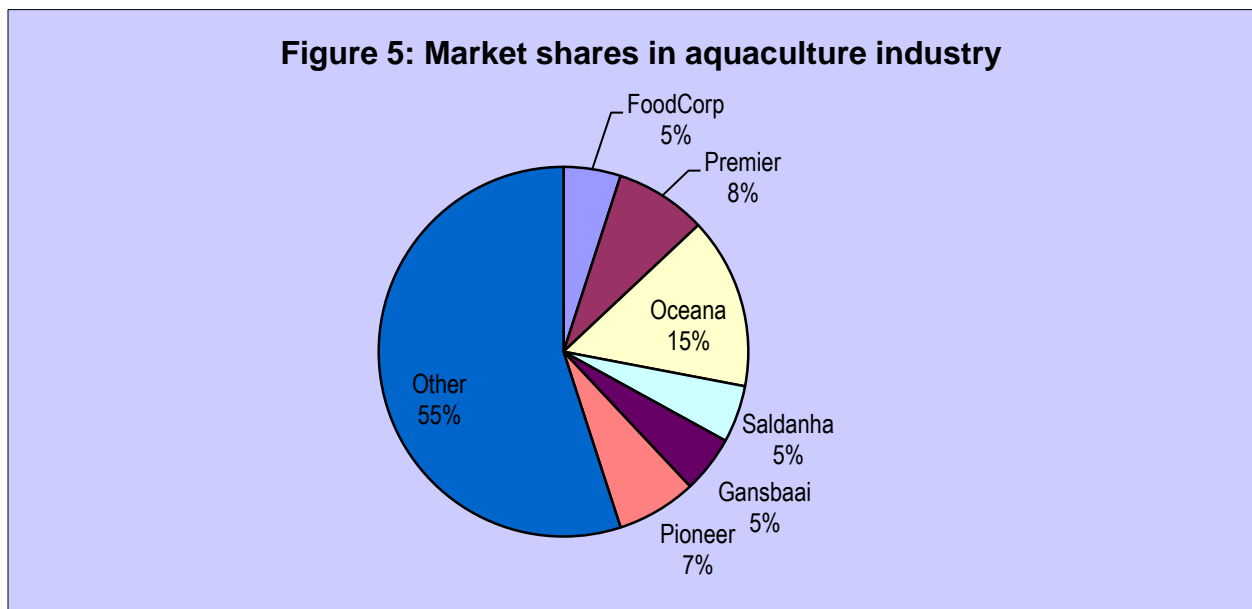
South African marine aquaculture industry employed 1 607 employees on permanent basis and just a few are employed on temporary basis. This is an increase of 3% relative to 2011 which was 1 556 workers. 78% of the total people employed were men and women constituted 22%. In total the sector employed 81% Historically Disadvantaged Individuals (HDI) and 19% non-HDIs. HDI employees are mainly unskilled and skilled while non-HDI employees are mainly management. The largest employer is the abalone sub-sector followed by the oyster sub-sector.

2. MARKET STRUCTURE

SA aquaculture products are marketed both locally and internationally, depending on the specific species. The abalone industry markets the bulk of their stock in the east. The trout industry markets the bulk of their products locally. Products such as crocodile skins are exported, while many of the other experimental species such as cob is marketed mainly on the local market.

2.1. Domestic market and prices

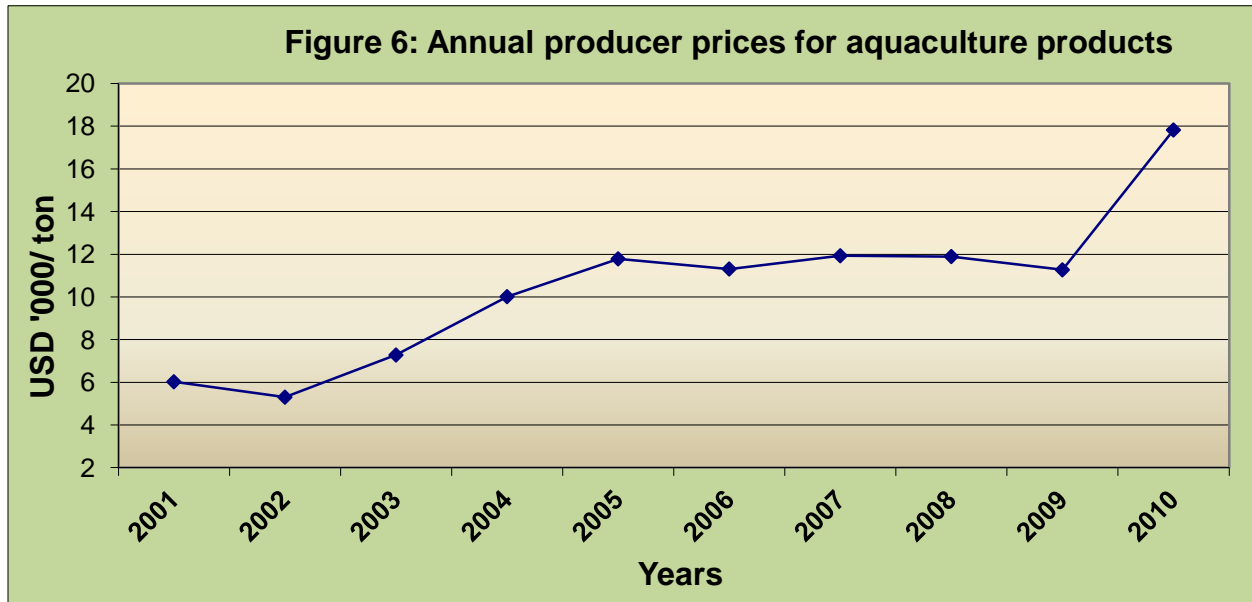
There are more than 355 processing companies registered with Marine and Coastal Management. Six companies command 45% share in the processing sector and the remaining 55% were taken up by the large number of small fishing companies. Figure 6 illustrates Market Shares in the Aquaculture Industry.



Source: Competition Commission

Figure 5 shows that Oceana holds the greatest share of the market in the aquaculture processing industry followed by Premier (8%) and Pioneer (7%).

Most of the aquaculture species like abalone are traded internationally. Therefore, the demand and supply conditions in the domestic international market influence domestic prices directly. Figure 6 below show the price movement of aquaculture products from 2001 to 2010.



Source: FAO

Figure 6 shows that producer price of aquaculture products moved at an increasing trend with minor decreases during the past decade. Its deep decline was experienced in 2002 (5 000 US\$/ ton) and its peak was experienced in 2010 (13 000 US\$/ ton). The Peak during 2010 might have been influenced by the continuous increase in demand of aquaculture products.

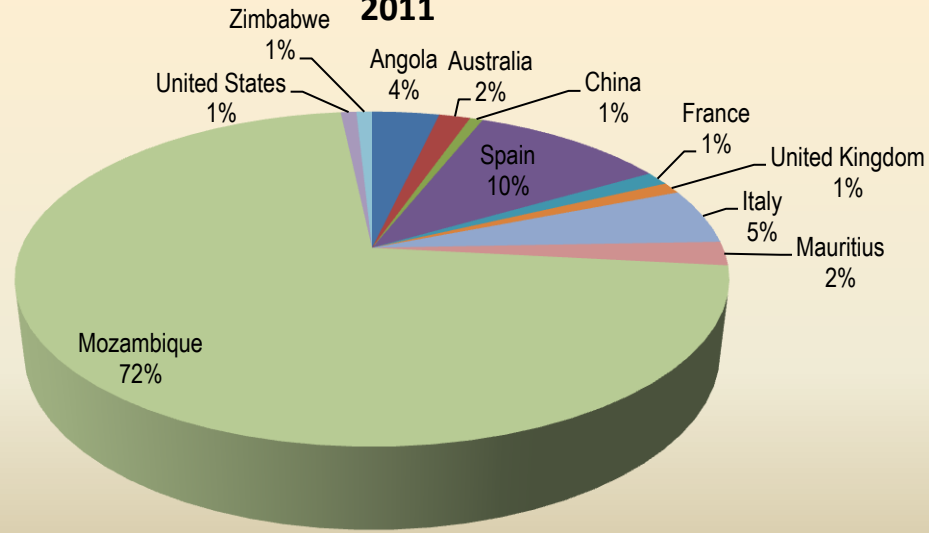
2.2. Import – Export Analysis

Import and Export of aquaculture products are combined with capture production and traded as fish and aquatic invertebrates.

2.2.1. Exports of fish and aquatic invertebrates.

South Africa exported 1.3 billion kilograms of fish and aquatic invertebrates in 2011 yielding an export value of R 30.2 billion. Figure 7 shows the main destination of South African fish and aquatic invertebrates export.

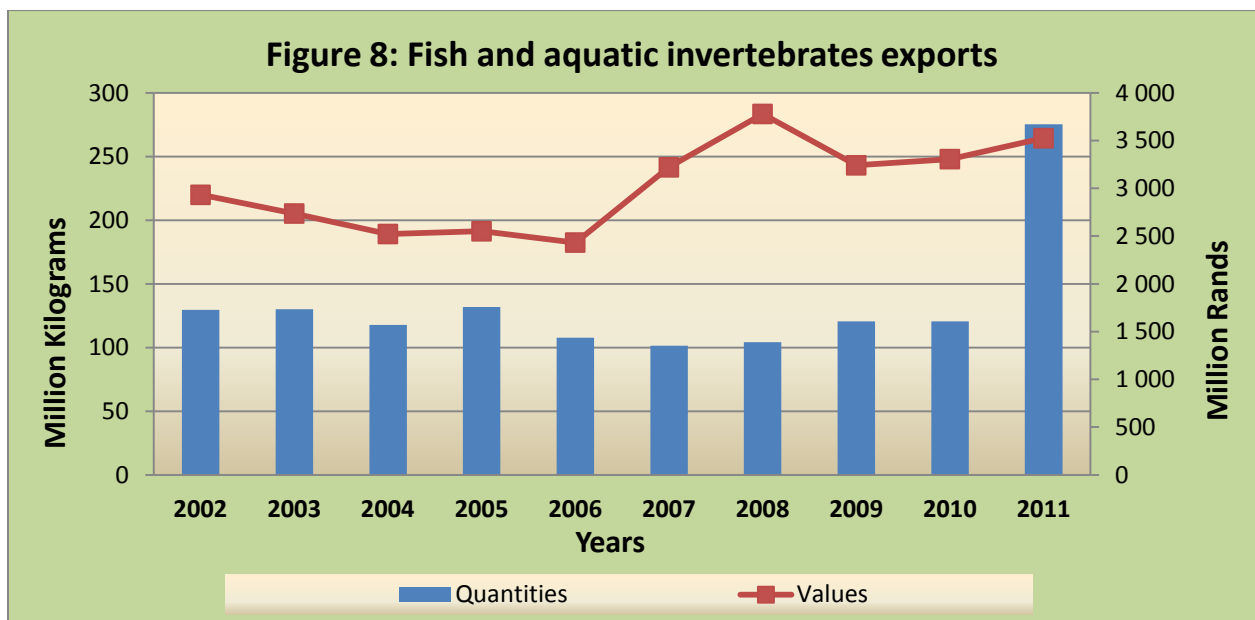
Figure 7: Fish and aquatic invertebrates export destinations in 2011



Source: Quantec EasyData

The above figure shows that the main destination of South African fish and aquatic invertebrates in 2011 was Mozambique commanding 72% followed by Spain with 10% of South Africa's fish and aquatic invertebrates' exports. Italy was third highest commander with only 5% share of South Africa's exports, followed by Angola with a share of 4%. Mozambique was the net importer of South African fish and aquatic invertebrates during 2011.

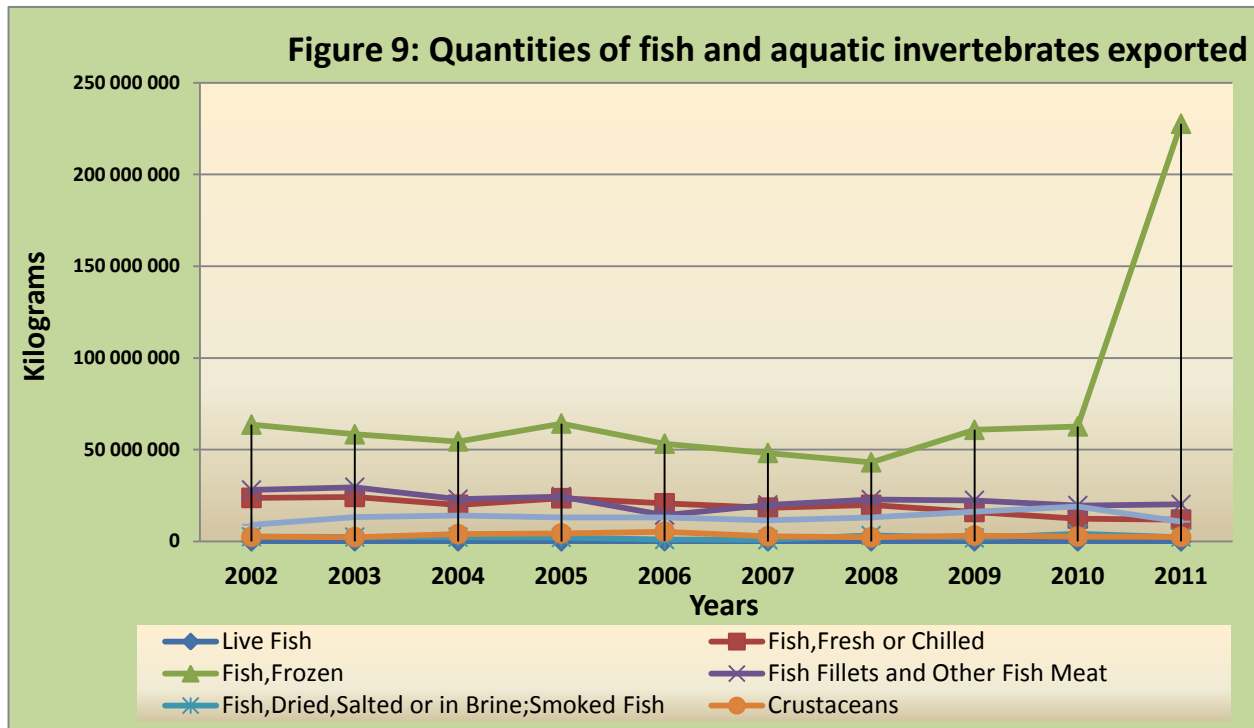
Figure 8 shows the export of fish and aquatic invertebrates from 2002 to 2011.



Source: Quantec EasyData

Figure 8 shows that exports of fish and aquatic invertebrates fluctuated throughout the decade and it also shows that it was less profitable to export because large quantities were exported with less value from 2002 to 2010 and it was profitable in 2011. The highest value of R 6.5 billion was experienced in 2008. There was an increase of 113% in quantity exported and an increase of 20% in value in 2011 compared to 2002.

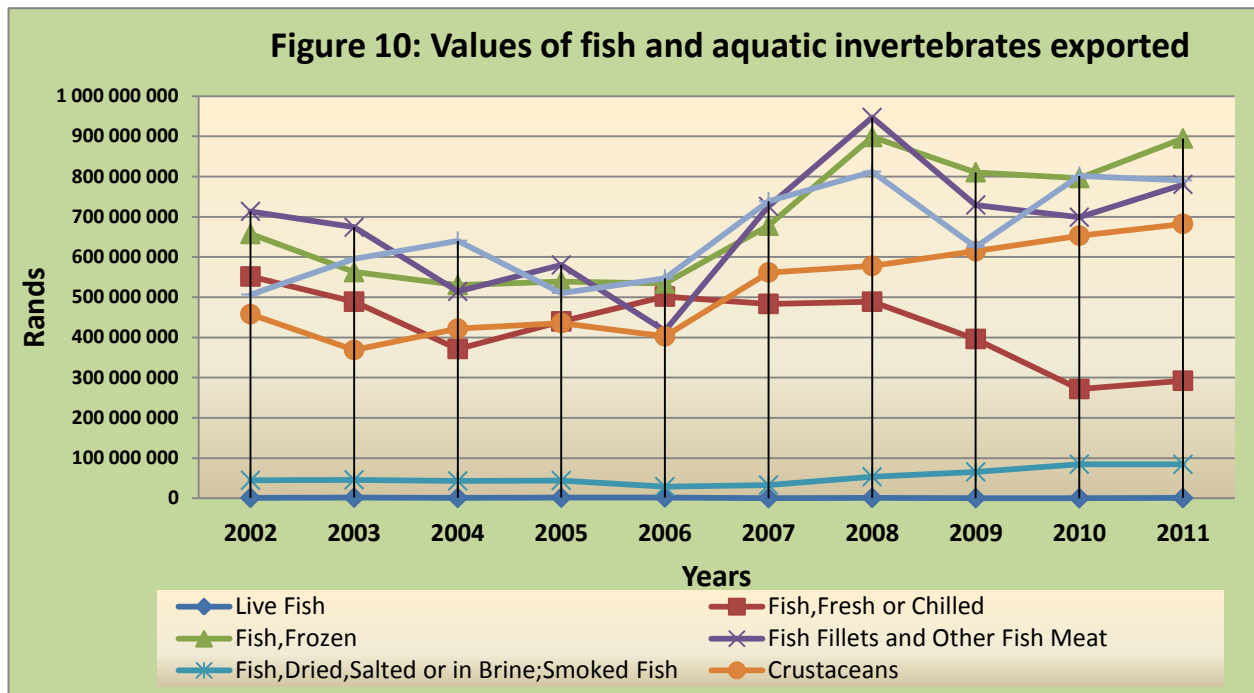
Figure 10 below shows the different fish and aquatic invertebrates' products that were exported from 2002 to 2011.



Source: Quantec EasyData

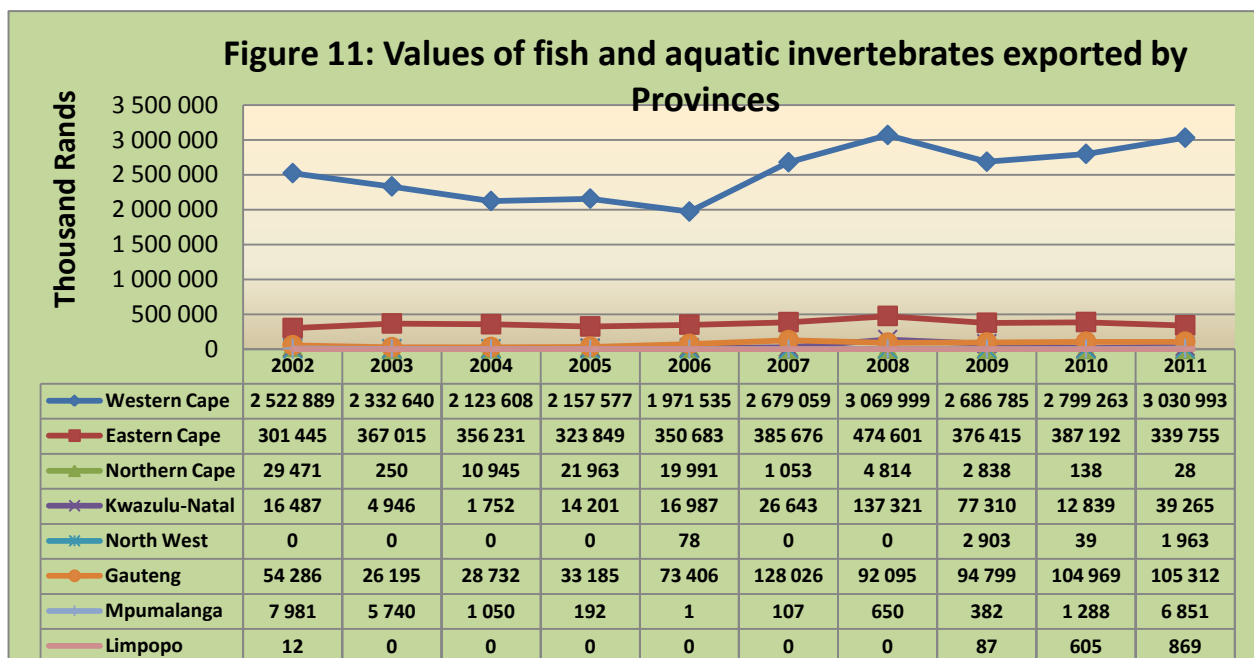
From Figure 9 it is evident that frozen fish was the main exported product from South Africa over the past ten years than any other fish and aquatic invertebrates' products. The second most exported product was fish fillets & other fish meat which commanded the second level followed by fresh or chilled fish then mollusks during the period under review. The least exported product was live fish with the total of 291,306 kilograms for a 10 year period.

Figure 10 to 20 show the export values of fish and aquatic invertebrates from regions.



Source: Quantec EasyData

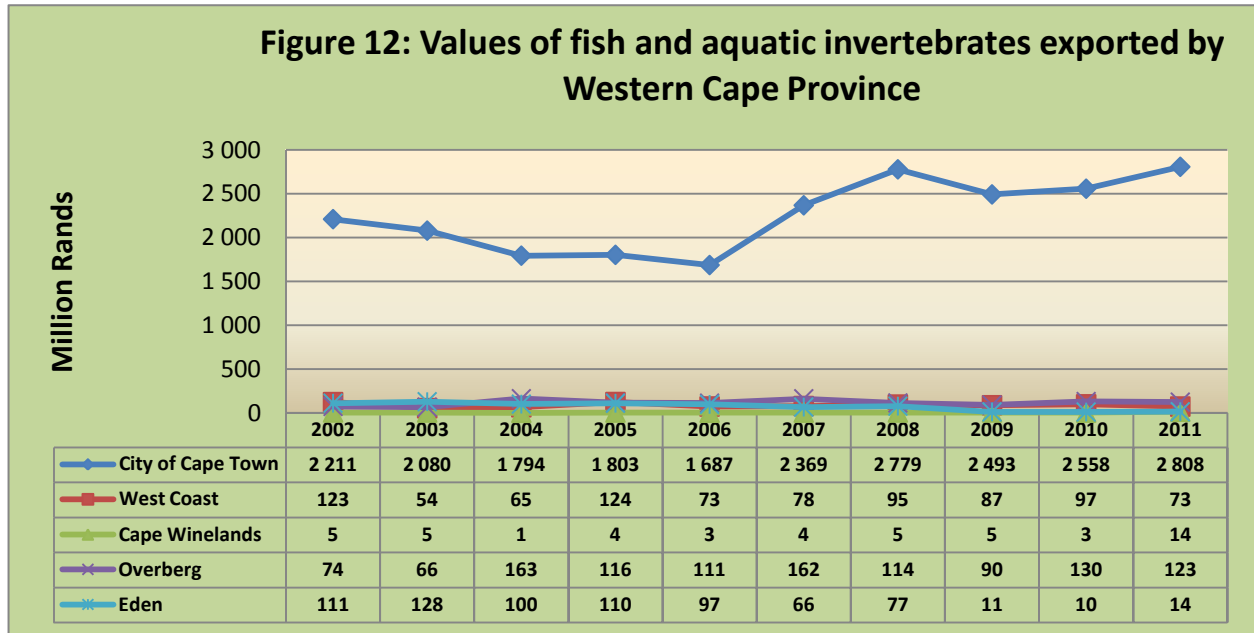
Figure 10 above shows that fish fillets commanded the greatest values of South African exports during the periods 2002 to 2003, 2005 and 2008. The peak value was experienced in 2008 by R 947 million of fish fillets followed by frozen fish by R 896 million. During 2004 and 2006 - 2007 Molluscs commanded the highest value of fish and aquatic invertebrates while frozen fish was the highest during 2009 to 2011.



Source: Quantec EasyData

Western Cape Province has recorded high export values of fish and aquatic invertebrates from 2002 to 2011. This is due to the fact that the western coast is more productive than other coastal and inland areas. The other factor is that Western Cape is the main exit point of exports. Regular fish and aquatic invertebrates' exports have also been recorded from Eastern Cape, Northern Cape, KwaZulu–Natal, Gauteng and Mpumalanga Provinces. Irregular exports were recorded in Limpopo, North West and Free State Provinces.

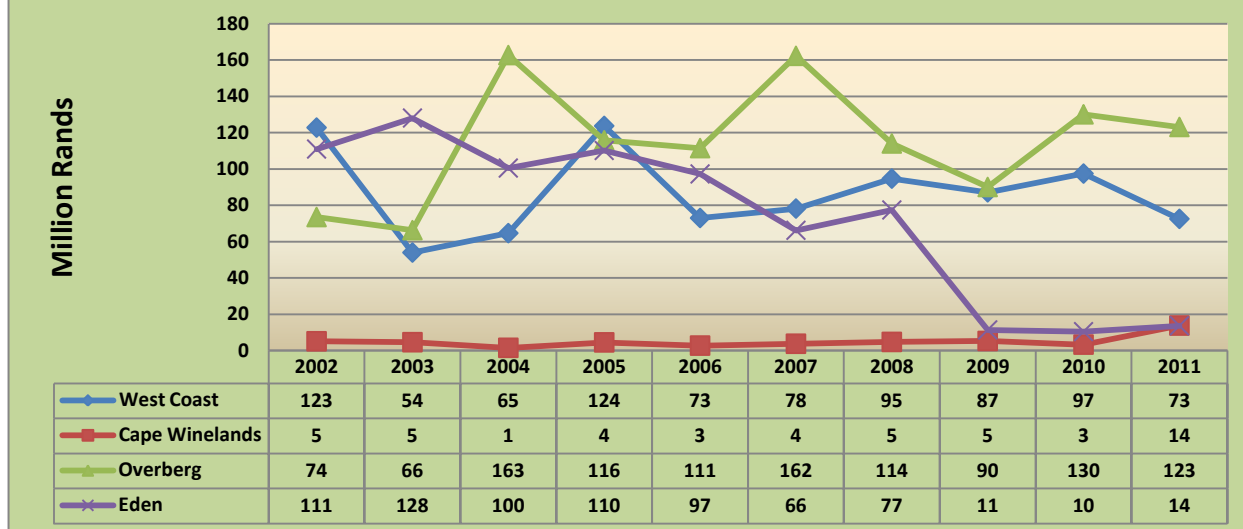
Figure 12: Values of fish and aquatic invertebrates exported by Western Cape Province



Source: Quantec EasyData

City of Cape Town metropolitan municipality in the Western Cape Province has dominated the export market with high values of fish and aquatic invertebrates throughout the period under review. This is due to the fact that it has many processing firms and it is also the main exit point of exports from South Africa. Fish and aquatic invertebrates' exports have also been recorded through the West Coast, Cape Winelands, Overberg and Eden district municipalities.

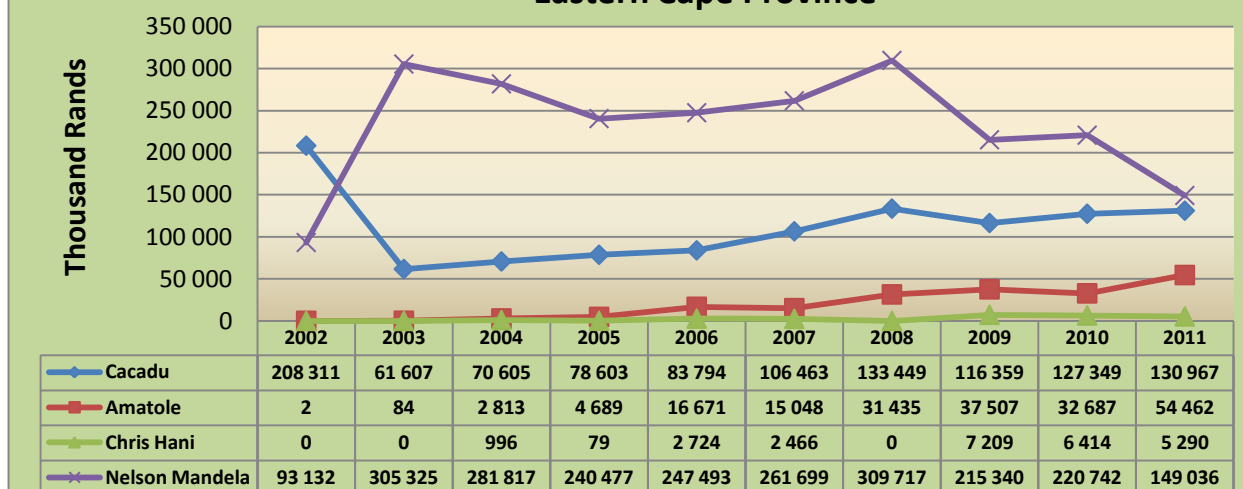
Figure 13: Values of fish and aquatic invertebrates exported by Western Cape excluding City of Cape Town Metropolitan Municipality



Source: Quantec EasyData

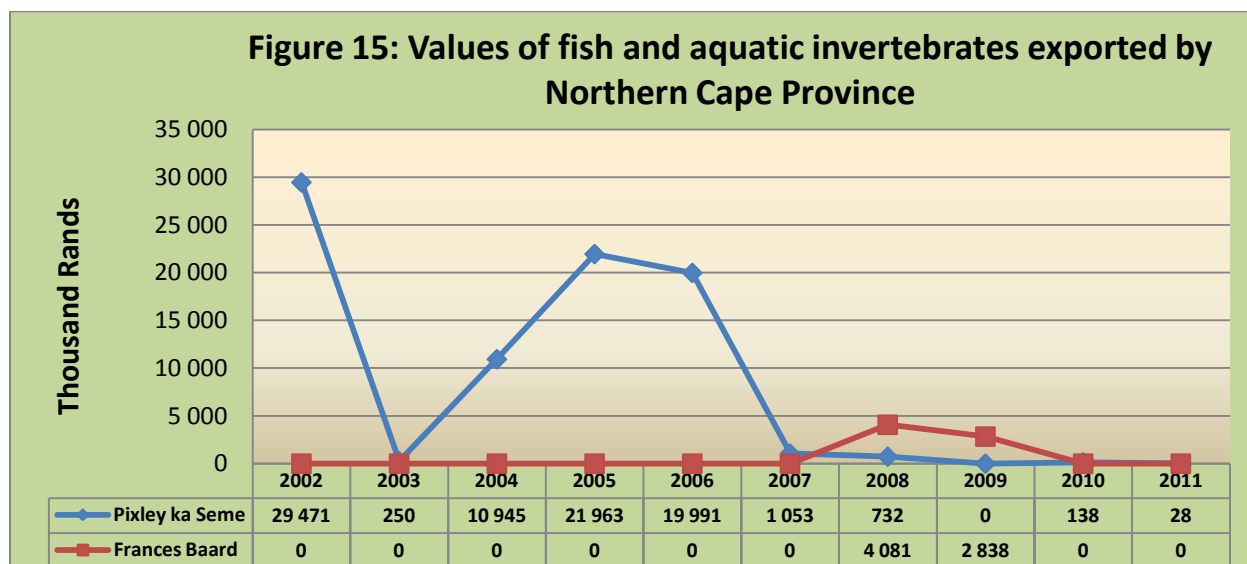
Export values of fish and aquatic invertebrates from Western Cape Province excluding City of Cape Town Metropolitan municipality, shows fluctuations among West Coast, Cape Winelands and Eden district municipalities. West Coast district municipality commanded the highest value during the periods 2002 and 2005, Eden district municipality commanded the highest value in 2003 only and Overberg district municipality recorded the highest value during 2004 and 2006 to 2011. This shows that Overberg dominated the market during the past decade. Cape Winelands district municipality recorded minimal exports during the period under analysis.

Figure 14: Values of fish and aquatic invertebrates exported by Eastern Cape Province



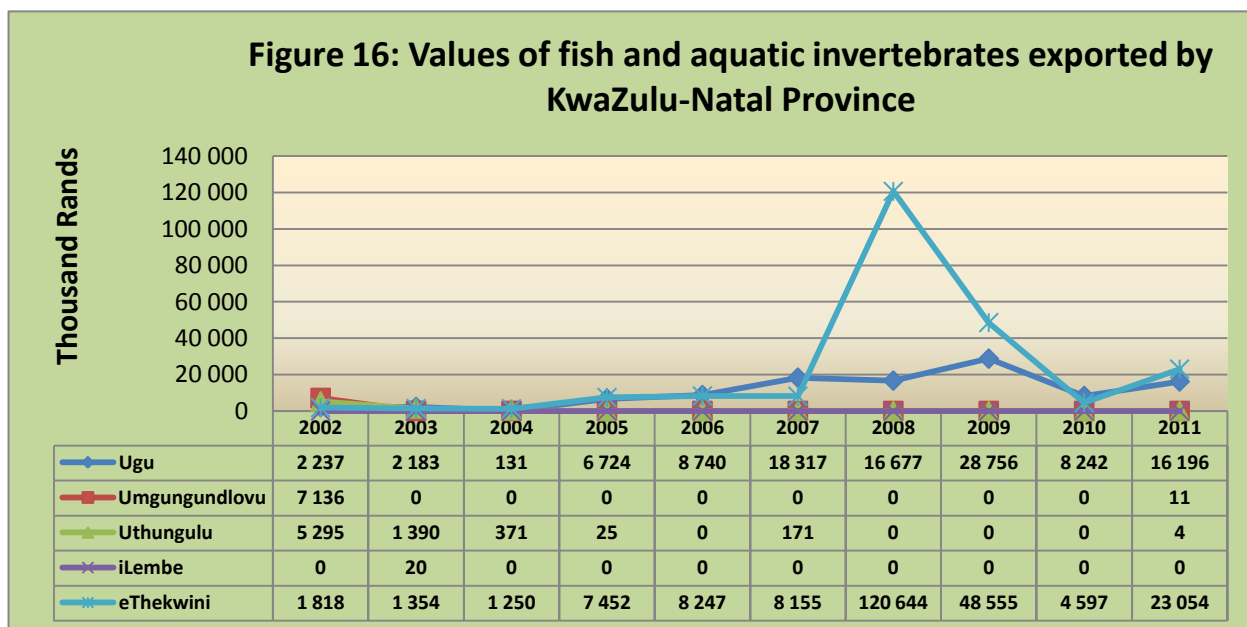
Source: Quantec Easy Data

Eastern Cape Province's export values of fish and aquatic invertebrates were mainly from Nelson Mandela metropolitan municipalities during the period under review. Cacadu district municipality commanded the highest value during 2002 only and Nelson Mandela Metropolitan municipality commanded the greatest shares from 2003 to 2011. Amatole district municipality commanded minimal values of fish and aquatic invertebrates' exports while Chris Hani district municipality commanded fractional export values.



Source: Quantec EasyData

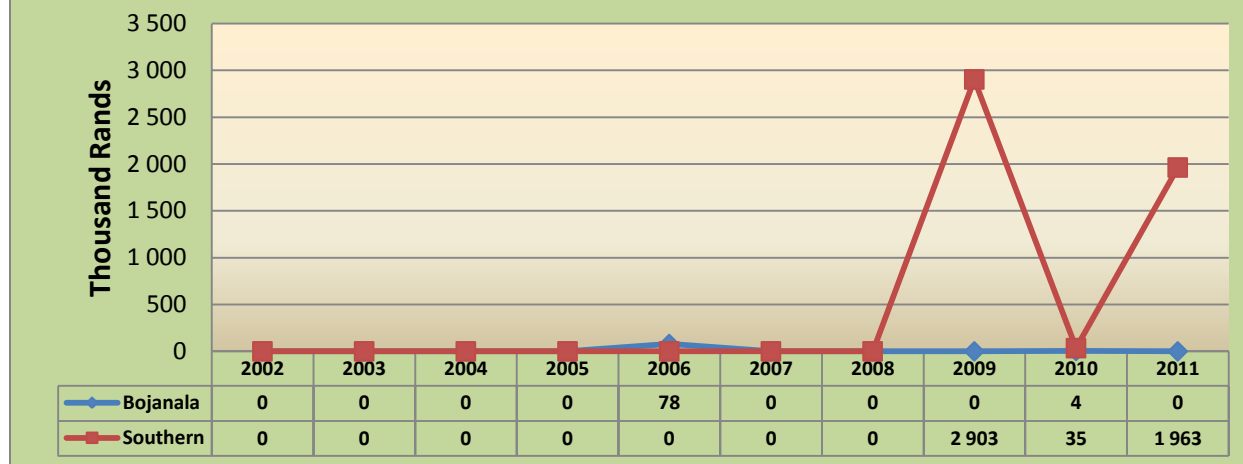
From Northern Cape Province, fish and aquatic invertebrates' exports were mainly from Pixley ka Seme which commanded the greatest values during 2002 to 2007. Frances Baard district municipality commanded the highest shares during 2008 to 2009 and diminished during other years.



Source: Quantec EasyData

In KwaZulu Natal Province Ugu district municipality and eThekweni metropolitan municipality completed for the greatest share during the period under review. Irregular exports of fish and aquatic invertebrates in KwaZulu–Natal Province were mainly from Umgugundlovu, Uthungulu district municipalities.

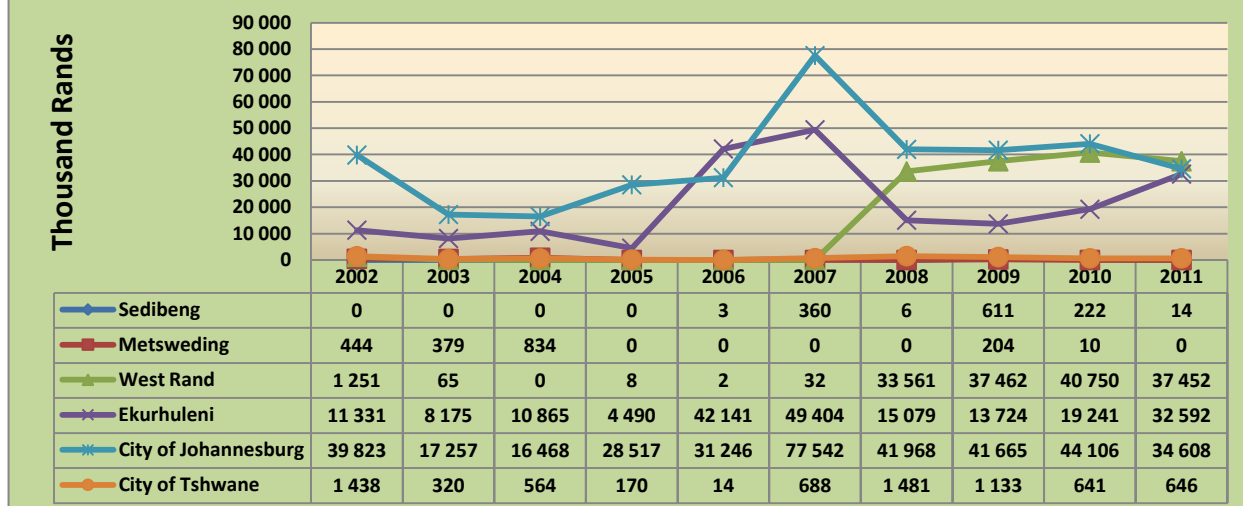
Figure 17: Values of fish and aquatic invertebrates exported by North West Province



Source: Quantec EasyData

In the North West Province, intermittent exports were recorded from Bojanala and Southern district municipality. There were no records of exports within the Province from 2002 to 2005 and from 2007 to 2008. The greatest values were commanded by Southern district municipalities in 2009 and 2011.

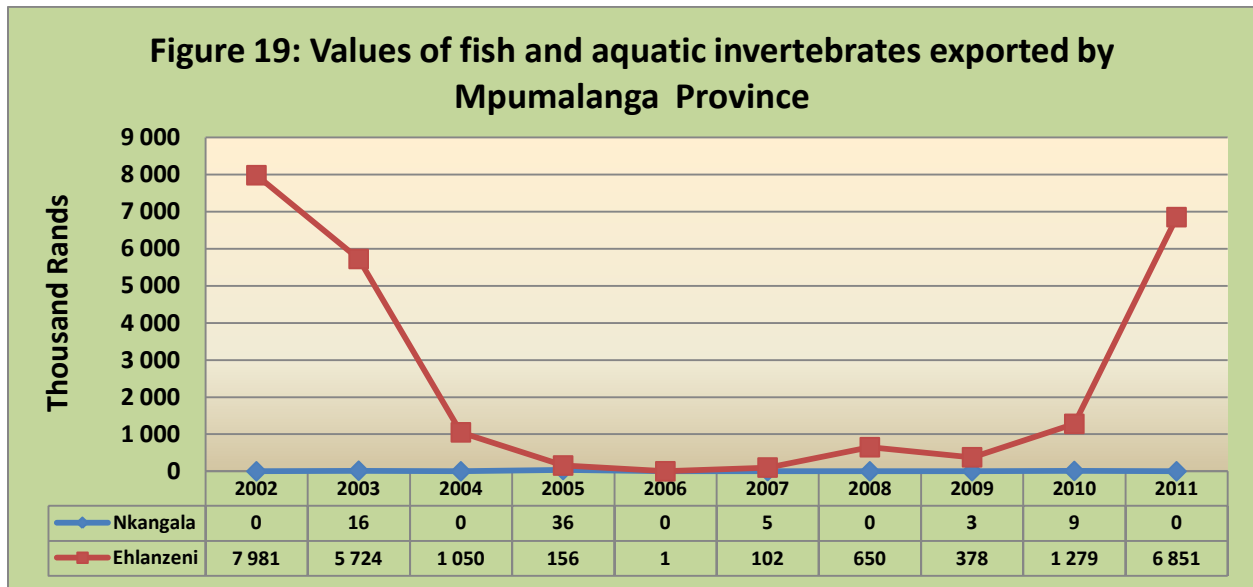
Figure 18: Values of fish and aquatic invertebrates exported by Gauteng Province



Source: Quantec EasyData

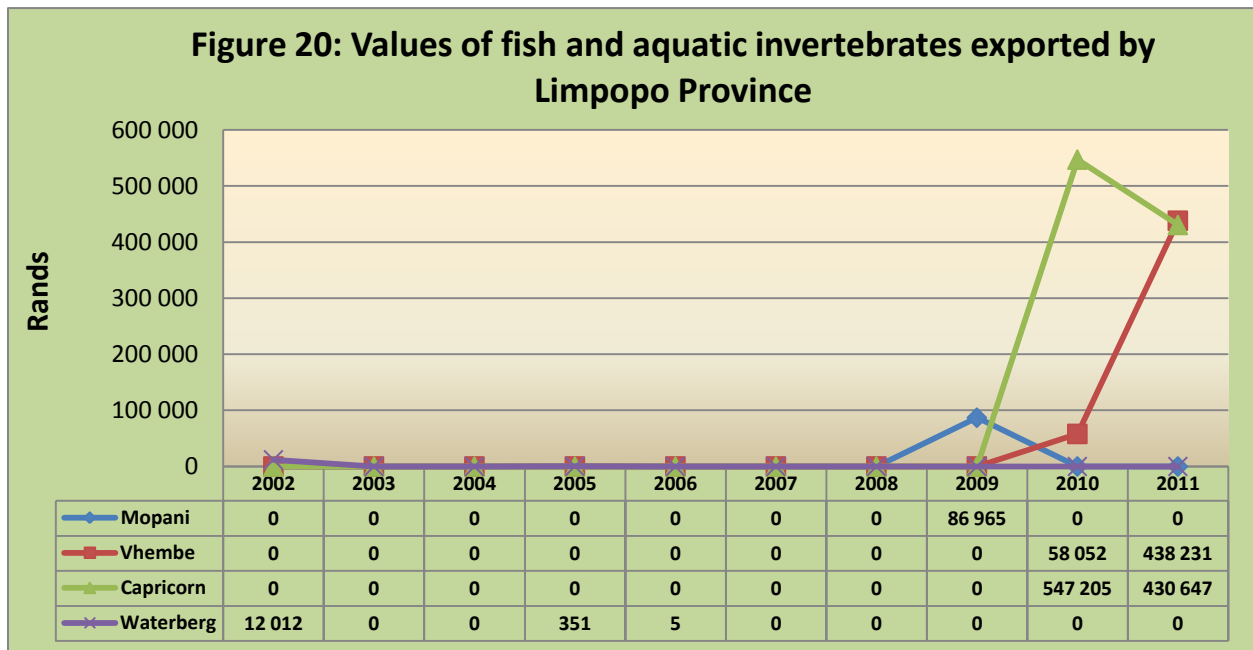
In Gauteng Province, high export values of fish and aquatic invertebrates were recorded from City of Johannesburg, Ekurhuleni district and West Rand metropolitan municipalities. The highest export value of

R 77.5 million was recorded in 2007 from City of Johannesburg metropolitan municipality. City of Tshwane metropolitan municipality recorded regularly although while Sedibeng, Metsweding and West Rand recorded irregular export values.



Source: Quantec Easy Data

Mpumalanga province's export values of fish and aquatic invertebrates were mainly from Ehlanzeni district municipality from 2002 until 2011 with high a value of R 7 981 000 in 2002. Irregular export values were recorded from Nkangala district municipality.



Source: Quantec EasyData

From Limpopo Province, the export values of fish and aquatic invertebrates were irregular and minimal high values were recorded during 2010 and 2011. Mopani district municipality recorded exports 2009 only, Vhembe and Capricorn district municipalities recorded from 2010 to 2011 while Waterberg district municipality recorded minimal exports values during 2002 and 2005 to 2006. This is a clear indication that Limpopo Province is not the main producing area of fish and aquatic invertebrates.

2.2.2. Share Analysis

The shares of the various provinces to the total South African value of exports for fish and aquatic invertebrates are presented in Table 1.

Table 1: Share of Provincial fish and aquatic invertebrates to the total RSA fish and aquatic invertebrates' exports (%)

Years Provinces	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Western Cape	86.03	85.23	84.19	84.58	81.04	83.19	81.23	82.89	84.66	85.98
Eastern Cape	10.28	13.41	14.12	12.70	14.42	11.98	12.56	11.61	11.71	9.64
Northern Cape	1.00	0.01	0.43	0.86	0.82	0.03	0.13	0.09	0.00	0.00
Kwazulu-Natal	0.56	0.18	0.07	0.56	0.70	0.83	3.63	2.38	0.39	1.11
North West	0	0	0	0	0	0	0	0.09	0	0.06
Gauteng	1.85	0.96	1.14	1.30	3.02	3.98	2.44	2.92	3.17	2.99
Mpumalanga	0.27	0.21	0.04	0.01	0	0	0.02	0.01	0.04	0.19
Limpopo	0	0	0	0	0	0	0	0	0.02	0.02
Total	100	100	100	100	100	100	100	100	100	100

Source: Calculated from Quantec EasyData

Table 1 show that Western Cape Province commands the greatest share of South Africa's fish and aquatic invertebrates' exports value followed at a distant by Eastern Cape and Gauteng Provinces Regular exports were also recorded from KwaZulu-Natal and Northern Cape Provinces. Fractional exports were recorded in Mpumalanga, North West and Limpopo Provinces. There were no exports recorded from Free State Province.

Table 2: Share of district fish and aquatic invertebrates to the total Western Cape Provincial fish and aquatic invertebrates' exports (%)

Years Districts	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
City of Cape Town	87.62	89.16	84.49	83.59	85.57	88.41	90.53	92.79	91.38	92.64
West Coast	4.87	2.31	3.04	5.73	3.70	2.92	3.08	3.24	3.48	2.39
Cape Winelands	0.20	0.20	0.07	0.21	0.14	0.14	0.15	0.20	0.12	0.45
Overberg	2.91	2.84	7.66	5.37	5.65	6.06	3.71	3.35	4.65	4.06
Eden	4.40	5.49	4.73	5.11	4.93	2.47	2.52	0.42	0.37	0.45
Total	100	100	100	100	100	100	100	100	100	100

Source: Calculated from Quantec Eas Data

City of Cape Town metropolitan municipality has commanded the greatest share of fish and aquatic invertebrates' exports value in the Western Cape Province during the period 2002 and 2011. City of Cape Town metropolitan municipality commanded between 83% to 93% of export shares throughout the period under analysis and the other few percentages were divided among West Coast, Cape Winelands, Overberg and Eden district municipalities.

Table 3: Share of district fish and aquatic invertebrates to the total Eastern Cape Provincial fish and aquatic invertebrates' exports (%).

Years Districts	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Cacadu	69.10	16.79	19.82	24.27	23.89	27.60	28.12	30.91	32.89	38.55
Amatole	0	0.02	0.79	1.45	4.75	3.90	6.62	9.96	8.44	16.03
Chris Hani	0	0	0.28	0.02	0.78	0.64	0	1.92	1.66	1.56
Nelson Mandela	30.90	83.19	79.11	74.26	70.57	67.85	65.26	57.21	57.01	43.87
Total	100	100	100	100	100	100	100	100	100	100

Source: Calculated from Quantec EasyData

Cacadu district municipality has commanded the greatest share of fish and aquatic invertebrates' exports value in the Eastern Cape Province during the period between 2002 and 2011 followed by Nelson Mandela metropolitan municipality. Fractional export shares were recorded in Amatole and Chris Hani district municipalities.

Table 4: Share of district fish and aquatic invertebrates to the total Northern Cape Provincial fish and aquatic invertebrates' exports (%).

Years Districts	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Pixley ka Seme	100	100	100	100	100	100	15.22	0.01	100	100
Frances Baard	0	0	0	0	0	0	84.78	99.99	0	0
Total	100	100	100	100	100	100	100	100	100	100

Source: Calculated from Quantec EasyData

Pixley ka Seme district municipality commanded 100% shares of fish and aquatic invertebrates' exports originating from the Northern Cape Province from 2002 to 2007 and again from 2010 to 2011. Frances Baard district municipality recorded minimal exports during 2008 and 2010 only.

Table 5: Share of district fish and aquatic invertebrates to the total KwaZulu-Natal Provincial fish and aquatic invertebrates' exports (%).

Years District	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Ugu	13.57	44.14	7.45	47.35	51.45	68.75	12.14	37.20	64.19	41.25
Umgungundlovu	43.29	0	0	0	0	0	0	0	0	0.03
Uthungulu	32.12	28.10	21.20	0.17	0	0.64	0	0	0.00	0.01
iLembe	0	0.39	0	0	0	0	0	0	0	0
eThekweni	11.03	27.37	71.34	52.48	48.55	30.61	87.86	62.80	35.80	58.71
Total	100	100	100	100	100	100	100	100	100	100

Source: Calculated from Quantec EasyData

In KwaZulu–Natal Province, high export shares of fish and aquatic invertebrates were recorded from eThekweni district municipality followed by Ugu district municipality. Fractional export shares were recorded from Umgungundlovu, Uthungulu and iLembe district municipalities. iLembe district municipality was less active during the period under review as it only commanded exports shares of 0.39% during 2003.

Table 6: Share of district fish and aquatic invertebrates to the total North West Provincial fish and aquatic invertebrates' exports (%).

Years Districts	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bojanala	0	0	0	0	100	0	0	0	11.24	0
Southern	0	0	0	0	0	0	0	100	88.76	100
Total	0	0	0	0	100	0	0	100	100	100

Source: Calculated from Quantec EasyData

From North West Province, irregular exports of fish and aquatic invertebrates were recorded from Bojanala and Southern district municipalities. Bojanala district municipality recorded 100% in 2006 while Southern district municipality commanded 100% from 2009 and 2011. There were no records of fish and aquaculture exports from 2002 to 2005 and from 2007 to 2008 in North West Province.

Table 7: Share of district fish and aquatic invertebrates to the total Gauteng Provincial fish and aquatic invertebrates' exports (%).

Years Districts	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Sedibeng	0	0	0	0	0	0.28	0.01	0.65	0.21	0.01
Metsweding	0.82	1.45	2.90	0.00	0.00	0.00	0	0.22	0.01	0
West Rand	2.30	0.25	0	0.02	0	0.03	36.44	39.52	38.82	35.56
Ekurhuleni	20.87	31.21	37.82	13.53	57.41	38.59	16.37	14.48	18.33	30.95
City of Johannesburg	73.36	65.88	57.32	85.93	42.57	60.57	45.57	43.95	42.02	32.86
City of Tshwane	2.65	1.22	1.96	0.51	0.02	0.54	1.61	1.19	0.61	0.61
Total	100	100	100	100	100	100	100	100	100	100

Source: Calculated from Quantec EasyData

In Gauteng Province, high export shares of fish and aquatic invertebrates were recorded from City of Johannesburg metropolitan municipality followed by Ekurhuleni and West Rand district municipalities. Regular exports were also recorded from City of Tshwane metropolitan Municipality. Intermittent exports were recorded from Sedibeng and Metsweding district municipality.

Table 8: Share of district fish and aquatic invertebrates to the total Mpumalanga Provincial fish and aquatic invertebrates' exports (%).

Years Districts	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Nkangala	0	0.27	0	18.70	0	5.08	0	0.89	0.70	0.00
Ehlanzeni	100	99.73	100	81.30	100	94.92	100	99.11	99.30	100
Total	100	100	100	100	100	100	100	100	100	100

Source: Calculated from Quantec EasyData

During the period 2002 to 2011, Ehlanzeni district municipality commanded the greatest shares of fish and aquatic invertebrates' exports. Irregular exports were recorded in Nkangala district municipality. There were no exports records from Gert Sibande district municipality.

Table 9: Share of district fish and aquatic invertebrates to the total Limpopo Provincial fish and aquatic invertebrates' exports (%).

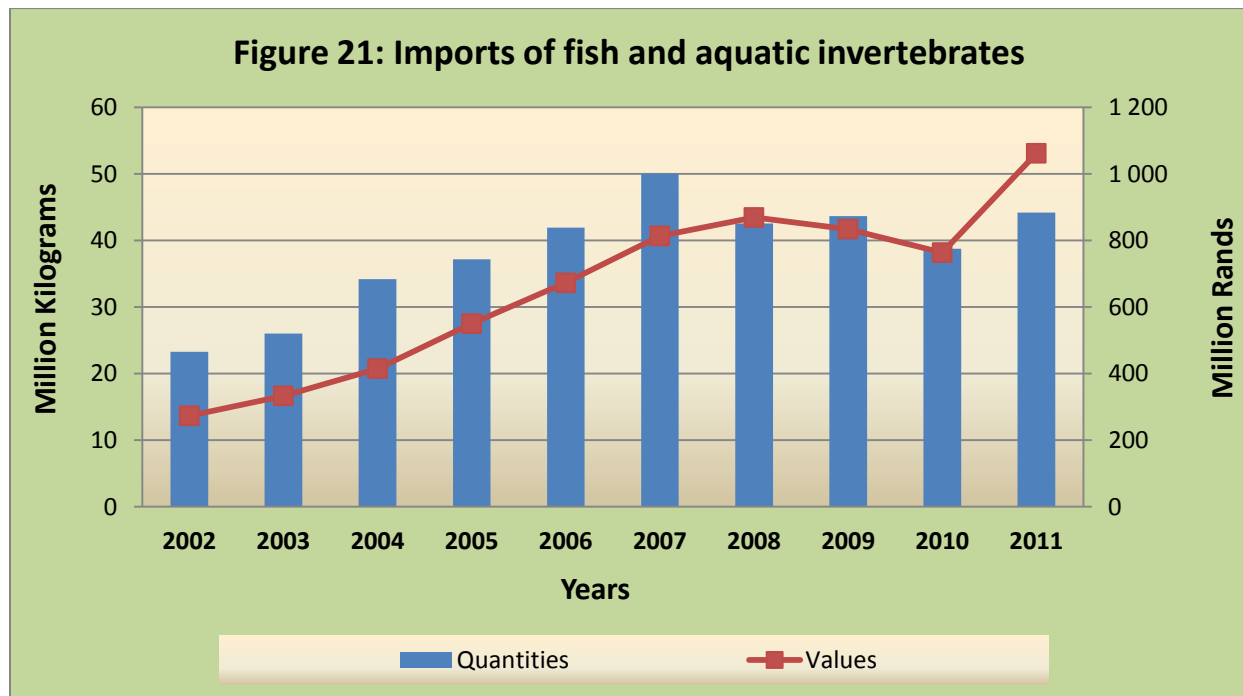
Years Districts	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Mopani	0	0	0	0	0	0	0	100	0	0
Vhembe	0	0	0	0	0	0	0	0	9.59	50.44
Capricorn	0	0	0	0	0	0	0	0	90.4	49.56
Waterberg	100	0	0	100	100	0	0	0	0	0
Total	100	0	0	100	100	0	0	100	100	100

Source: Calculated from Quantec EasyData

Limpopo Province, recorded irregular exports shares of fish and aquatic invertebrates from Mopani, Vhembe, Capricorn and Waterberg district municipalities. Waterberg commanded a 100% share during 2002, 2005 and 2006.

2.2.3. Imports.

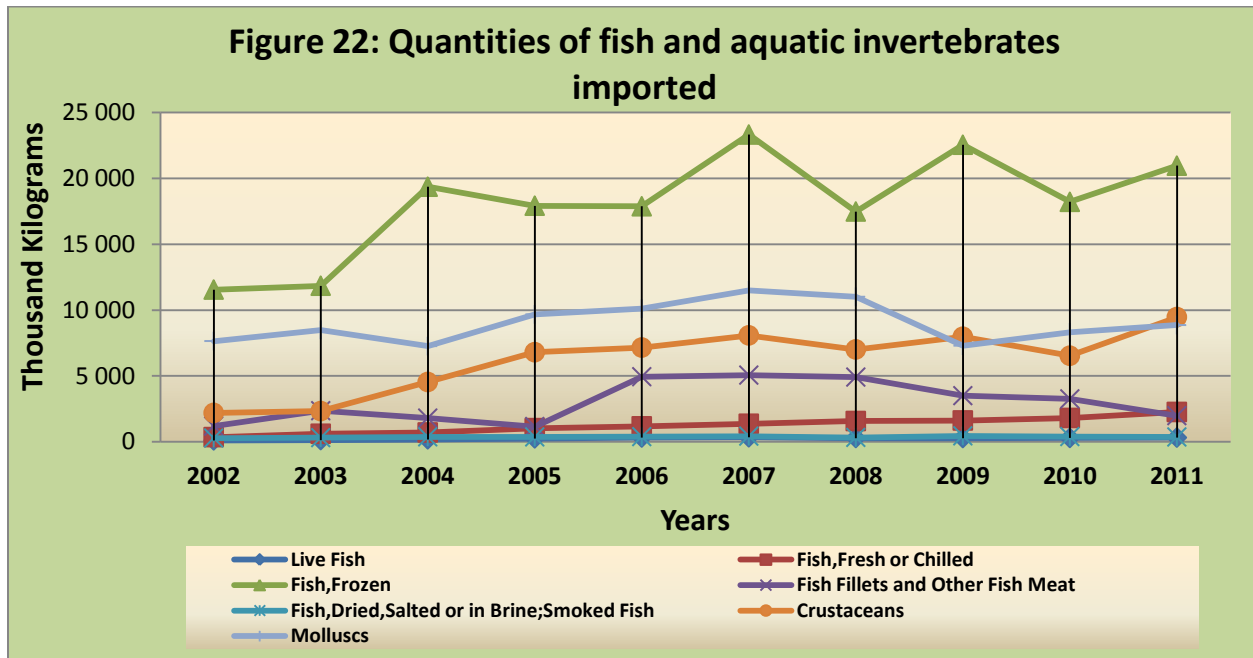
Figure 21 below show the imports of fish and aquatic invertebrates from 2002 to 2011.



Source: Quantec EasyData

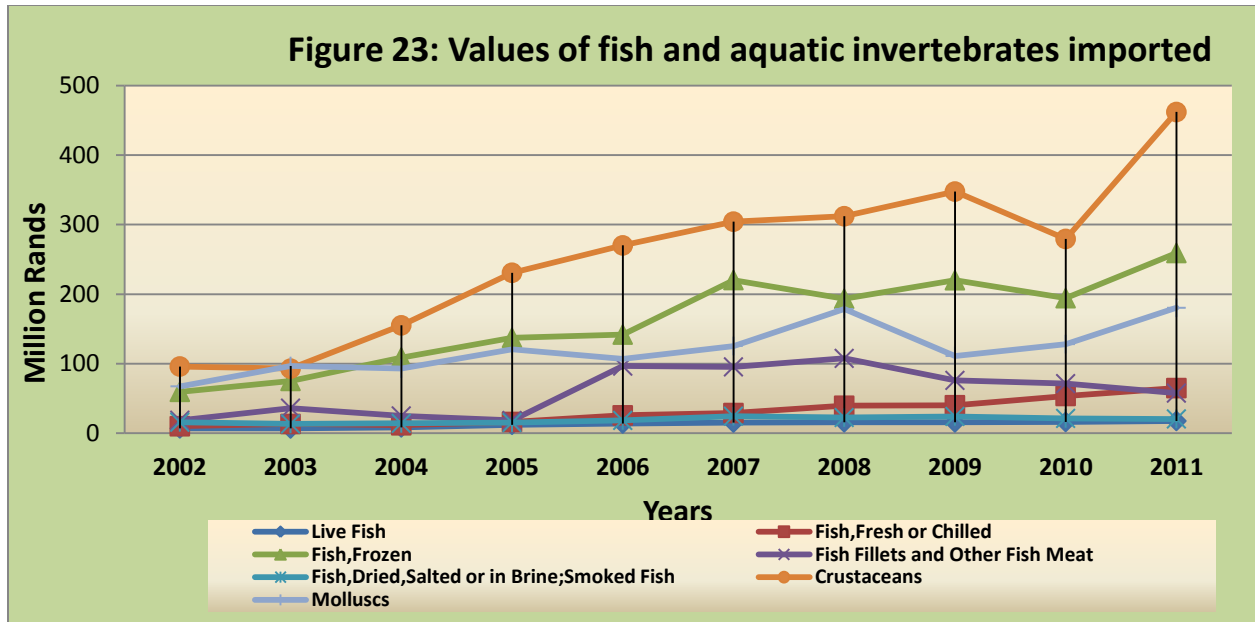
Imports (quantity and value) of fish and aquatic invertebrates have been steadily increasing from 2002 to 2007 and fluctuated during 2008 to 2011. It has been profitable to import fish and aquatic invertebrates from 2002 to 2005 since more quantities were imported with less value in contrast during 2008 and 2011 it was not profitable to import fish and aquatic invertebrates products. On average 38 million kilograms of fish and aquatic invertebrates worth R 657 million has been imported during the past decade.

The following figure shows the various fish and aquatic invertebrates' products imported by South Africa from 2002 to 2011.



Source: Quantec EasyData

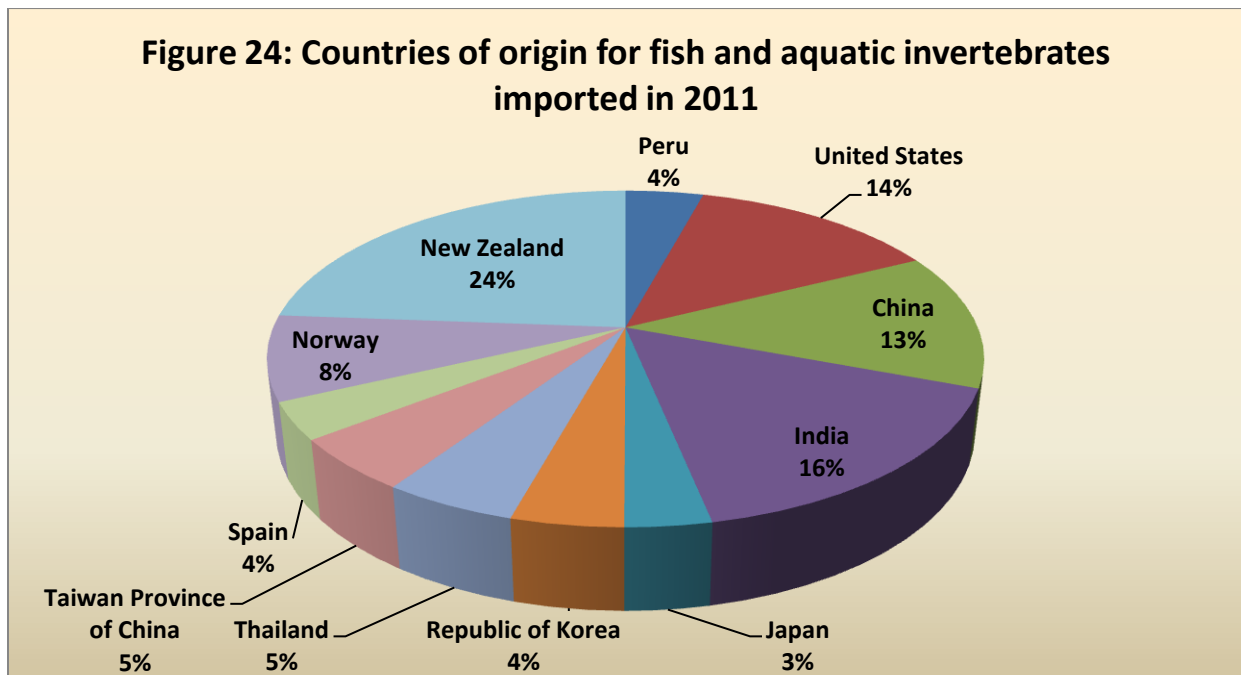
Figure 22 indicates that the most imported fish and aquatic invertebrates' product during the past decade was frozen fish followed at a distant by molluscs and crustaceans. On average the quantity of frozen fish imported was 18 million kilograms, molluscs was 9 million kilograms and crustaceans was 6 million kilograms per annum during the period 2002 to 2011.



Source: Quantec EasyData

Crustaceans commanded the third largest quantities (see Figure 23) but its value was the highest during the period under review followed by frozen fish and molluscs. Crustaceans commanded a total value of R 2.5 billion followed by R 1.6 billion for frozen fish and R 1.2 billion for molluscs. This shows that although frozen fish is the most imported product, it is less expensive relative to crustaceans.

South African imports of fish and aquatic invertebrates were mainly from New Zealand, India, United States (US) and China. Figure 24 below shows the origin of South African fish and aquatic invertebrates imports.



Source: Quantec EasyData

Most of South African fish and aquatic invertebrates' imports were from New Zealand, which commanded the greatest shares of 24% of South African fish and aquatic invertebrates' imports market, followed by India with 16%, US with 14% and China with 13%. The mentioned four countries constitute 67% shares of South African imports and the other seven countries share among themselves 33% of South African fish and aquatic invertebrates' imports.

3. Organizational Analysis

3.1. Threats and Opportunities

Some of the Threats and Opportunities for fish farming in South Africa are as follows:

Table 10: Threats and opportunities in the aquaculture industry

Threats	Opportunities
<ul style="list-style-type: none"> ➤ Shortage of expertise and aquaculture professionals. ➤ Lack of technical skills and technical support or extension services. ➤ High feed, equipment and technology costs. ➤ Lack of veterinary services and disease management. ➤ Poor government understanding and support. ➤ Lack of species choice and good seed stock. ➤ Complex resource-based legislation. ➤ Inaccessible financial sector and poor financial support services. ➤ Lack of marketing services, marketing structures and market penetration. <p>Climatic variability and seasonality.</p>	<ul style="list-style-type: none"> ➤ There is high demand for affordable protein and shortages in traditional fisheries products. ➤ Aquaculture is moving onto Government agenda. ➤ High potential for agricultural diversification. ➤ Good natural resources. ➤ Good infrastructure. ➤ Potential for export opportunities. ➤ Linkages with tourism. ➤ Growing economy and good economic climate.

3.2. Key Constraints

Aquaculture industry reveals that growth has fallen far short of expectation due to the following constraints:

- Uncoordinated institutional environment
- Lack of appropriate technology
- Difficulties in obtaining suitable culture sites
- Inadequate public sector support measure to pioneer farmers
- High production costs
- Lack of local quality feed
- Lack of access to suitable water quantity and quality for freshwater aquaculture.

4. Aquaculture Projects

4.1 Department of Science and Technology (DST) projects

- The DST in partnership with the University of Stellenbosch and other partners have been providing support, training and technology for the establishment of emerging trout farmers within the private irrigation dams on the wine estate of the Southern Western Cape region (Stellenbosch, Tulbagh, and Worcester). Following a successful five-site grow-out pilot, the objective is to establish 35 small-scale trout farmers each producing 6-8 tons of trout annually, with a retail value of R 6.5 million. These are registered as members of Hands-On Small-Scale Fish Farmer Co-Op, which has secured 200 tons per annum of Grade-A trout supply agreement with Three Streams Smokehouse, whose products retail at Woolworths and Pick n Pay. In 2008/9 Hands-On is being incubated as a business and will be exited, with 35 members, a 250 ton production capacity, and a slaughter facility to enable primary beneficiation and product development on site, as well as the ability to process its produce and develop its own brand.
- The DST-DoA-DWAF provincial grow-out pilots are to establish one provincial grow-out pilots per province to ascertain the technical, environmental, and commercial factors of the production of indigenous fresh-water species (tilapia, catfish (barbell), trout and carp) using High-Density Poly-Ethylene (HDPE) cage-net technology in State-owned irrigation waterworks. The target provinces are Eastern Cape, Kwazulu-Natal, Limpopo, Mpumalanga, North West, Northern Cape and Free State. These provinces have fledgling aquaculture industry, and potential for growth, however require technology support and capacity development to do so.
- The Hondeklip Bay Abalone Grow-Out pilot consisted of 16 grow-out cages, stocked with 20 000 animals. The pilot is housed in the disused Oceana Lobster Processing plant. The buildings were renovated to accommodate the pilot infrastructure. The cages are based on exactly the same production technology used by commercial farmers in the Western Cape. HIK Abalone, the technology partner to the project, one of the largest abalone producers, worked in partnership with the University of Stellenbosch in implementing the grow-out pilot in which growth-rates were monitored in Hondeklip Bay and at HIK Farm (as control) over 2-years. The DST in partnership with the Fishing and Mariculture Development Agency (FAMDA) and HIK Abalone teamed up in 2007 to expand the project, and to establish abalone-basket manufacturing SMME, pipe fitting workshop, component storage, and project office, in anticipation of possible commercial expansion of the pilot. The project is being expanded from the current 16 tanks to 92 with a capacity to accommodate 100 000 animals. Already 20 additional production tanks have been installed, and 15 permanent jobs and 80 part-time job opportunities have been established, all benefiting local people. The FAMDA Aquaculture Certificate Programme and an intensive aquaculture training programme accredited by Stellenbosch University are being provided to the beneficiaries. A community small-scale West Coast rock-lobster operation is also being assisted by providing live-lobster holding facility and technology support.
- Marine Finfish Grow-Out Pilot entails three indigenous and endangered South African line-fish species, namely dusky kob (*Argyrosomus japonicus*), silver kob (*A. inodorus*) and yellowtail (*Seriola lalandi*). These species are good candidates for cage aquaculture because they are widely distributed, highly productive, tolerate a wide range of temperatures and share an excellent domestic and international

market profile. Through R&D in the past 5 years I&J Limited has successfully developed the technology to spawn all three species from wild-caught brood stock and proceeded to establish a commercial finfish hatchery at Danger Point (Gansbaai) commercially producing fingerlings from the 3 species, for aquaculture. Four HDPE Cages were constructed and successfully introduced in the water in November 2007. The cages incorporate a Scottish design, built using locally supplied materials, and the mooring system was designed by an Australian company that has deployed these systems in various parts of the world. In December 2007, 40 000 dusky kob fingerlings with an average mass of 8 grams were introduced in sea cage number four. The successful introduction of kob was followed up by the introduction of 18 000 yellowtail fingerlings, with an average weight of 5 grams, in sea cage number two. Both cages are equipped with locally-produced predator nets of 160mm and with an inside net presently of 10 mm.

- Yellowtail Ranching (Western Cape) project aims at developing and demonstrating technology whereby beach-seine encircled yellowtail is transferred to a towing cage, towed back to a selected holding site and then transferred into moored holding cages. Here the fish would be held, conditioned and marketed, thus enabling the fishermen and women to retain quality of their catch, and develop a profitable and sustainable yellowtail ranching venture, priding itself on product quality, environmental awareness, and technical innovation.

4.2 Aquaculture Development and Enhancement Programme (ADEP)

Minister of Trade and Industry (the dti) has launched the Aquaculture Development of and Enhancement Programme (ADEP) to stimulate the investment and growth in the aquaculture sector. The aim of ADEP is to stimulate investment in the aquaculture sector with the intention to increase production; sustain and create jobs; encourage geographical spread and broaden participation. ADEP will offer a grant of R40 million for new and expansion of the existing projects. Aquaculture is still at an infancy stage and ADEP will provide an opportunity to grow the sector.

4.3 Aquaculture Value Chain Round Table (AVCRT)

The Department of Agriculture, Forestry and Fisheries (DAFF) developed the Concept document on Value Chain Round Tables (VCRTs) during 2011, which was subsequently approved by the Minister. A VCRT is a forum that brings together industry leaders from different nodes of a value chain to coordinate processes aimed at resolving value-chain challenges with the purpose of enhancing value chain competitiveness and meeting consumer needs. The aim of VCRT is to foster collaborative industry-government actions that help to secure an enduring global advantage without limiting the round table to issues and developments that are external to South Africa. The round table considers domestic sectoral development activities as they directly impact on South Africa's global competitiveness and its reputation as a food supplier.

The Aquaculture Association of Southern Africa (AASA) formally requested the establishment of the Aquaculture Value Chain Round Table (AVCRT) through the office of the Deputy Director General: Economic Development, Trade and Marketing. The request was accepted and the department appointed the Chief Director: Aquaculture and Economic Development, Dr. Motseki Hlatshwayo to serve as the co-

chair of the VCRT representing the government. Mr. Roger Krohn, the President of AASA was appointed as the co-chair of the Value Chain Round Table, representing the aquaculture industry.

Members of the AVCRT are inclusive of aquaculture farmers, feed manufacturers, emerging and commercial aquaculture farmers from different subsectors, researchers from universities, government officials from different departments, hatchery operators and Fish Processing Establishment exemption holders, NGOs, implementing agencies and labour unions.

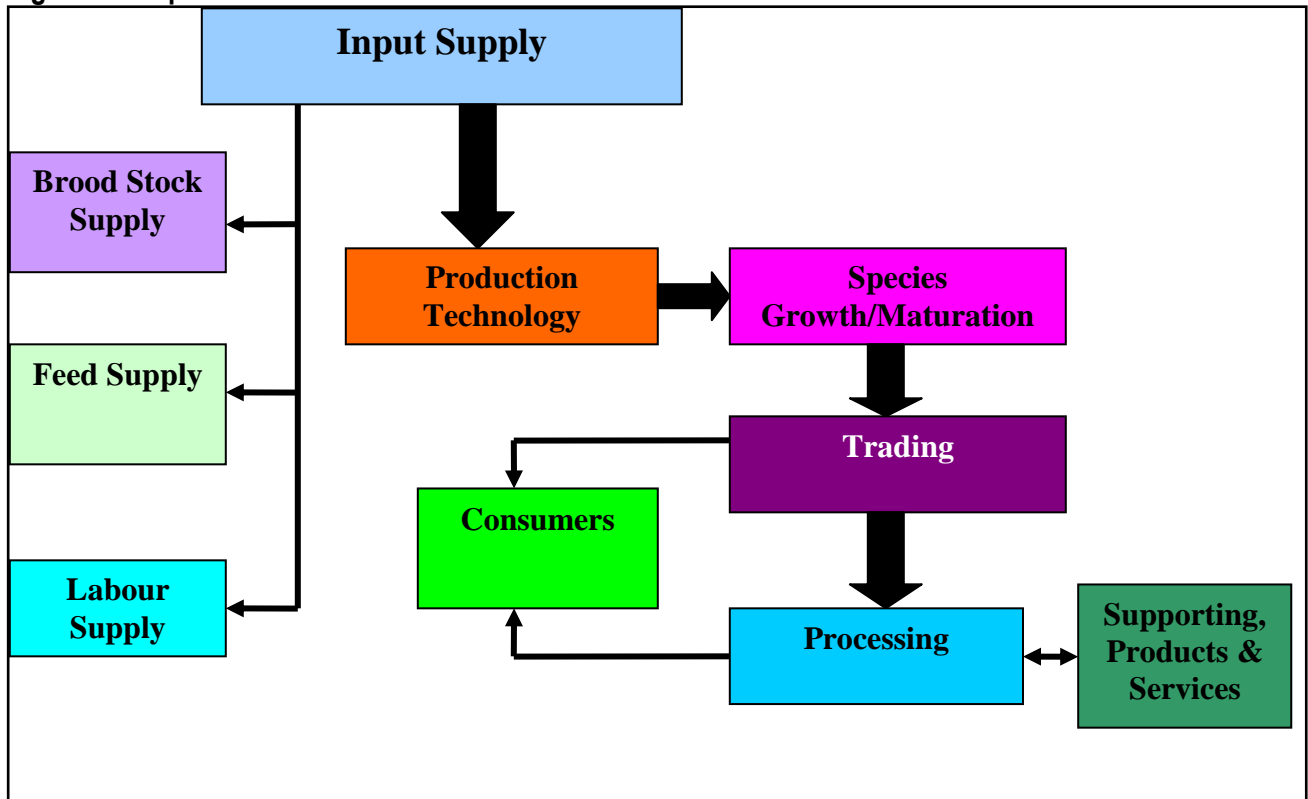
5. THE VALUE CHAIN

The value chain for aquaculture comprises of a number of primary activities. The “input supply” stage consists of three critical elements: (i) Stock supply which originates from hatcheries or nurseries; (ii) the feed supply which is either imported or produced locally and (III) the labour supply which carry out the various activities within the hatcheries.

The second element is that of “production technology” where the technology utilized depends on the type of business enterprise to be carried out i.e. whether cages or ponds, as well as the various methods of transportation and capital equipment required.

The third stage is the maturing of the species and where they reach the correct age for distribution and sale. This makes up the next step, where the trading of the particular species is underway, either to the local or export market. The traders will either process the species themselves or sell it to processors who in turn will sell it to the consumers. Supporting products and services include the research and technology element of this value chain.

Figure 25: Aquaculture market value chain



Source: Trade and Investment Cacadu

6.1. Competitiveness of fish and aquatic invertebrates industry in exports

Table 11: List of importing markets for fish and aquatic invertebrates exported by South Africa in 2011

Importers	Trade Indicators								Tariff (estimated) faced by South Africa (%)
	Exported value 2011 (USD thousand)	Trade balance 2011 (USD thousand)	Share in South Africa's exports (%)	Exported growth in value between 2007-2011 (% p.a.)	Exported growth in value between 2010-2011 (% p.a.)	Ranking of partner countries in world imports	Share of partner countries in world imports (%)	Total import growth in value of partner countries between 2007-2011 (% p.a.)	
World	486350	340153	100	0	7		100	6	
Spain	85761	82249	17.6	-10	-13	3	6.4	-1	5.8
Italy	78089	78084	16.1	3	14	6	4.9	3	5.8
Hong Kong, China	58923	58915	12.1	9	-14	10	3	11	0
China	37451	23969	7.7	74	133	4	5.6	12	10.2
Portugal	28682	28148	5.9	2	40	17	1.9	0	5.8
United States of America	26083	17349	5.4	-5	2	2	13.4	4	0
Australia	23647	23475	4.9	-5	-1	24	0.7	6	0
Japan	19358	17670	4	-20	13	1	13.6	6	4.3
France	17897	17806	3.7	3	22	5	5.2	5	5.8
Cameroon	16862	16862	3.5		76	54	0.1	54	0.3
United Kingdom	9623	7687	2	-21	0	11	2.6	-2	5.8
Angola	9507	9507	2	21	36	57	0.1	29	20
Netherlands	7631	7611	1.6	-2	59	13	2.4	8	5.8
Greece	6904	6872	1.4	0	5	29	0.5	-4	5.8
Mozambique	6419	1260	1.3	8	56	80	0.1	17	0
Germany	5990	5985	1.2	22	26	7	4.4	9	5.8
Mauritius	5470	4602	1.1	21	7	37	0.3	5	0

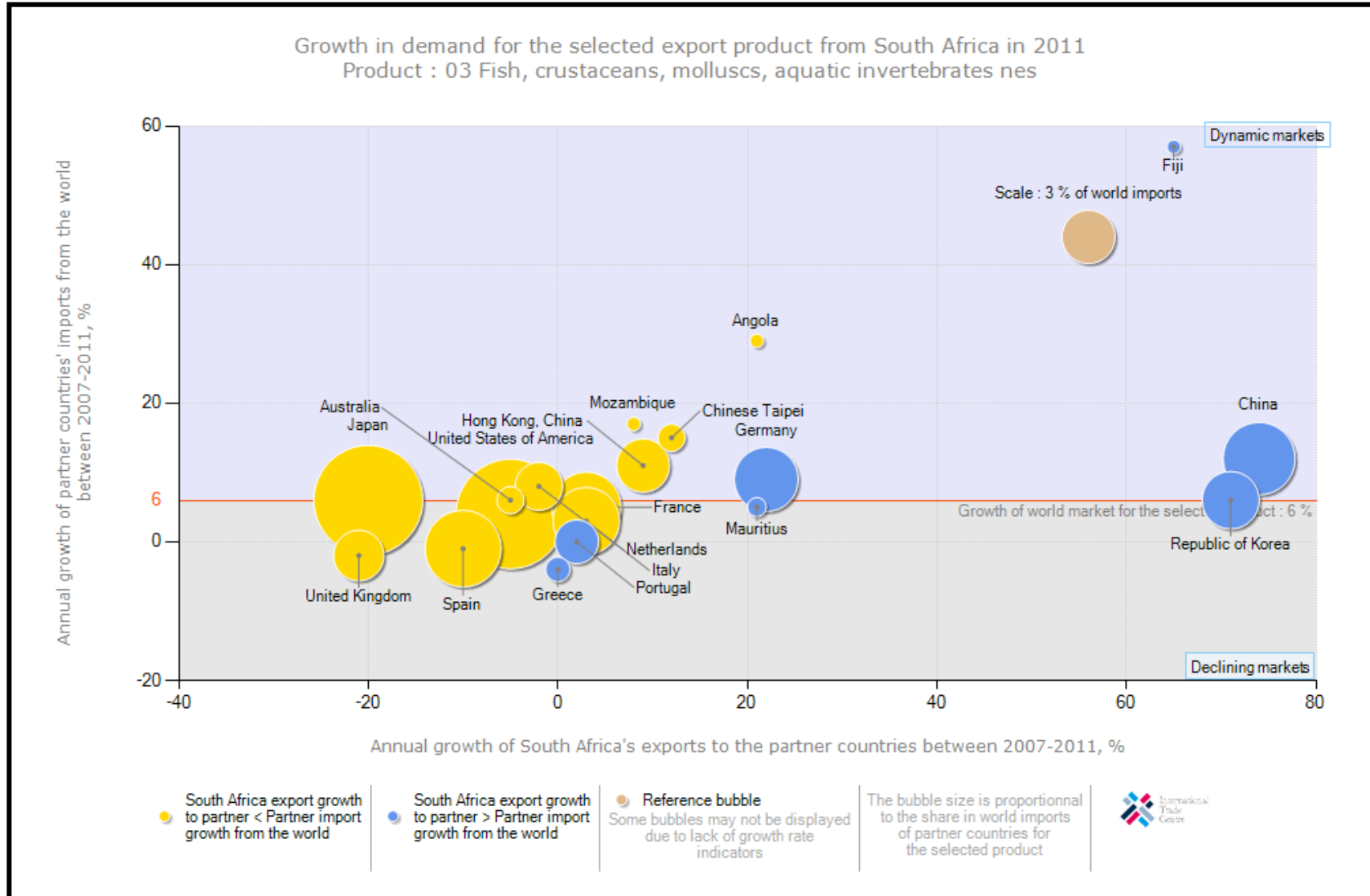
Source: ITC calculations based on COMTRADE statistics.

In 2011, South Africa's exports represented **0.51%** of world exports for fish and aquatic invertebrates and its ranking in world export was **40**. Table 11 shows that the total exported South African fish and aquatic invertebrates during 2011 was valued at US\$ 486 350 000. South Africa exported greater quantities of fish and aquatic invertebrates to Spain, Italy and Hong Kong (China). The greatest share of South African fish and aquatic invertebrates exports were destined to Spain which commanded 17.6% share during the year 2011 followed by Italy and Hong Kong (China) with 16.1% and 12.1% shares respectively.

South African fish and aquatic invertebrates' exports to the world increased by 0% in value per annum between the periods 2007 and 2011. During the same period, exports value of fish and aquatic invertebrates to Spain decreased by 10% and exports value to Italy increased and Hong Kong (China) increased by 3% and 9% respectively.

Exports value of fish and aquatic invertebrates to the world increased by 7% during the period 2010–2011. During the same periods exports value to Spain and Hong Kong (China) decreased by 13% and 14% respectively while Italy increased by 14%.

Figure 26: Growth in demand for fish and aquatic invertebrates exported by South Africa in 2011

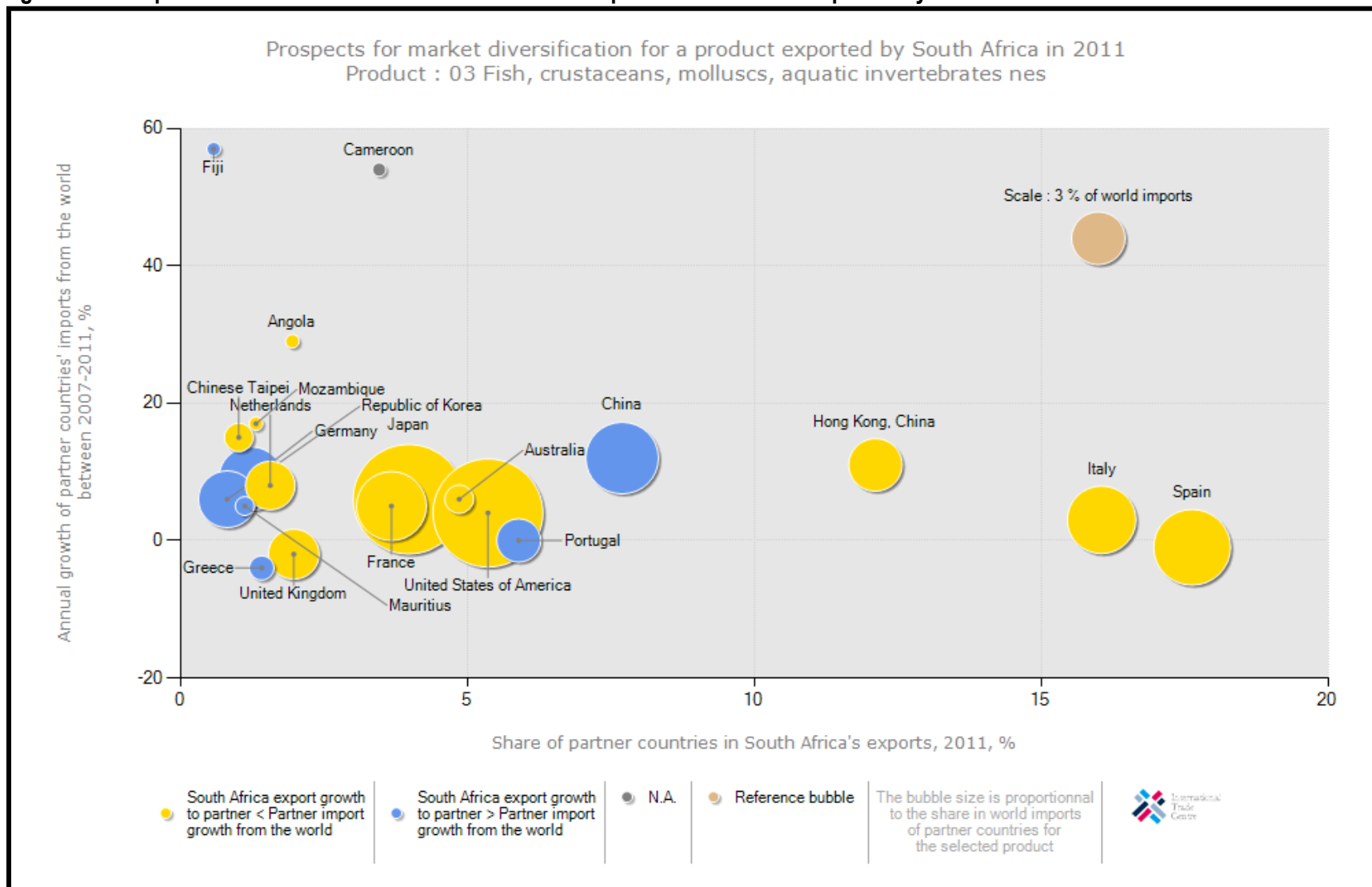


Source: Trademap, ITC

Figure 26 shows that between the periods 2007 - 2011 South Africa's exports to Germany, Greece, Portugal, China, Republic of Korea, Mauritius and Fiji were growing at a rate that is greater than their imports from the world. During the same periods South Africa's exports to Spain, Japan, USA, Australia, Hong Kong, United Kingdom, Mozambique, France, Italy, Netherlands, Angola, and Chinese Taipei were growing at a rate that is less than their imports from the world.

Further analysis indicate that Germany, Fiji, Republic of Korea and China represent gains in dynamic market and Greece represent losses in the declining market because their annual import growths were less than the world market growth. The most growing demand was found in Fiji where the annual growth of South African exports increased by 65%.

Figure 27: Prospects for market diversification for fish and aquatic invertebrates exported by South Africa in 2011



Source: Trademap, ITC

Most of South Africa's fish and aquatic invertebrates were exported to China which is having a share of 7.7%. If South Africa wishes to diversify its fish and aquatic invertebrates exports, it can penetrate the markets of Fiji because its annual growth of 57%. Japan and USA are the biggest markets in the world with the world market share of 13.6% and 13.4% respectively but their annual imports growths are very low. USA's imports growth is at 4% and Japan's growth was 6% during 2011. These restrict South Africa to penetrate into their import market.

6.2. Competitiveness of fish and aquatic invertebrates industry in imports

Table 12: List of exporting markets for fish and aquatic invertebrates imported by South Africa in 2010

Exporters	Trade Indicators								Tariff (estimated) applied by South Africa (%)
	Imported value 2011 (USD thousand)	Trade balance 2011 (USD thousand)	Share in South Africa's imports (%)	Imported growth in value between 2007-2011 (% p.a.)	Imported growth in value between 2010-2011 (% p.a.)	Ranking of partner countries in world exports	Share of partner countries in world exports (%)	Total export growth in value of partner countries between 2007-2011 (% p.a.)	
World	146197	340153	100	5	40		100	9	
India	36230	-36230	24.8	5	82	7	3.4	21	3.5
Norway	14103	-14048	9.6	17	32	2	9.5	12	1.3
China	13482	23969	9.2	2	51	1	11.5	25	3.5
New Zealand	12338	-11723	8.4	-5	10	24	1.1	6	3.5
Thailand	10489	-9417	7.2	24	25	9	3.2	6	3.5
United States of America	8734	17349	6	-5	369	3	5.3	6	3.5
Argentina	7966	-7738	5.4	33	28	21	1.5	6	3.5
Mozambique	5159	1260	3.5	-10	49	86	0.1	-9	0
Ecuador	4043	-4037	2.8	29	4392	20	1.6	17	3.5
Spain	3512	82249	2.4	4	-33	8	3.3	4	3.5
Peru	2907	-2907	2	5	-1	34	0.8	17	3.5
Republic of Korea	2892	1098	2	50	302	17	1.9	16	3.5
Chinese Taipei	2380	2585	1.6	-6	21	18	1.8	8	3.5
Chile	2164	-2164	1.5	-5	-20	6	3.7	4	3.5
Falkland Islands (Malvinas)	2060	-2060	1.4	-12	-20	57	0.2	1	3.5
United Kingdom	1936	7687	1.3	10	110	15	2.3	6	3.5
Uruguay	1849	-1292	1.3	19	93	51	0.2	5	3.5

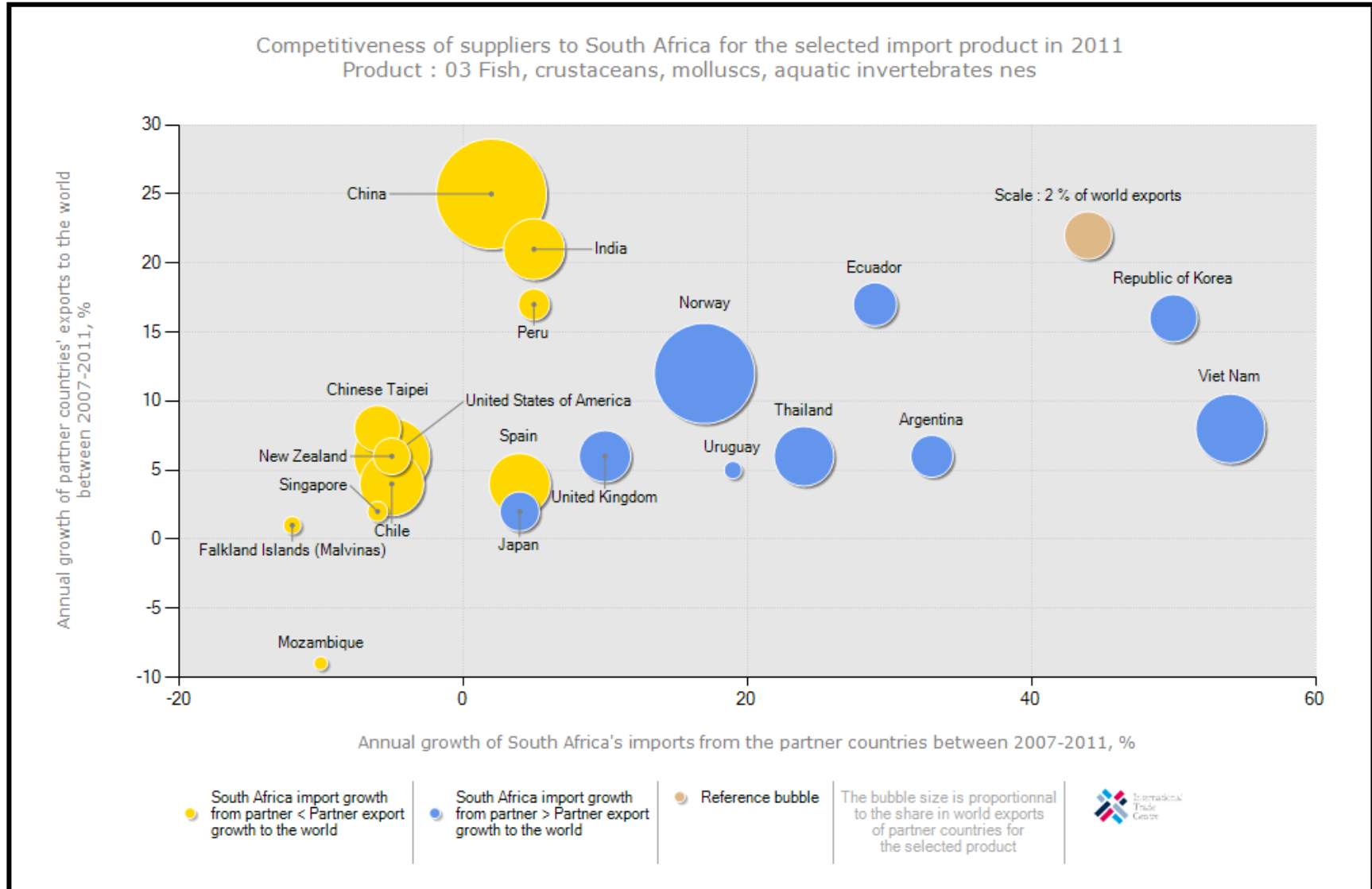
Source: ITC calculations based on COMTRADE statistics.

In 2011, South Africa's imports represented **0.15%** of world imports for fish and aquatic invertebrates and its ranking in world export was **51**. Table 12 shows that during 2011 South African imported fish and aquatic invertebrates was valued at US\$ 146 197 000. The main suppliers were India, Norway, China, New Zealand, and Thailand which commanded a share of 24.8%, 9.6%, 9.2%, 8.4% and 7.2% respectively.

South African imports value growth rate of fish and aquatic invertebrates from 2007 to 2011 increased by 5% per annum. At the same time India's exports of fish and aquatic invertebrates to South Africa also increased by 5%. Norway, China and Thailand increased up to 17%, 2% and 24% respectively. New Zealand experienced a decrease of 5%.

South African imports value of fish and aquatic invertebrates during the period 2010-2011 increased by 40%. India also experienced an increase of 82% further increases were also increased from Norway, China, New Zealand and Thailand by 32%, 51%, 10% and 25% respectively during the same periods.

Figure 28: Competitiveness of suppliers to South Africa for fish and aquatic invertebrates in 2011

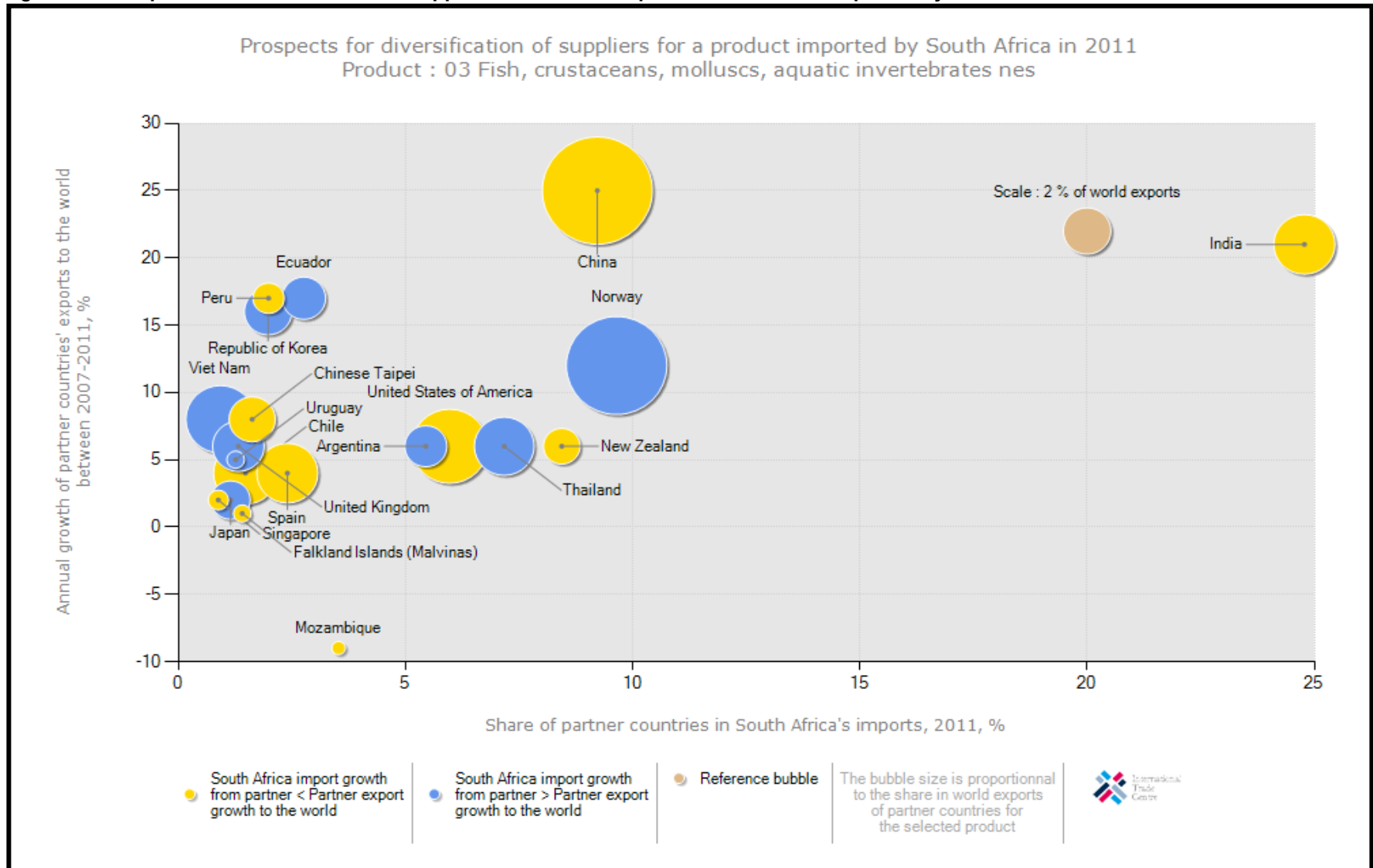


Source: Trademap, ITC

Figure 28 illustrates that between 2007 and 2011 South Africa's fish and aquatic invertebrates' imports from the China, India, Peru, Spain, Chinese Taipei, New Zealand, Singapore, Chile, United States of America, and Mozambique were growing at a rate that is less than their export growth to the world. It was also noticed that during the same period South Africa's fish and aquatic invertebrates' imports from Viet Nam, United Kingdom, Norway, Uruguay, Thailand, Japan, Ecuador, Republic of Korea and Argentina were growing at a rate greater than their export to the world.

China and Norway are the biggest and the most competitive markets of fish and aquatic invertebrates with the world share of 11.5% and 9.5% respectively. Their annual export growth is also attractive at 25% and 12% rate respectively.

Figure 29: Prospects for diversification of suppliers for fish and aquatic invertebrates imported by South Africa in 2011



Source: Trademap, ITC

Figure 29 above shows the prospects for diversification of suppliers for fish and aquatic invertebrates by South Africa in 2011. If South Africa is to diversify its fish and aquatic invertebrates' imports the biggest suppliers exists in China and Norway. Therefore, the mentioned countries are the most attractive markets which South African fish and aquatic invertebrates market can penetrate. Currently China and Norway's shares on South African imports are at 9.22% and 9.65% respectively.

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- p) Northern Aquaculture Workgroup (NAWG) - Regional
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7. ACKNOWLEDGEMENTS

The following organizations are to be acknowledged:

- a. Aquaculture Association of South Africa.
www.aasa-aqua.co.za
- b. Competition Commission
www.comptrib.co.za
- c. FAO
www.fao.org
- d. Statistics and Economic Analysis
www.daff.gov.za
- e. Oceana
www.oceana.co.za
- f. Premier Fishing.
www.PremierFishing.co.za
- g. Quantec.
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- h. Trade and Industrial Policy Strategies (TIPS)
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