A PROFILE OF THE SOUTH AFRICAN AQUACULTURE MARKET VALUE CHAIN

2010

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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 experienced a peak increase in 2008 of 43 421 000 US$ and declined a little in 2009 to 39 500 000 US$. Although there is a minor decrease in 2009, there is still an increase of 24 667 000 US$ compared to 2000. There were some major declines during 2002 and 2007; this was mainly due to the decline of price of aquaculture production.

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, centred in the Hermanus area on the Cape south coast. There is also an experimental offshore farm (cage culture) off Gansbaai for salmon.

1.2. Production trends

Globally, China is the main producer of aquaculture followed at a distant by India, Vietnam, Indonesia and Thailand as depicted in Figure 2. China is the largest producer of aquaculture in the world with over 32 million tons of aquaculture production in 2008 followed at a distant by India taking only over 3 million tons.
Figure 3 below shows the world production excluding China because of its outrageous gap from other countries. It is evident that other major producers are India, Vietnam, Indonesia and Thailand.

Source: FAO.
South African aquaculture by international standards is still a very small sector. It produces in the region of 1% to 2% of the aquaculture output on the African continent, and only about 0.01% of the world aquaculture output. Figure 5 below shows aquaculture production trends from 2000 to 2009.
Production of aquaculture started low in 2000 and increased from 2001 until it reached its peak in 2003 and started decreasing slightly from 2004 to 2009. Even though figure 4 shows a decrease in 2009, the tons produced shows an increase of 89% compared to 2000 and a decrease of 19% compared to 2003 which experienced the highest production. The continuous decrease is mainly due to an increase in the production of aquatic plants.

The following figure shows the production of aquaculture and aquatic invertebrates per province.
Figure 5 above clearly shows that aquaculture production dominated in the Western Cape accounting for 60% with its tonnage making up 2 233 ton, followed by Eastern Cape by 18% (671 ton) and Mpumalanga was the third with 9% (319 ton). Limpopo produced less than a percent of aquaculture production and its tonnage was 0.43 ton in 2008.

1.3. Employment

South African aquaculture industry employed 1 837 full-time and 355 part-time or temporary workers. This figure covers the primary producers only and not aquaculture secondary services.

The largest employer is the abalone sub-sector with over 1 000 full time employees and 141 part-time. The second was Trout production sector with 346 full time and 163 part-time employees.
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.

Figure 6: Market shares in aquaculture industry

Source: Competition Commission.

Figure 6 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 7 below show the price movement of aquaculture products from 2000 to 2009.

![Figure 7: Annual producer prices for aquaculture products](image)

**Source:** FAO.

Figure 7 shows that producer price of aquaculture products was fluctuating during the past decade. Its deep decline was experienced in 2002 (4 000 US$/ton) and its peak was experienced in 2008 (8 000 US$/ton). The prices of aquaculture are mainly controlled by the demand and supply.

### 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 120 million tons of fish and aquatic invertebrates in 2009 yielding an export value of R 2.6 billion. Figure 8 shows the main destination of South African fish and aquatic invertebrates export.
Figure 8: Fish and aquatic invertebrates export destinations in 2009

Source: Quantec Easy Data.

The above figure shows that the main destination of South African fish and aquatic invertebrates in 2009 was Spain commanding 30% of South Africa’s exports. Italy was second with only 17% share of South Africa’s exports, followed by Cameroon with a share of 13%. The three countries constitute 60% of South African fish and aquatic invertebrates export market and the other countries share 40%.

Figure 9 shows the export of fish and aquatic invertebrates from 2000 to 2009.
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 higher than the value. From 2007 to 2008 less quantity was exported with high value, this was due to the weaker Rand compared to US dollars. The highest value of R 3.2 billion was commanded in 2008. There is an increase of R 1.8 billion in 2008 compared to 2000 and an increase of R 1.2 billion in 2009 compared to 2000.

The export quantities of fish and aquatic invertebrates decrease by 7% in 2009 compared to 2000 and 11% compared to 2001 which was the highest.

Figure 10 below show the different fish and aquatic invertebrates products that were exported from 2000 to 2009.
From Figure 10 it is evident that frozen fish was the main product that was exported 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 during the periods 2000 to 2005 and 2008 to 2009. Fresh or chilled fish was the second most exported product during 2006.

Figure 11 to 21 show the export values of fish and aquatic invertebrates from regions.
Figure 11 above shows that fish fillets commanded the highest value of South African exports during the periods 2000 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 2007 Molluscs commanded the highest value of fish and aquatic invertebrates.

Source: Quantec Easy Data.
Western Cape Province has recorded high export values of fish and aquatic invertebrates from 2000 to 2009. 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. 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 and North West Provinces. There were no exports recorded from Free State Province.

Source: Quantec Easy Data.
City of Cape Town metropolitan municipality in the Western Cape Province has dominated the export market with high values of fish and aquatic invertebrates from 2000 to 2009. This is due to the fact that it has many processing firms and it is also the main exit point. Fish and aquatic invertebrates’ exports have also been taking place through the West Coast, Cape Winelands, Overberg and Eden municipalities.

Source: Quantec Easy Data.
Export values of fish and aquatic invertebrates from Western Cape Province excluding City of Cape Town Metropolitan municipality, shows fluctuations among West Coast, Overberg and Eden district municipalities. Overberg district municipality commanded the highest value during the periods 2004 and 2005 to 2007, West Coast district municipality commanded the highest vale in 2000 to 2002 and Eden district municipality recorded the highest value in 2003.

<table>
<thead>
<tr>
<th>Years</th>
<th>Cacadu</th>
<th>Amatole</th>
<th>Chris Hani</th>
<th>Nelson Mandela</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>210,924</td>
<td>0</td>
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<td>141,285</td>
</tr>
<tr>
<td>2001</td>
<td>185,100</td>
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<td>0</td>
<td>165,811</td>
</tr>
<tr>
<td>2002</td>
<td>416,623</td>
<td>3</td>
<td>0</td>
<td>186,264</td>
</tr>
<tr>
<td>2003</td>
<td>123,213</td>
<td>168</td>
<td>0</td>
<td>610,649</td>
</tr>
<tr>
<td>2004</td>
<td>141,211</td>
<td>5,625</td>
<td>1,992</td>
<td>563,634</td>
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<tr>
<td>2005</td>
<td>157,207</td>
<td>9,378</td>
<td>158</td>
<td>480,955</td>
</tr>
<tr>
<td>2006</td>
<td>167,589</td>
<td>33,341</td>
<td>5,449</td>
<td>494,987</td>
</tr>
<tr>
<td>2007</td>
<td>212,926</td>
<td>30,097</td>
<td>4,932</td>
<td>523,398</td>
</tr>
<tr>
<td>2008</td>
<td>266,899</td>
<td>62,870</td>
<td>14,418</td>
<td>619,433</td>
</tr>
<tr>
<td>2009</td>
<td>232,718</td>
<td>60,764</td>
<td>0</td>
<td>430,681</td>
</tr>
</tbody>
</table>

Source: Quantec Easy Data.

Eastern Cape Province’s export values of fish and aquatic invertebrates were mainly from Cacadu district and Nelson Mandela metropolitan municipalities from 2000 to 2009. Cacadu district municipality commanded the highest value from 2000 to 2002 and Nelson Mandela metropolitan municipality took over from 2003 to 2009. From Amatole district municipality exports were recorded from 2002 to 2009 while in the Chris Hani district municipality exports were recorded from 2004 to 2009 but diminished in 2008.
From Northern Cape Province, fish and aquatic invertebrates exports were mainly from Pixley ka Seme district municipality. It started high at a rand value of R 79,301,000 in 2000 and continually decreasing at a fluctuating trend until it reached a value of R 1,465,000 before it diminished in 2009. Frances Baard district municipality recorded exports only in 2008 and 2009.

Source: Quantec Easy Data.
Regular exports of fish and aquatic invertebrates in KwaZulu-Natal Province were mainly from Ugu and eThekwini district municipalities. Ugu district municipality recorded the highest values during the periods 2000 - 2004 and 2006 - 2007, while eThekwini district municipality recorded the highest values during 2005 and 2008 – 2009. There were irregular exports recorded in Umgungundlovu, Uthukela, Uthungulu and iLembe district municipalities.

Source: Quantec Easy Data.
Irregular exports of fish and aquatic invertebrates were recorded from Bojanala and Southern district municipalities of North West Province. Bojanala district municipality recorded its exports value in 2001 and 2006 while Southern district municipality recorded in 2009 only.

Source: Quantec Easy Data.
In Gauteng Province, high export values of fish and aquatic invertebrates were recorded from Ekurhuleni district and city of Johannesburg metropolitan municipalities. The highest export value was recorded in 2007 from City of Johannesburg metropolitan municipality. City of Tshwane also recorded regular although low export values over the past decade.

West Rand district municipality experienced drastic increases of value during 2008 and 2009 and became the second highest commander of fish and aquatic invertebrates export value market. Intermittent export values were also recorded from Metsweding and Sedibeng district municipalities throughout the period under analysis.

![Figure 20: Values of fish and aquatic invertebrates exported by Mpumalanga Province](image)

Mpumalanga Province’s export values of fish and aquatic invertebrates were mainly from Ehlanzeni district municipality from 2000 until 2009 with high a value of R 19 962 000 in 2002 followed by decreases until 2006 and started increasing slightly from 2007 and 2009. Irregular export values were recorded in Nkangala district municipality.

*Source: Quantec Easy Data.*
From Limpopo Province, the export values of fish and aquatic invertebrates were irregular and minimal; Mopani district municipality recorded exports in 2000 only while Waterberg district municipality recorded in 2002 and 2005. This is a clear indication that Limpopo Province is not the main producing area of fish and aquatic invertebrates.

2.2.2. Share Analysis

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

<table>
<thead>
<tr>
<th>Years Provinces</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Cape</td>
<td>83.05</td>
<td>88.55</td>
<td>86.03</td>
<td>85.26</td>
<td>84.21</td>
<td>84.57</td>
<td>81.03</td>
<td>83.16</td>
<td>81.22</td>
<td>82.87</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>11.03</td>
<td>8.08</td>
<td>10.28</td>
<td>13.42</td>
<td>14.13</td>
<td>12.70</td>
<td>14.43</td>
<td>12.00</td>
<td>12.57</td>
<td>11.56</td>
</tr>
<tr>
<td>Northern Cape</td>
<td>2.48</td>
<td>1.11</td>
<td>1.01</td>
<td>0.01</td>
<td>0.43</td>
<td>0.86</td>
<td>0.82</td>
<td>0.03</td>
<td>0.13</td>
<td>0.09</td>
</tr>
<tr>
<td>Kwazulu-Natal</td>
<td>0.38</td>
<td>0.43</td>
<td>0.56</td>
<td>0.18</td>
<td>0.07</td>
<td>0.56</td>
<td>0.70</td>
<td>0.83</td>
<td>3.64</td>
<td>2.42</td>
</tr>
<tr>
<td>North West</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.09</td>
</tr>
<tr>
<td>Gauteng</td>
<td>2.86</td>
<td>1.74</td>
<td>1.85</td>
<td>0.93</td>
<td>1.12</td>
<td>1.30</td>
<td>3.02</td>
<td>3.97</td>
<td>2.43</td>
<td>2.95</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>0.19</td>
<td>0.08</td>
<td>0.27</td>
<td>0.21</td>
<td>0.04</td>
<td>0.01</td>
<td>0.00</td>
<td>0.00</td>
<td>0.02</td>
<td>0.01</td>
</tr>
<tr>
<td>Limpopo</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
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<tr>
<td>Total</td>
<td>100</td>
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<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

*Source: Calculated from Quantec Easy Data.*

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 Northern Cape Provinces. Fractional exports were recorded in Gauteng, Mpumalanga and KwaZulu–Natal Provinces and rarely in
Limpopo, North West Provinces and there were no shares experienced in Free State Province.

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

<table>
<thead>
<tr>
<th>Years Districts</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Cape Town</td>
<td>88.08</td>
<td>87.73</td>
<td>87.62</td>
<td>89.16</td>
<td>84.49</td>
<td>83.58</td>
<td>85.56</td>
<td>88.40</td>
<td>90.52</td>
<td>93.60</td>
</tr>
<tr>
<td>West Coast</td>
<td>6.52</td>
<td>4.57</td>
<td>4.87</td>
<td>2.31</td>
<td>3.04</td>
<td>5.74</td>
<td>3.71</td>
<td>2.93</td>
<td>3.09</td>
<td>3.23</td>
</tr>
<tr>
<td>Cape Winelands</td>
<td>0.24</td>
<td>0.42</td>
<td>0.20</td>
<td>0.20</td>
<td>0.07</td>
<td>0.21</td>
<td>0.14</td>
<td>0.13</td>
<td>0.15</td>
<td>0.20</td>
</tr>
<tr>
<td>Overberg</td>
<td>3.23</td>
<td>3.56</td>
<td>2.92</td>
<td>2.84</td>
<td>7.66</td>
<td>5.37</td>
<td>5.66</td>
<td>6.07</td>
<td>3.72</td>
<td>2.55</td>
</tr>
<tr>
<td>Eden</td>
<td>1.94</td>
<td>3.72</td>
<td>4.40</td>
<td>5.49</td>
<td>4.73</td>
<td>5.11</td>
<td>4.94</td>
<td>2.48</td>
<td>2.52</td>
<td>0.43</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
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<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Calculated from Quanetc Easy 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 2000 and 2009. City of Cape Town metropolitan municipality commanded over 83% of export shares throughout the period under analysis and the other percentage shares 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 (%).

<table>
<thead>
<tr>
<th>Years Districts</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
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<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cacadu</td>
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<td>52.75</td>
<td>69.10</td>
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<td>19.82</td>
<td>24.27</td>
<td>23.89</td>
<td>27.60</td>
<td>28.12</td>
<td>31.51</td>
</tr>
<tr>
<td>Amatole</td>
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<td>0.00</td>
<td>0.02</td>
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<td>1.45</td>
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<td>3.90</td>
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</tr>
<tr>
<td>Chris Hani</td>
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<td>0.00</td>
<td>0.00</td>
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<td>0.02</td>
<td>0.78</td>
<td>0.64</td>
<td>0.00</td>
<td>1.95</td>
</tr>
<tr>
<td>Nelson Mandela</td>
<td>40.11</td>
<td>47.25</td>
<td>30.90</td>
<td>83.19</td>
<td>79.11</td>
<td>74.26</td>
<td>70.57</td>
<td>67.85</td>
<td>65.26</td>
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<td><strong>100</strong></td>
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</tr>
</tbody>
</table>

Source: Calculated from Quanetc Easy Data.

Nelson Mandela metropolitan municipality has commanded the greatest share of fish and aquatic invertebrates exports value in the Eastern Cape Province during the period between 2000 and 2009 followed by Cacadu district 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 (%).

<table>
<thead>
<tr>
<th>Years Districts</th>
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<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
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<tbody>
<tr>
<td>Pixley ka Seme</td>
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<td>100</td>
<td>100</td>
<td>15.22</td>
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<tr>
<td>Frances Baard</td>
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<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

*Source: Calculated from Quantec Easy Data.*

Pixley ka Seme district municipality commanded 100% shares of fish and aquatic invertebrates exports originating from the Northern Cape Province from 2000 to 2007. In 2008 year, Frances Baard municipality resumed exports and commanded 85% in 2008 and 99.99% in 2009 while Pixley ka Seme has only 15% and 0.01% respectively.

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

<table>
<thead>
<tr>
<th>Years District</th>
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<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ugu</td>
<td>58.71</td>
<td>52.42</td>
<td>13.57</td>
<td>44.14</td>
<td>7.45</td>
<td>47.39</td>
<td>51.45</td>
<td>68.78</td>
<td>12.15</td>
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<tr>
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<td>0</td>
<td>43.29</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Uthukela</td>
<td>0.85</td>
<td>0.16</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Uthungulu</td>
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<td>35.57</td>
<td>32.12</td>
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<td>21.20</td>
<td>0.08</td>
<td>0.64</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>iLembe</td>
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<td>0</td>
<td>0.39</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>eThekwini</td>
<td>40.43</td>
<td>11.85</td>
<td>11.03</td>
<td>27.37</td>
<td>71.34</td>
<td>52.52</td>
<td>48.55</td>
<td>30.57</td>
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<td>62.80</td>
</tr>
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<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

*Source: Calculated from Quantec Easy Data.*

In KwaZulu–Natal Province, high export shares of fish and aquatic invertebrates were recorded from eThekwini and Ugu district municipalities. Fractional export shares were recorded from Umgungundlovu, Uthukela, Uthungulu and iLembe district municipalities.

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

<table>
<thead>
<tr>
<th>Years Districts</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bojanala</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>Southern</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>100</td>
<td>0</td>
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<tr>
<td>Total</td>
<td>0</td>
<td>100</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

*Source: Calculated from Quantec Easy Data.*

From North West Province, irregular exports of fish and aquatic invertebrates were recorded from Bojanala and Southern district municipalities.
Table 7: Share of district fish and aquatic invertebrates to the total Gauteng Provincial fish and aquatic invertebrates' exports (%).

<table>
<thead>
<tr>
<th>Years</th>
<th>Districts</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sedibeng</td>
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<td>0.00</td>
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<td>0.00</td>
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<tr>
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<td>1.50</td>
<td>2.97</td>
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<tr>
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<td>West Rand</td>
<td>1.67</td>
<td>4.63</td>
<td>2.31</td>
<td>0.26</td>
<td>0.00</td>
<td>0.02</td>
<td>0.00</td>
<td>0.03</td>
<td>36.52</td>
<td>39.69</td>
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<td></td>
<td>Ekurhuleni</td>
<td>29.87</td>
<td>10.96</td>
<td>20.88</td>
<td>31.81</td>
<td>38.33</td>
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<td>City of Johannesburg</td>
<td>66.42</td>
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<td>73.34</td>
<td>65.18</td>
<td>58.19</td>
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<td>60.64</td>
<td>45.49</td>
<td>43.95</td>
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<td>City of Tshwane</td>
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<td>7.10</td>
<td>2.65</td>
<td>1.26</td>
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<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Calculated from Quantec Easy Data.

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

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

<table>
<thead>
<tr>
<th>Years</th>
<th>Districts</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nkangala</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>18.70</td>
<td>0</td>
<td>5.08</td>
<td>0</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>Ehlanzeni</td>
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<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>81.30</td>
<td>100</td>
<td>94.92</td>
<td>100</td>
<td>99.11</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Calculated from Quantec Easy Data.

During the period 2000 to 2009, Ehlanzeni district municipality commanded the greatest shares of fish and aquatic invertebrates’ exports. Irregular exports were recorded in Nkangala district municipality.

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

<table>
<thead>
<tr>
<th>Years</th>
<th>Districts</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mopani</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Waterberg</td>
<td>0</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>100</td>
<td>100</td>
<td>0</td>
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<tr>
<td></td>
<td>Total</td>
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<td>100</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Calculated from Quantec Easy Data.

Limpopo Province, recorded irregular exports shares of fish and aquatic invertebrates from Mopani and Waterberg district municipalities.
2.2.3. Imports.

Figure 22 below show the imports if fish and aquatic invertebrates from 2000 to 2010.

![Figure 22: Fish and invertebrates imports](chart)

Source: Quantec Easy Data.

Imports (quantity and value) of fish and aquatic invertebrates have been steadily increasing from 2000 to 2007 and decreased during 2008 and 2009. It has been profitable to import fish and aquatic invertebrates from 2000 to 2007 since more quantities were imported with less value in contrast during 2008 and 2009 it was not profitable to import fish and aquatic invertebrates products. On average 34 169 tons of fish and aquatic invertebrates worth R 525 million has been imported during the past decade.

The following figure shows the various fish and aquatic invertebrates’ products imported by South Africa from 2000 to 2009.
Figure 23 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 16 064 tons, molluscs was 8 931 tons and crustaceans was 5 115 tons during the period 2000 to 2009

South African imports of fish and aquatic invertebrates were mainly from New Zealand, Morocco and India. Figure 24 below shows the origin of South African fish and aquatic invertebrates imports.
Most of South African fish and aquatic invertebrates’ imports were from New Zealand, which commanded the greatest shares of 21% of South African fish and aquatic invertebrates’ imports, followed by Morocco with 16% and India with 13%. The mentioned three countries constitute 50% shares of South African imports and the other ten countries share among themselves 50% 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>
<thead>
<tr>
<th>Threats</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ Shortage of expertise and aquaculture professionals.</td>
<td>➢ There is high demand for affordable protein and shortages in traditional fisheries products.</td>
</tr>
<tr>
<td>➢ Lack of technical skills and technical support or extension services.</td>
<td>➢ Aquaculture is moving onto Government agenda.</td>
</tr>
<tr>
<td>➢ High feed, equipment and technology costs.</td>
<td>➢ High potential for agricultural diversification.</td>
</tr>
<tr>
<td>➢ Lack of veterinary services and disease management.</td>
<td>➢ Good natural resources.</td>
</tr>
<tr>
<td>➢ Poor government understanding and support.</td>
<td>➢ Good infrastructure.</td>
</tr>
<tr>
<td>➢ Lack of species choice and good seed stock.</td>
<td>➢ Potential for export opportunities.</td>
</tr>
<tr>
<td>➢ Complex resource–based legislation.</td>
<td>➢ Linkages with tourism.</td>
</tr>
<tr>
<td>➢ Inaccessible financial sector and poor financial support services.</td>
<td>➢ Growing economy and good economic climate.</td>
</tr>
<tr>
<td>➢ Lack of marketing services, marketing structures and market penetration.</td>
<td></td>
</tr>
<tr>
<td>Climatic variability and seasonality.</td>
<td></td>
</tr>
</tbody>
</table>

### 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 access to suitable water quantity and quality for freshwater aquaculture.

### 4. 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.

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 InvestmentCacadu.
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 2009
South Africa’s exports represent 0.56% of world exports for fish and aquatic invertebrates; its ranking in world export is 40.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
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<td>World</td>
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<tr>
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<td>26</td>
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Source: ITC calculations based on COMTRADE statistics.
Table 11 shows that the total exported fish and aquatic invertebrates during 2009 was valued at US$ 387 893 000. 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 21.4% share during the year 2009 followed by Italy with 16.4% share and China with 13% shares.

South African fish and aquatic invertebrates’ exports to the world increased by 2% in value per annum between the periods 2005 and 2009. During the same period, exports value of fish and aquatic invertebrates to Spain decreased by 3% and exports value to Italy increased by 4%.

Exports value of fish and aquatic invertebrates to the world decreased by 20% during the period 2008–2009. During the same periods exports value to Spain and Italy decreased by 40% and 13% respectively.
The chart above shows that between the periods 2005-2009 South Africa’s exports to Germany, Hong Kong (China), Greece, Italy, United Kingdom 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 Japan, USA, Australia, Portugal, France, Switzerland, Netherlands, Mauritius, China and Chinese Taipei were growing at a rate that is less than their imports from the world.

Further analysis indicate that Germany, Fiji, Hong Kong and Greece represent gains in dynamic market, meaning that South Africa’s exports to these countries were growing faster than their imports from the rest of the world. Japan, USA, and Australia’s import growth from the world is greater than South Africa’s export growth to these countries but they represent losses in the declining market.
If South Africa wishes to diversify its fish and aquatic invertebrates exports, the most attractive market exist in Cameroon because its annual growth is high at 60%. Japan and USA are the biggest markets in the world but their annual growths are very low. USA’s imports growth is at 2% while Japan’s growth was decreased by 1%. 
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 2009

South Africa’s imports represent 0.13% of world exports for fish and aquatic invertebrates; its ranking in world export is 50.

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</tbody>
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Source: ITC calculations based on COMTRADE statistics.
Table 12 shows that during 2009 South African imported fish and aquatic invertebrates was valued at US$ 97 849 000. The main suppliers were India, Norway and New Zealand which commanded a share of 24.3%, 7.5% and 7.2% respectively.

South African imports value growth rate of fish and aquatic invertebrates from 2005 to 2009 increased by 4% per annum. At the same time India exports of fish and aquatic invertebrates to South Africa decreased by 1% in value while Norway and New Zealand’s exports of fish and aquatic invertebrates to South Africa increased by 10% and 11% respectively in value.

South African imports value of fish and aquatic invertebrates during the period 2008-2009 decreased by 6% while imports from India increased by 2% during the same period.
Competitiveness of suppliers to South Africa for the selected import product in 2009
Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes

Annual growth of partner countries' exports to the world, %
Annual growth of South Africa's imports from the partner countries between 2005-2009, %

Legend:
- South Africa import growth from partner < Partner export growth to the world
- South Africa import growth from partner > Partner export growth to the world
- Reference bubble
  Some bubbles may not be displayed due to lack of growth rate indicators
- Bubble size is proportional to the share in world exports of partner countries for the selected product
The chart illustrates that between 2005 and 2009 South Africa’s fish and aquatic invertebrates’ imports from the China, Norway, Japan, Spain, Chinese Taipei and Mozambique were growing at a rate that is less than their export growth to the world. Chinese Taipei and Mozambique’s annual export growth to South African decreased by 4% and 8% respectively. It was also noticed that during the same period South Africa’s fish and aquatic invertebrates’ imports from Republic of Korea, Malaysia, Thailand, Peru, 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 9.8% and 9.6% respectively. Republic of Korea is another competitive market due to its annual import growth of 98% but its world share is at 1.7%.
Prospects for diversification of suppliers for a product imported by South Africa in 2009
Product: 03 Fish, crustaceans, molluscs, aquatic invertebrates nes

Scale: 2% of world exports

Annual growth of partner countries' exports to the world between 2005-2009, %

Share of partner countries in South Africa's imports, 2009, %

South Africa import growth from partner < Partner export growth to the world
South Africa import growth from partner > Partner export growth to the world
N.A.
Reference bubble
Some bubbles may not be displayed due to lack of growth rate indicators
Bubble size is proportionnal to the share in world exports of partner countries for the selected product

Viet Nam
Peru
Republic of Korea
Morocco
Chile
Japan
Spain
Malaysia
United States of America
New Zealand
Argentina
Thailand
China
Norway
Norway
Falkland Islands (Malvinas)
Chinese Taipei
Singapore
Mozambique
India
The figure above shows the prospects for diversification of suppliers for fish and aquatic invertebrates by South Africa in 2009. 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 can penetrate. Currently China and Norway’s shares on South African imports are at 6.46% and 7.53% respectively.
6. AQUACULTURE INDUSTRY BODIES

Overarching Aquaculture Sector Association:

a) Aquaculture Association of Southern Africa (AASA)
   Chairperson: Mr Etienne Hinrichsen
   Cell: +27-(0)82 8221236
   Email: aquaeco@telkomsa.net
   E-mail: chairman@aasa-aqua.co.za
   Website: www.aasa-aqua.co.za

b) Sub-sector associations:

c) Abalone Farmers Association of Southern Africa (AFASA)
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   Fax: +27-28-312-2288
   E-mail: barnes@mweb.co.za
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d) Aquaculture Institute of South Africa (AISA)
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   Email: lbotes@ai-sa.org.za
   Tel: 021 556 7339

e) Catfish South Africa
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   Cell: +27-(0)82 569 8906
   E-mail: ingobeckert@gmail.com

f) Mpumalanga Trout Producers Forum.
   T: +27-(0)13 235 1248/4101
   F: +27-(0)13 235 4101
   E-mail: Lunsklip@intekom.co.za

g) Mussel and Oyster Forum
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h) Western Cape Tilapia Growers Association
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   E-mail: gthomas@iafrica.com
   www.aquaculture-africa.com

i) South African Koi Traders Association (SAKTA).
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   Mobile fax: +27-(0)83 281 5862
   E-mail: sakta@orientkoi.com

j) Tilapia Association of South Africa (TILASA)
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o) SAWG Vice-Chairperson: William Gertenbach
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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.commprib.co.za

c. FAO
   www.fao.org

d. National Department of Agriculture
   www.daff.gov.za

e. Nola
   www.nola.co.za

f. Oceana
   www.oceana.co.za

g. Premier Fishing.
   www.PremierFishing.co.za

h. Quantec.
   www.quantec.co.za

i. Trade and Industrial Policy Strategies (TIPS)
   www.tips.org.za

j. Aquaculture Institute of South Africa (AISA)
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   Email: lbotes@ai-sa.org.za
   Tel: 021 556 7339

k. Trade and Investment
   http://www.tradeandinvestcacadu.co.za/agri/aqua

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