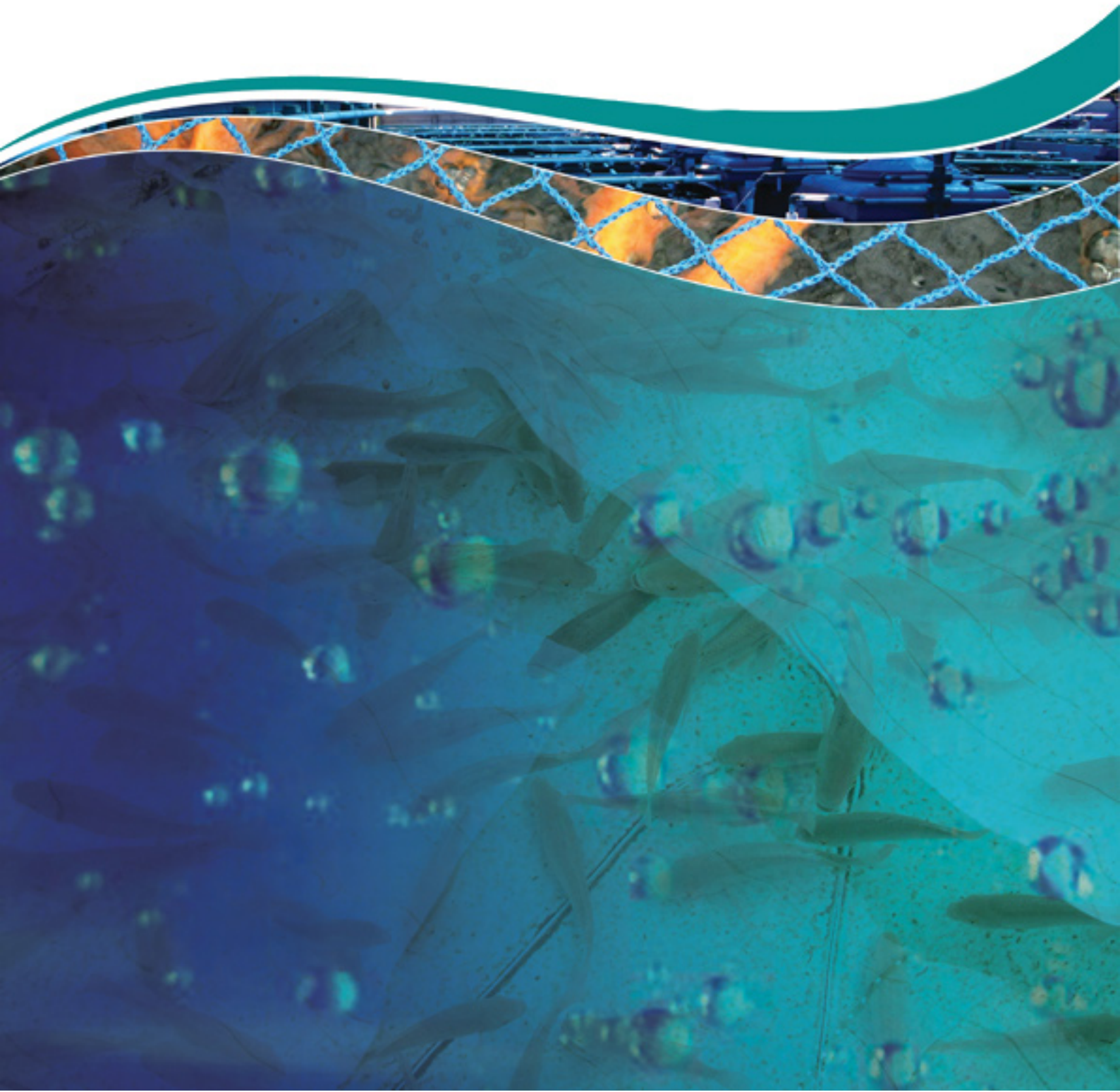




2009 AISA Aquaculture Benchmarking Survey



Prepared for:



Aquaculture Institute of South Africa
PO Box 51743, West Beach, Cape Town
South Africa 7449
Contact: Dr Lizeth Botes
Email: lbotes@ai-sa.org.za
Tel: 021 556 7339



Swisscontact
3rd Floor , Anton Anreith Arcade,
The Business Place, Foreshore,
Cape Town, 8001, South Africa.
Contact: Juancho Hagnauer
Email: jh@swisscontact.co.za
Tel: 012 346 5102

Prepared by:



Enviro-Fish Africa (Pty) Ltd
22 Somerset Street
Grahamstown 6140
South Africa
Email: efa@ru.ac.za
Tel: 046 622 8241

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Acronyms and Abbreviations

AISA	- Aquaculture Institute of South Africa
BEE	- Black Economic Empowerment
DAFF	- Department of Agriculture, Forestry and Fisheries
DEAT	- Former Department of Environmental Affairs and Tourism
DoA	- Former Department of Agriculture
DST	- Department of Science and Technology
DTI	- Department of Trade and Industry
DWAF	- Former Department of Water Affairs and Forestry
DWEA	- Department of Water and Environmental Affairs
E.Cape	- Eastern Cape Province
EIA	- Environmental Impact Assessment
EU	- European Union
FAMDA	- Fishing and Mariculture Development Association
HACCP	- Hazard Alert Critical Control Point
KZN	- KwaZulu-Natal Province
MCM	- Marine and Coastal Management Branch of the Department of Agriculture, Forestry and Fisheries
N.Cape	- Northern Cape Province
NEMBA	- National Environmental Management: Biodiversity Act
OIE	- Office International des Epizooties
QHMP	- Quality and Health Management Programme
SABS	- South African Bureau of Standards
SME	- Small and Medium Enterprises
SMEDP	- Small and Medium Size Enterprise Development Programme
STP	- Skills development and Training Programme
WWF	- Worldwide Fund for Nature

Preface

Due to the previous lack of reliable statistics about the Aquaculture Sector, the Aquaculture Institute of South Africa (AISA) initiated the “aquaculture benchmarking” project in 2006, with the aim of surveying the industry every three years. The ability to provide reliable statistics to all stakeholders in the aquaculture sector is a key objective for AISA. The 2009 Benchmarking Survey was made possible through a partnership and funding from Swisscontact SA. It was decided to broaden the scope of the 2009 Benchmarking Survey to include a marketing survey that would provide information about species markets, consumer perceptions about aquaculture, factors influencing consumer preferences, and product distribution etc.

At AISA we are acutely aware of the need for reliable production statistics, as we receive a constant stream of requests for data (provincially, nationally and internationally). Since one of AISA's primary functions is promotion of aquaculture sector development, reliable statistics are especially important in order to establish the growth of the sector over the past three years, the contribution that the sector has made to economic growth, and most importantly to establish the needs of the sector in order to grow the sector over the next five years. This information is used to inform national and provincial strategies, as well as our own organisational business strategy and planning.

The success of the 2009 survey was overwhelming, and I'd like to thank all participants for the time they have dedicated to assist us in this survey. We hope that the 2009 survey will go far in supporting decision making in the interest of the development of the Aquaculture Sector in South Africa.

Dr. Lizeth Botes (PhD)
Chief Executive Officer (CEO)
Aquaculture Institute of South Africa (AISA)
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The individuals in all branches of aquaculture who generously gave of their time to complete yet another survey of opinion are thanked most sincerely. We trust that this product, and the processes that it will support justify your support. The real value of this survey lies in the near 100% sample that your cooperation made possible. Special thanks are due to Mr Ferdi Endemann of the Western Cape Province Department of Agriculture for surveying the small farmers and to Analytix Business Intelligence who assisted with the Market survey questionnaire design and who executed the consumer survey. The financial support from the Swiss State Secretariat for Economic Affairs through Swisscontact SA that made this survey possible is greatly appreciated.

Executive Summary

The present report is the second national aquaculture benchmarking survey undertaken by the Aquaculture Institute of South Africa (AISA) which included surveys of primary production and markets

A combination of methods was used to survey the primary producers of aquaculture industry for the period 2005-2008. These included a questionnaire, telephone and face-to face interviews, aggregated production data from producer associations and government sources, and various reports and industry association minutes. One hundred and eleven responses were received, of which 79 were active producers, 14 had left aquaculture, and 14 were not currently producing aquaculture products.

The major commercial freshwater species groups were trout, ornamental fish, koi carp and African catfish, while the main marine species groups were mussels, oysters, and abalone. The most significant recent development was the emergence of pilot commercial scale marine fish culture, visibly, dusky kob, silver kob and yellowtail. Total South Africa aquaculture production in 2008 was 3654 tons worth R327 million. Production tonnage grew at an average rate of 7.8% between 2005 and 2008, and total value at an average annual rate of 32% over the same period. A steady growth in abalone production occurred over the survey period to 934 tons. A consistent production of seaweed for abalone feed was reported by four abalone farms. Oyster production rose by 42% over the survey period to 289 tons in 2008. The first sales of locally cultured marine fish were recorded during 2007 and 2008 by pilot commercial farms producing dusky kob. Mussel production was constant around 500t per annum. Trout production fluctuated over the survey period but rose to 943 tons in 2008. Ornamental fish and koi farmers reported steady production with modest growth. African catfish production was reported to be constant around the 180t level for the last few years. The existing marron farmers did not record any production over the survey period. Pilot tilapia production was approximately 10 tons in 2008. In terms of value, South African aquaculture was dominated by abalone production which was R268 million in 2008, representing 81% of the total rand value of the aquaculture sector. Trout production was second at R28 million in 2008, representing 8.5% of the total. Koi and ornamental were worth R11.5 million, followed by oysters (R8.5 million) and mussels (R6 million).

The provincial distribution of aquaculture production was dominated by the Western Cape Province in both the marine and freshwater sectors, which accounted for 61% of the tonnage and 83% value of total South African output in 2008. Second was the Eastern Cape Province, where predominantly marine farms accounted for 18% of total production representing 7% of the value of South African output in 2008. Mpumalanga, with mainly trout production, was third in terms of value (3.4% of total), with its tonnage making up 8.7% of total production. The other provinces made up the balance of production with production tonnages below 200t.

Exports of South African aquaculture production were made up almost entirely of abalone in 2008, representing 24% of total tonnage and 82% of the total value of South African aquaculture production in 2008. Small quantities of koi carp and trout ova were also exported.

Most South African aquaculture enterprises were relatively young businesses, with 50% less than 10 years old, and 31% less than five years old. Only 20% of enterprises were older than 20 years. Most (76%) aquaculture enterprises were small businesses with a turnover of less than R5 million. Of the larger enterprises with turnover above R5 million, the majority (14) were marine and produced abalone. In terms of provincial distribution, most (13) larger commercial enterprises (R5 million turnover) were located in the Western Cape Province, while small scale commercial enterprises (< R5 million turnover) were more evenly distributed amongst the provinces.

A high degree of vertical integration was evident in primary production, with 69% of producers operating hatcheries, and 75% raising fry or early juveniles. Producers tended to be vertically integrated into secondary production activities as well, with almost half involved in packing and distribution, and 31% in processing.

The most important ranked constraints to aquaculture enterprise development were environmental regulatory requirements, site selection, processing, permitting, access to finance, and access to research and development. The most important ranked interventions to promote aquaculture were:

- National policy, strategic plan and implementation plan for the sector
- Facilitation of access to finance
- Promotion of aquaculture education, training and skills development
- Capacity to monitor and guarantee the safety of the aquaculture products
- Monitoring of water quality to ensure export of aquaculture product
- Veterinary Services for Aquaculture
- Identification and zoning of areas for aquaculture development
- Research, technology development and transfer
- Promotion of South African aquaculture
- Promotion of best management practices
- Promotion of trade in aquaculture products

The South African aquaculture industry employed 1837 full-time, and 355 part-time/ temporary workers, in 2008. This figure excludes the secondary services which are part of the sector but not primary fish producers. The abalone sub-sector was the largest employer with just over 1000 full time employees, and 141 part-time. Second was trout production with 346 full time and 163 part-time. Employment in the aquaculture sector grew by approximately 80% between 2005 and 2008, and was highest in the abalone sector where the number of people employed rose by 234%. On a regional basis, the Western Cape Province was the largest employer with 1022 permanent and 286 part-time employees in 2008. Second was the Eastern Cape (384 full time; 12 part-time) and third Gauteng (185 full-time; 8 part-time). The balance was made up by the other provinces with substantially lower numbers. The survey revealed that very few (<10%) aquaculture farms employed seasonal labour. As is the case in most South African primary industries, the professional skills level was mainly white, while the unskilled and semi-skilled categories comprised predominantly of black and coloured employees. A more balanced racial profile was evident in the "skilled" and "middle services" categories.

The "small to medium size enterprise" characteristic of many aquaculture ventures was reflected in the market channels utilised. The most commonly used market channel was wholesalers, with 35 primary aquaculture enterprises utilising this option. However, a relatively high number of enterprises (26) sold directly to consumers, particularly trout and koi producers. Two thirds of respondents sold their product as either live or freshly killed, whereas only one third employed some form of processing or value adding. The largest volume of trout (45%), mussels (55%) and oysters (61%) was sold in the Western Cape Province, while the Gauteng provided the biggest market for ornamentals (28%), koi carp (53%), catfish (99%) and dusky kob (100%) (Table 6.4). The second biggest market for trout was KZN (19.5%), with Gauteng third (11.6%).

Interviews with producers revealed that the odds are stacked heavily against the entry of small businesses into aquaculture. Fourteen respondents indicated that they were no longer in production, and a further 14 were not producing any product at the time of the survey; - mainly because their enterprises were not financially viable, or there was a regulatory hurdle which they could not overcome. There was a net exodus of small producers over the survey period, juxtaposed with a phase of consolidation and expansion of larger producers. Apart from government sponsored small scale farmers, there were few small scale entrants into the aquaculture industry. A great many of the constraints related to the application of environmental legislation and permitting, lack of coordination between government departments, and compliance with health and product quality standards. The back bone of the South African aquaculture industry is clearly the established

medium size enterprises, which have achieved the critical mass to run vertically integrated operations. Medium size producers interviewed were generally optimistic about market prospects for aquaculture products, but were acutely aware of the dynamic nature of markets which are increasingly affected by global forces.

The market survey component of the 2009 Aquaculture Benchmarking survey, was divided into two related surveys:- a consumer survey and a buyer (restaurant, supermarket and wholesale) survey. The surveys aimed to gather data on:

1. The South African seafood market and contribution of aquaculture species.
2. Consumer perceptions and needs in terms of seafood and aquaculture products.
3. Factors influencing consumer preferences, e.g.: geographic location, culture, religion etc.
4. Market trends.

Key findings from the consumer and seafood buyer marketing surveys, which have implications for aquaculture development, were:

Consumers:

- Consumers lack awareness of aquaculture and the associated product characteristics. Eighty-five percent of consumers have not heard of aquaculture, and do not distinguish between wild and farmed aquaculture products. If offered a choice between wild and farmed seafood products, they would choose wild – due to perceived more “natural” product qualities.
- Religion and culture did not strongly influence consumer buying choices, but geographic location and race group did.
- Consumers in the Western Cape displayed the greatest awareness of aquaculture.
- South African consumers are conservative in their seafood choices, sticking to what they know. Black consumers are the most conservative in their seafood product choices, but displayed a strong growth in seafood buying compared to other race groups.
- Better educated, and higher LSM group, consumers were more aware of what aquaculture was and purchased a greater variety of seafood including sushi.
- Consumers would like more information about whether their products were farmed or imported, and indicated a preference for local seafood products.

Seafood buyers:

- Seafood buyers for restaurants, wholesalers, and supermarkets, were familiar with aquaculture products and their positive product characteristics. They expected a greater proportion of the market to be supplied by aquaculture products in the future.
- Buyers do not distinguish between aquaculture and wild products, but buy on the basis of required product characteristics, particularly: quality, freshness, availability, appearance and price. They generally do not inform the customer whether a product is of farmed or wild origin.
- Aquaculture products feature prominently in the mix of products purchased by restaurants and wholesale seafood outlets. Fewer aquaculture products are stocked by supermarkets, which sell mainly frozen, wild seafood products. The highest selling aquaculture products are imported namely, salmon, prawns and mussels.
- The supply of certain wild seafood products was becoming increasingly limited, particularly items such as fresh tuna and linefish.
- Restaurant and seafood wholesale buyers would purchase more aquaculture products, particularly fresh products, if they were available.
- Seafood buyers were aware of seafood sustainability issues, and generally supported awareness and labelling schemes such as the WWF’s Sustainable Seafood Initiative (SASSI), and the Marine Stewardship Council (MSC) certification in their purchase choices. Aquaculture products were perceived as a potentially sustainable supply of seafood.

The surveys confirmed that the seafood market is in a period of transition, with declining supplies of traditional, local wild fish, and increasing market share by imported wild and farmed products. There is an opportunity for locally farmed products to gain a greater market share in the fresh high value product markets. It is unlikely that locally cultured products will be competitive in the frozen, commodity type product niches – with the possible exception of mussels. There is a trend to pre-cooked, ready to eat products in supermarkets which aquaculture producers may be able to exploit.

The survey showed that South African seafood suppliers are buying into the concept of sustainable seafood, and sustainability is becoming important in purchase decisions. Aquaculture products were regarded as potentially sustainable products, although consumers and buyers were aware of some of the negative health and environmental associations with intensively farmed products. Therefore, if the aquaculture industry establishes itself as a credible source of sustainable seafood, this should help to secure market share in the future.

The following recommendations for promoting the growth of the Aquaculture Sector over the next five years were made:

- A comprehensive set of industrial support measures.
- Support for Small Aquaculture Enterprise Development
- Facilitated Compliance with Environmental Legislation
- Veterinary Services
- Recognise and Support Ornamental Fish Aquaculture
- Support Aquaculture Research
- Water Zoning, Infrastructure and Services
- Access to Finance
- Promotion of aquaculture education, training and skills development
- Promotion of South African Aquaculture Products
- Promote Aquaculture Sustainability Schemes
- A National Aquaculture Strategy and Coordinated Government Support

1. Introduction

This report presents a survey of primary aquaculture production and markets in South Africa, which was undertaken as part of the Aquaculture Institute of South Africa's (AISA) 2009 Aquaculture Benchmarking Survey.

The first benchmarking survey, conducted in 2006, provided valuable primary data and opinions directly from producers, which has assisted government planning in support of aquaculture sector development¹. In the light of the significant developments in South African aquaculture since 2006, particularly the increasing government support for sector development, the benchmarking survey was repeated in 2009.

Reliable primary information and statistics on industry trends are vital to investment decisions and planning, by both industry and government. A further factor motivating the 2009 Benchmarking Survey is maintaining continuity of production statistics as the collection and publication of aquaculture production data has been erratic in South Africa¹²³. Although various government departments compile data on components of the sector, the "AISA Aquaculture Benchmarking Survey" represents the only comprehensive attempt to document the status of both marine and freshwater aquaculture on a regular basis. In addition to gathering production data, the survey provided a valuable opportunity to interview producers and gain a comprehensive snapshot of the "state of play" of South African aquaculture.

The local aquaculture literature reflects an almost complete absence of any primary research on the South African market for aquaculture products, as research has historically focussed on production technology. Local seafood market information is almost entirely locked up in private enterprises, and is effectively a "black box" for new producers and aquaculture sector planners. Reliable primary information and statistics on industry trends are vital to investment decisions and planning, by both industry and government. It was therefore decided to conduct a pilot survey on the local market and consumer perceptions about aquaculture products.

The AISA 2009 aquaculture benchmarking survey consisted of two components:

1. The primary production survey which aimed to:
 - a. Establish the growth of production the sector since 2006
 - b. Provide insight into the value chain and the sector's contribution to economic development
 - c. Establish the needs of the sector in order to grow over the next five years.
2. The marketing survey which aimed to determine:
 - a. The markets for aquaculture species.
 - b. Consumer perceptions and needs in terms of aquaculture products.
 - c. Factors influencing consumer preferences, e.g.:. geographic location, culture, religion etc.
 - d. How these factors influence the market and product distribution.

In this report the results of the AISA 2009 Aquaculture Benchmarking Survey are presented and discussed. Recommendations for promoting growth of the sector over the next five years are based on a synthesis of both the production and marketing surveys are presented.

1 Botes, Thompson and Louw, 2006. Benchmarking survey of the South African (marine and freshwater) aquaculture sector. Aquaculture Institute of South Africa report. 94p.

2 Hoffman, L.C., J.J. Swart and D. Brink. 2000 "The 1998 production and status of aquaculture in South Africa." *Water SA* 26(1).

3 Sauer, W, Hecht, T., Britz, P.J., and Mather, D. (eds). "An Economic and Sectoral Study of the South African Fishing Industry. Volume 2. Fishery Profiles." Report prepared by Rhodes University for Marine and Coastal Management, Department of Environment Affairs and Tourism, 2003, Chapter 15 Mariculture, pp. 293 308..

2. Methodology

2.1 Production Survey

2.1.1 Production survey methodology

A combination of methods was used to survey the primary producers of aquaculture industry. These included a questionnaire (Appendix 1), telephone and face-to face interviews, aggregated production data from producer associations and government sources, and various reports and industry association minutes. The data and producer opinions were gathered during the months of May and June 2009. The questionnaire was emailed or faxed to the respondents, and telephonic and email follow-ups were conducted to elicit responses and perform selected interviews. In the Western Cape Province, Mr Ferdi Endemann, an Aquaculture Extension Specialist with the Department of Agriculture assisted by surveying the 23 active small scale trout farmers associated with the "Hands-On Cooperative".

2.1.2 Database of Contacts

The confidential database of producer contacts from the 2006 benchmarking was updated during the survey. Contact information for current producers was obtained from producer associations, government sources, the 2006 AISA survey database, and personal contacts. Those no longer in production, or not involved in primary production, were removed from the active producer lists.

2.1.3 Data Capture and Analysis

The data from the surveys was captured into an Excel spreadsheet from which aggregate data was extracted for analysis and presentation in the report.

2.1.4 Survey Returns

The high number of survey returns yielded a total estimate of total production, value and employment in the primary aquaculture sector (Table 2.1). Eighty three active producers were identified of which only four declined to participate in the survey. Fourteen respondents indicated they had closed their operations, and another 14 were not currently producing any aquaculture products. We could not verify a further 37 contacts in the 2006 AISA and other databases, but were confident that few, if any, were active producers, as we asked key industry informants and producer association representatives to verify our list of active aquaculture operations.

Table 2.1 Number and category of returns for the AISA 2009 Survey.

Survey Participants	n	percent
Surveys returned	79	53.3
Closed operations	14	9.4
Not active producers	14	9.4
Declined to participate	4	2.7
Could not verify contact	37	25.0
Total respondents	111	75.0
Survey forms sent	148	100.0

2.2. Market Survey

2.2.1 Survey Methodology

The market research was divided into two related surveys: - a consumer survey and a buyer (restaurant, supermarket and wholesale) survey.

The aims of the consumer study were to gain insights into:

- The market for specific seafood types.
- The consumer needs with regard to how sales of aquaculture products compare to other produce.
- Consumer preferences for certain products.
- Awareness, understanding and perceptions of aquaculture products.
- Purchasing behaviour and trends of seafood forms and value-added products.

The aims of the buyer study were to gain insights into:

- The quantity of wild vs. aquaculture seafood purchased;
- The quantity of local vs. imported seafood purchased;
- The buyers' knowledge of aquaculture related issues; and international and local seafood trends

2.2.2 Survey Questionnaires

The survey content and questionnaire were developed by Analytix Business Intelligence and AISA with input from the production survey team. The questionnaires are contained in appendices as follows:

- Consumer questionnaire – Appendix 2
- Restaurant buyer questionnaire – Appendix 3
- Wholesale buyer questionnaire – Appendix 4
- Supermarket buyer questionnaire – Appendix 5

2.2.3 Sample Size and Geographical Distribution

The sample of the consumer study consisted of 300 respondents who were randomly selected and interviewed. Face to face interviews were conducted at supermarkets and in residential areas, each survey taking an average of 15-20 minutes to complete. The total sample margin of error was 5.6% with a 95% level of confidence

In order to ensure that respondents were representative of the national urban South African population, the sample was drawn from Gauteng (GP, $n=100$), the Western Cape (WC, Cape Town $n=100$), the Eastern Cape (EC, Port Elizabeth $n=50$) and Kwazulu-Natal (KZN, Durban $n=50$). The focus was placed on these metropolitan areas as they contribute more than 70% to national food expenditure (Stats SA Income and Expenditure survey 2005/2006).

The racial mix of respondents was white $n=100$; coloured $n=75$; Indian $n=75$; and black $n=50$. A quota sample was used to ensure that we gained feedback that accurately reflects the perceptions, opinions and behaviour from a diverse geo-demographic population of end-consumers (within the given budget parameters) within major metropolitan areas and to ensure that we received credible and reliable feedback from the multitude of cultures and racial groups and consisted of a White; Coloured; Indian; and Black respondents.

The majority respondents (70%) were female while thirty percent were male. It was assumed that more females than males were responsible for the monthly household grocery shopping. A 70% female quota was used to reflect secondary research from AMPS 2008, where the majority of supermarket grocery shopping was found to be done by females. The sample was drawn from consumers categorised within the Living Standards Measure⁴ (LSM) 8 (16%), 9 (41%) and 10 (44%), so that a robust sample of people were surveyed who were hypothesised to consume more seafood/fish than people within lower income sectors.

The buyer sample consisted of five restaurant (of which three responded), four supermarket (of which two responded), and four wholesale (of which three responded) buyers. Buyers were contacted telephonically and asked to complete the questionnaires which were returned via email and fax.

4 The South African Advertising Research Foundation's LSM (Living Standards Measure) has become the most widely used marketing research tool in Southern Africa. It divides the population into 10 LSM groups, 10 (highest) to 1 (lowest). The LSM cuts across race and other outmoded techniques of categorising people, and instead groups people according to their living standards using criteria such as degree of urbanisation and ownership of cars and major appliances.

3. Aquaculture Production in South Africa

3.1 Species Cultured in South Africa

The lists of marine and freshwater species cultured in South Africa during the period 2005-2008 are presented in Tables 3.1 and 3.2 respectively. Approximately five commercial species groups were cultured in the marine and freshwater environments respectively. However, a greater number of marine species were at a pilot commercial and research stage of development, indicating that more investment and economic growth was occurring in the marine sector.

The major commercial freshwater species groups were trout, ornamental fish, koi carp and African catfish, while the main marine species groups were mussels, oysters, and abalone.

Table 3.1 Freshwater Species Cultured in South Africa during the Period 2005-2008.

Common Name	Scientific Name	Status	Origin
Rainbow Trout	<i>Onchorynchus mykiss</i>	Commercial	Exotic
Brown trout	<i>Salmo trutta</i>	Commercial	Exotic
Ornamental fish	Mixed Species	Commercial	Exotic
Koi Carp	<i>Cyprinus carpio</i>	Commercial	Exotic
African Catfish	<i>Clarias gariepinus</i>	Commercial	Indigenous
Mozambique Tilapia	<i>Oreochromis mossambicus</i>	Pilot commercial	Indigenous
Nile tilapia	<i>Oreochromis niloticus</i>	Pilot commercial	Exotic
Marron	<i>Cherax tenuimanus</i>	Pilot commercial	Exotic
Waterblommetjies	<i>Aponogeton distachyos</i>	Commercial	Indigenous

Table 3.2 Marine Species Cultured in South Africa during the Period 2005-2008.

Common Name	Scientific Name	Status	Origin
Abalone	<i>Haliotis midae</i>	Commercial	Indigenous
Spanish Mussel	<i>Mytilus galloprovincialis</i>	Commercial	Exotic
Brown Mussel	<i>Perna perna</i>	Commercial	Indigenous
Oysters	<i>Crassostrea gigas</i>	Commercial	Exotic
Dusky Kob	<i>Aryrosomus japonicus</i>	Pilot commercial	Indigenous
Silver Kob	<i>Aryrosomus inodorus</i>	Pilot commercial	Indigenous
Yellowtail	<i>Seriola lalandii</i>	Pilot commercial	Indigenous
Atlantic Salmon	<i>Salmo salar</i>	Pilot commercial	Exotic
Clownfish	<i>Various species</i>	Pilot commercial	Exotic
White Margined Sole	<i>Dagichthyes marginatus</i>	Research	Indigenous
Pacific White Prawn	<i>Litopenaeus vannamei</i>	Pilot commercial	Exotic
White Prawn	<i>Penaeus indicus</i>	Commercial	Indigenous
West Coast Rock Lobster	<i>Jasus lalandii</i>	Research	Indigenous
East Coast Rock Lobster	<i>Panulirus homarus homarus</i>	Research	Indigenous
Scallop	<i>Pecten sulcicostatus</i>	Research	Indigenous
Blood Worm	<i>Arenicola loveni</i>	Research	Indigenous
Seaweed	<i>Ulva lactuca</i>	Commercial	Indigenous
Seaweed	<i>Gracillaria</i>	Commercial	Indigenous

The most significant development since the 2006 benchmarking survey was the emergence of pilot commercial scale marine fish culture, visibly, dusky kob, silver kob and yellowtail.

In the freshwater sub-sector, 7 of the 10 species cultured were exotic, while in the marine sub-sector, 13 were indigenous and 5 exotic, reflecting a research and development focus on developing local marine species for commercial aquaculture.

Commercial production of species that had terminated by the end of the survey period included Nile tilapia, Atlantic salmon, and white prawn.

3.2. Number of Active Producers

Eighty four active commercial aquaculture production entities were identified in South Africa, with 48 in the freshwater and 36 in marine sub-sectors respectively (Table 3.3). The Western Cape Province had the highest number of commercial aquaculture operations (33). The actual number of production units in the Western Cape was higher than the number of aquaculture enterprises indicated in Table 3.3, as the "Hands-On" trout farming cooperative and the Masiza Mussel Farming cooperative at Saldanha Bay (which were recorded as single commercial enterprises in Table 3.3), comprised of 23 and 4 active small farmer production units respectively in 2008. The Eastern Cape Province had second highest number of producers (19) and the Mpumalanga was third with 10. All other provinces had less than 10 active producers and none were identified in the Free State.

Table 3.3 Active aquaculture enterprises by province in 2008.

Region	Freshwater	Marine	N	%
Eastern Cape	8	11	19	22.6
KwaZulu Natal	7	1	8	9.5
Mpumalanga	10	0	10	11.9
Limpopo	1	0	1	1.2
North West	1	0	1	1.2
Northern Cape	0	5	5	6.0
Gauteng	6	1	7	8.3
Western Cape	15	18	33	39.3
Total	48	36	84	100.00

The provincial distribution of marine aquaculture enterprises is presented in Table 3.4. Eighteen abalone enterprises were surveyed, with the majority located in the Western Cape (13), and the rest in the Eastern Cape (2) and Northern Cape (3). Nine oyster farming operations were active in Northern, Western and Eastern Cape. Only one mussel farming enterprise was active in Saldanha Bay, which comprised of a partnership between Blue Bay Mussel farm and four small scale production units of the Masiza Mussel farming cooperative. Seven marine fish farming companies were active in the Western Cape, Eastern Cape and KZN;- all developing commercial operations for dusky kob (*A. japonicus*), and some also silver kob (*A. inodorus*) and yellowtail (*S. lalandii*). A pilot marine ornamental fish farm had suspended production in 2009, and a sea cage salmon farm identified in the 2006 benchmarking survey had ceased operations. One pilot scale prawn farm was active in the Eastern Cape Province, farming the introduced Pacific white prawn. A prawn farm at Mtunzini in KZN culturing the indigenous white prawn (*Penaeus indicus*) had ceased operations since the 2006 benchmarking survey but a new pilot prawn farm had opened in the Eastern Cape.

The provincial distribution of freshwater aquaculture enterprises is presented in Table 3.5. Half (24) were trout producers with the highest number (11) located in the Western Cape Province, followed by Mpumalanga (7) and KZN (4). Ornamental (11) and koi (8) farms constituted the only other substantial freshwater category, and were evenly distributed between the provinces.

One pilot tilapia (E. Cape) and two very small marron farms (one W.Cape and one E.Cape) were surveyed. While it is known that waterblommetjies (*Aponogeton distachyos*) are grown in water, the producers do not participate in aquaculture institutional structures, and none were identified during the survey. Two catfish (*C. gariepinus*) producers were identified, one in the North-West Province and one in the Western Cape.

Table 3.4 Marine aquaculture enterprises by species and province in 2008.

Common Name	Scientific Name	Province	Number of farms
Abalone	<i>Haliotis midae</i>	Eastern Cape	2
Abalone	<i>Haliotis midae</i>	Western Cape	13
Abalone	<i>Haliotis midae</i>	Northern Cape	3
Mussels	<i>Mytilus galloprovincialis</i>	Western Cape	1 ¹
Oysters	<i>Crassostrea gigas</i>	Eastern Cape	4
Oysters	<i>Crassostrea gigas</i>	Northern Cape	2
Oysters	<i>Crassostrea gigas</i>	Western Cape	3
Marine Fish	<i>Aryrosomus japonicus</i> , <i>Argyrosomus inodorus</i> <i>Seriola lalandii</i>	Eastern Cape	4
Marine Fish	<i>Aryrosomus japonicus</i>	Kwazulu Natal	1
Marine Fish	<i>Aryrosomus japonicus</i>	Gauteng	1
Marine Fish	<i>Aryrosomus japonicus</i> <i>Argyrosomus inodorus</i> <i>Seriola lalandii</i>	Western Cape	1
Seaweed	<i>Ulva lactuca</i> and <i>Gracillaria</i>	Eastern Cape	3
Seaweed	<i>Ulva lactuca</i>	Western Cape	2
Prawns	<i>Litopenaeus vannamei</i>	Eastern Cape	1
Total			35²

Table 3.5 Freshwater aquaculture enterprises by species and province in 2008.

Common Name	Scientific Name	Province	Number of farms
Trout	<i>Onchorynchus mykiss</i>	Eastern Cape	1
Trout	<i>Onchorynchus mykiss</i>	KwaZulu Natal	4
Trout	<i>Onchorynchus mykiss</i>	Mpumalanga	7
Trout	<i>Onchorynchus mykiss</i>	Western Cape	11 ³
Trout	<i>Onchorynchus mykiss</i>	Gauteng	1
Ornamental fish	Mixed Species	Eastern Cape	2
Ornamental fish	Mixed Species	KwaZulu Natal	3
Ornamental fish	Mixed Species	Limpopo	1
Ornamental fish	Mixed Species	Mpumalanga	1
Ornamental fish	Mixed Species	Gauteng	3
Ornamental fish	Mixed Species	Western Cape	1
Koi Carp	<i>Cyprinus carpio</i>	Eastern Cape	2
Koi Carp	<i>Cyprinus carpio</i>	Gauteng	2
Koi Carp	<i>Cyprinus carpio</i>	Mpumalanga	2
Koi Carp	<i>Cyprinus carpio</i>	Western Cape	2
African Catfish	<i>Clarias gariepinus</i>	Eastern Cape	1
African Catfish	<i>Clarias gariepinus</i>	North West	1
Mozambique Tilapia	<i>Oreochromis mossambicus</i>	Eastern Cape	1
Marron	<i>Cherax tenuimanus</i>	Eastern Cape	1
Marron	<i>Cherax tenuimanus</i>	Western Cape	1
Total			48

3.3 Total Aquaculture Production and Value

The total surveyed production tonnage and value of the South Africa marine and freshwater aquaculture sub-sectors are presented in Tables 3.6 and 3.7 respectively. These data are presented graphically in Figures 3.1 and 3.2 to illustrate the growth trends. Total in 2008 was 3664 tons, representing a product farm gate value of R327 million. Production tonnage grew at an average rate of 7.8% between 2005 and 2008, and total value at an average annual rate of 32% over the same period. The differential growth in tonnage and value is explained by the rise in the total abalone tonnage which is far more valuable than other aquaculture products. The total production tonnage in the freshwater sector was fairly flat (around 1000t) for the period 2005-2008, whereas modest growth in the marine sector was evident.

Table 3.6 Total South African aquaculture production tonnage for the period 2005-2008

Production (tons)				
Subsector	2005	2006	2007	2008
Marine	1,893	2,253	2,484	2,446
Freshwater	1,022	1,068	925	1,218
Total Tonnage	2,915	3,321	3,409	3,664

Table 3.7 Total value of South African aquaculture production for the period 2005-2008

Value (ZAR millions)				
	2005	2006	2007	2008
Marine	110,7	162,7	225,2	284,0
Freshwater	32,7	33,4	33,0	43,4
Total Value	143.5	196.1	258.3	327.4

If the production tonnage by species group is considered (Table 3.8), a steady growth in abalone production occurred over the survey period with existing farms building up to full production. Abalone production levelled off somewhat in 2008. A consistent production of seaweed for abalone feed was reported by four abalone farms. Oyster production rose by 42% over the survey period, but was fairly stable during 2007/8. The first sales of locally cultured marine fish were recorded during 2007 and 2008 by pilot commercial farms producing dusky kob. Mussel production was constant around 500t per annum. Trout production fluctuated over the survey period with a poor production year being recorded in 2007 due to environmental conditions. Ornamental fish and koi farmers reported steady production with modest growth. African catfish production was reported to be constant around the 180t level for the last few years. The existing marron farmers did not record any production over the survey period.

In terms of value, South African aquaculture is dominated by abalone production which was R268 million in 2008, representing 81% of the total rand value of the aquaculture sector (Table 3.9). Trout production was second at R28 million in 2008, representing 8.5% of the total. Koi and ornamental were worth R11.5 million, followed by oysters (R8.5 million) and mussels (R6 million).

Figure 3.1 South African marine and freshwater aquaculture production 2005-2008.

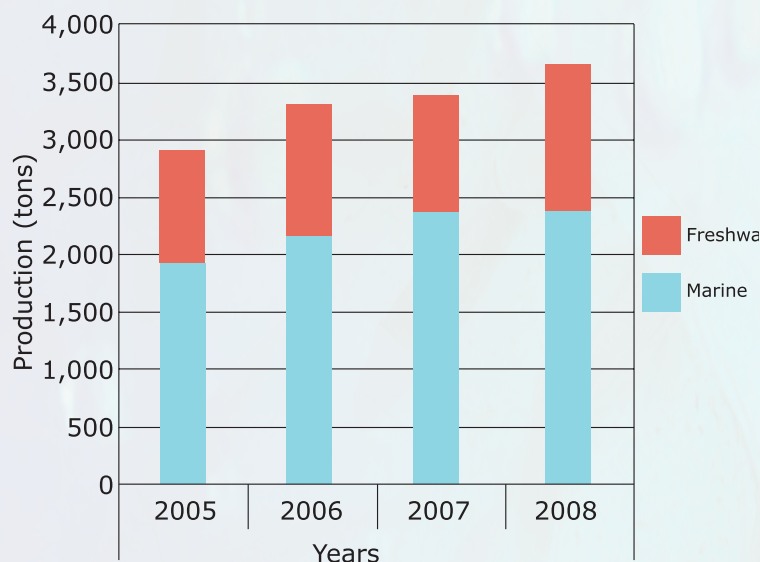


Figure 3.2 South African marine and freshwater aquaculture production value 2005-2008.

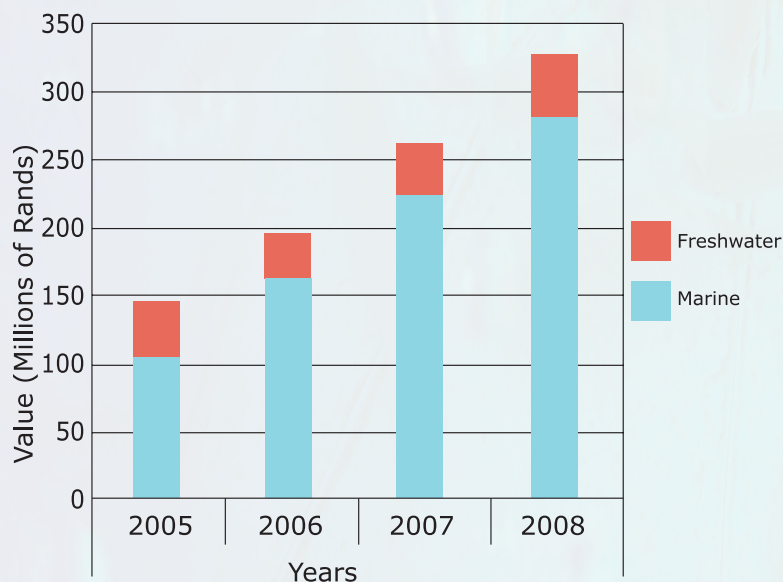


Table 3.8 Total South African aquaculture production 2005-2008 by species group. Production for the species groups is reported in tons, with the exception of Koi and ornamental fish which are reported as numbers.

Species Tonnage

Species	2005	2006	2007	2008
Abalone	662.0	756.0	915.0	934.0
African Catfish	180.0	180.0	180.0	180.0
Dusky Kob	0.0	0.0	35.0	10.0
Marron	2.0	1.0	0.0	0.0
Mussels	400.0	500.0	500.0	600.0
Oysters	166.0	251.0	280.0	289.0
Prawns	0.0	0.0	0.0	4.0
Seaweed	665.0	747.0	753.0	608.0
Tilapia	0.0	0.0	0.0	10.0
Trout	763.0	807.0	658.0	943.0
Yellowtail	0.0	0.0	0.0	0.0
Koi Carp (000's)	472.7	493.0	518.8	514.2
Ornamentals (000's)	545.8	546.6	609.0	601.0
Total*	2,915.0	3,321.0	3,409.0	3,664.0
*assuming 50g/koi and 10g/ornamental				

Table 3.9 Value of South African aquaculture production (2005-2008) by species group.

Value (ZAR millions)

Species Group	2005	2006	2007	2008
Abalone	100.0	148.2	210.8	268.2
African Catfish	3.6	3.6	3.6	3.6
Dusky Kob	0.00	0.0	1.75	0.5
Koi Carp	1.5	2.1	1.9	1.8
Marron	0.2	0.1	0.0	0.0
Mussels	4.2	4.6	5.0	6.0
Ornamental Species	7.9	8.4	9.2	9.7
Oysters	6.0	9.2	6.9	8.4
Prawns	0.0	0.0	0.0	0.1
Seaweed	0.5	0.6	0.7	0.6
Tilapia	0.0	0.0	0.0	0.3
Trout	19.3	19.0	18.2	27.9
Yellowtail	0.0	0.0	0.0	0.0
Total	143.4	196.1	258.2	327.4

The provincial distribution of aquaculture production was dominated by the Western Cape Province in both the marine and freshwater sectors, which accounted for 61% of the tonnage and 83% value of total South African output in 2008 (Tables 3.10 and 3.11, Figs. 3.3 and 3.4). Second was the Eastern Cape Province, where predominantly marine farms accounted for 18% of total production representing 7% of the value of South African output in 2008. Mpumalanga, with mainly trout production, was third in terms of value (3.4% of total), with its tonnage making up 8.7% of total production. The other provinces made up the balance of production with production tonnages below 200t.

Table 3.10 Provincial profile of South African aquaculture production volume in 2008.

Production (tons)								
Sub-sector	Eastern Cape	KwaZulu Natal	Gauteng	Limpopo	Mpumalanga	North West	Northern Cape	Western Cape
Marine	668.4	2.5	2.5	0.0	0.0	0.0	56.7	1,715.5
Freshwater	2.9	142.1	56.5	0.4	318.7	180.0	0.0	517.8
Total (tons)*	671.4	144.6	59.0	0.43	318.7	180.0	56.7	2,233.2

*assuming 50g/koi and 10g/ornamental

Table 3.11 Provincial profile of the value of South African aquaculture production in 2008.

Value (ZAR million)								
Sub-sector	Eastern Cape	KwaZulu Natal	Gauteng	Limpopo	Mpumalanga	North West	Northern Cape	Western Cape
Marine Species	24.5	0.1	0.2	0.0	0.0	0.0	4.4	256.8
Freshwater Species	1.7	5.6	6.4	0.2	11.2	4.6	0.0	16.7
Total	24.2	5.7	7.6	0.2	11.2	4.6	4.4	272.5

Figure 3.3 South African provincial aquaculture production (tons) in 2008.

Total Provincial Production

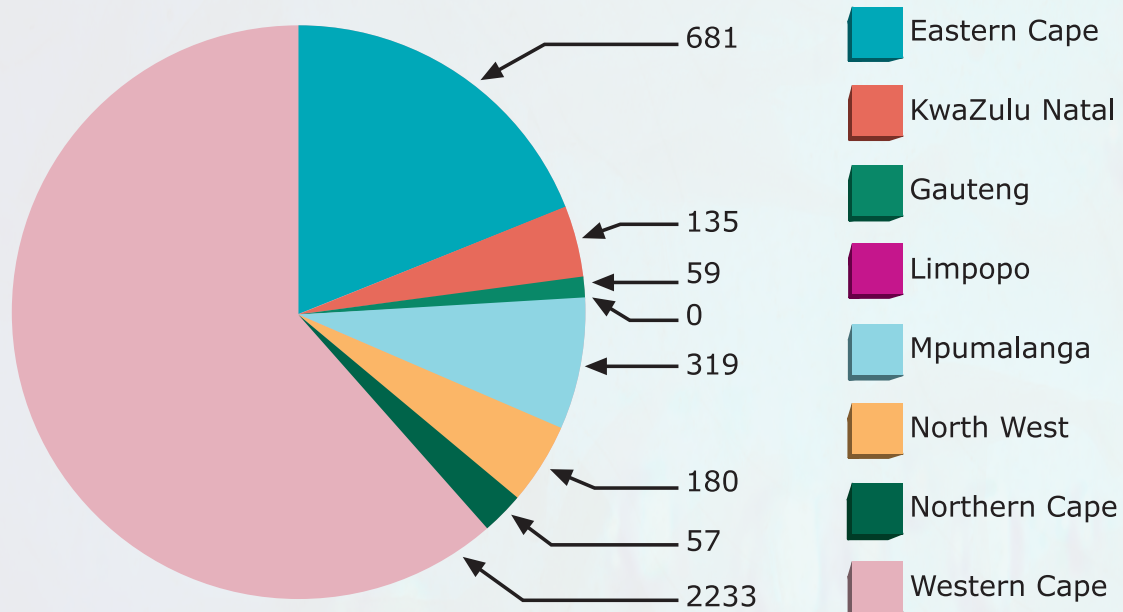
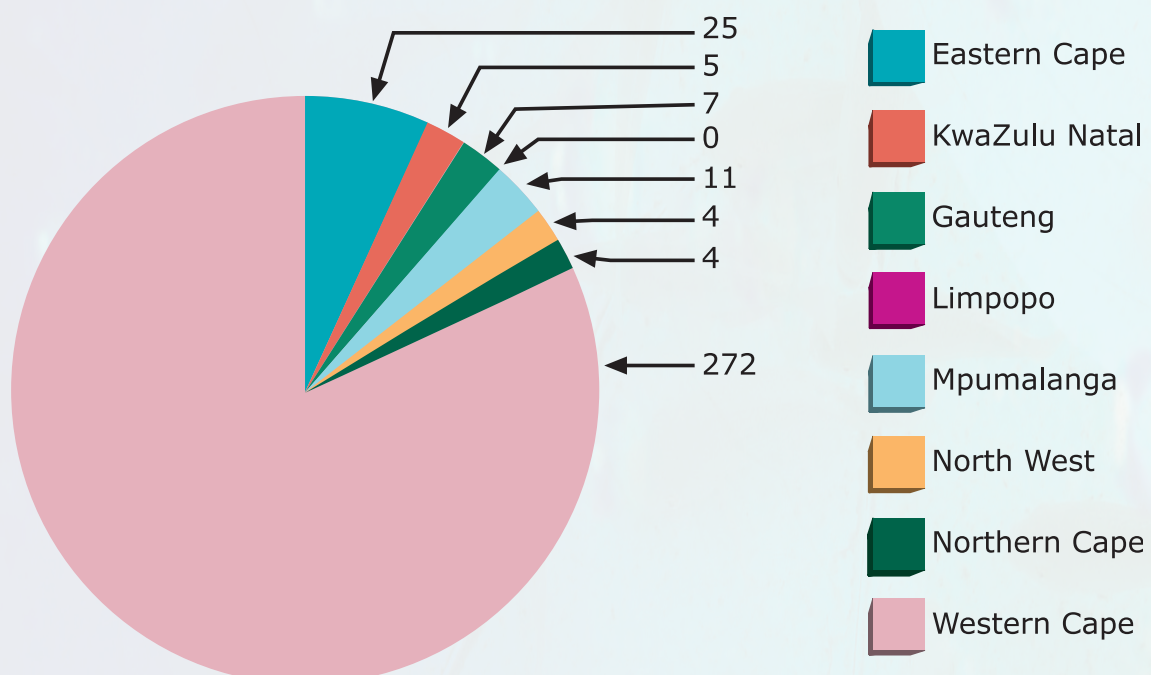


Figure 3.4 Value of South African provincial aquaculture production in 2008 (Rand millions).

Total Provincial Value



3.4 Production and Value to Export and Local Market

Exports of South African aquaculture production were made up almost entirely of abalone in 2008, representing 24% of total tonnage and 82% of the total value of South African aquaculture production (Table 3.12). The provincial profile of marine and freshwater exports is presented in Table 3.13 and Figs. 3.5 and 3.6. A small amount freshwater production, in the form of koi carp, was exported from Gauteng, Mpumalanga and the Western Cape. One trout producer reported occasional exports of ova, but these were not reported separately in the production statistics.

Domestic sales of aquaculture products comprised 2,711 tons worth R58.7 million in 2008 (Table 3.12). On a provincial basis, the Western Cape Province was leading producer with 1395 tons worth R271 million, followed by the Eastern Cape with 593 tons of product worth R24 million (Table 3.14). Mpumalanga and KwaZulu-Natal were third and fourth respectively in terms of tonnage and value, with production mainly made up of trout sales.

Table 3.12 Proportion of 2008 South African aquaculture tonnage and value exported and sold locally.

	Production	Value (ZAR Million)
Domestic	2,711	58.7
Export	940	268.4
Total	3,651	327.1

Table 3.13 Provincial profile of marine and freshwater aquaculture exports 2008.

Sub-sector	Eastern Cape		Gauteng		Mpumalanga		Western Cape		Northern Cape	
	Tons	Rand	Tons	Rand	Tons	Rand	Tons	Rand	Tons	Rand
Marine	88.0	21.6	0.0	0.0	0.0	0.0	837.5	243.8	8.7	2.8
Fresh-water	0.0	0.0	4.6	0.0	0.6	0.0	0.6	0.1	0.0	0.0
Total	88.0	21.6	4.6	0.0	0.6	0.0	838.1	243.9	8.7	2.8

Table 3.14 Provincial profile of marine and freshwater aquaculture sold in the domestic market in 2008.

Sub-sector	Eastern Cape		KwaZulu Natal		Gauteng		Limpopo		Mpumalanga		North West		Northern Cape		Western Cape	
	Tons	Rand	Tons	Rand	Tons	Rand	Tons	Rand	Tons	Rand	Tons	Rand	Tons	Rand	Tons	Rand
Marine	580.5	23.5	2.5	0.1	2.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0	48.0	1.6	878	256
Fresh-water	13.0	1.0	132.1	5.3	52.0	6.4	0.4	0.2	318.1	11.2	180.0	3.6	0.0	0.0	517	16
Total	593.4	23.5	134.6	5.4	54.5	6.6	0.4	0.2	318.1	11.2	180.0	3.6	48.0	1.6	1,395	271

Figure 3.5 South African aquaculture exports by province in 2008

Exports - Tons

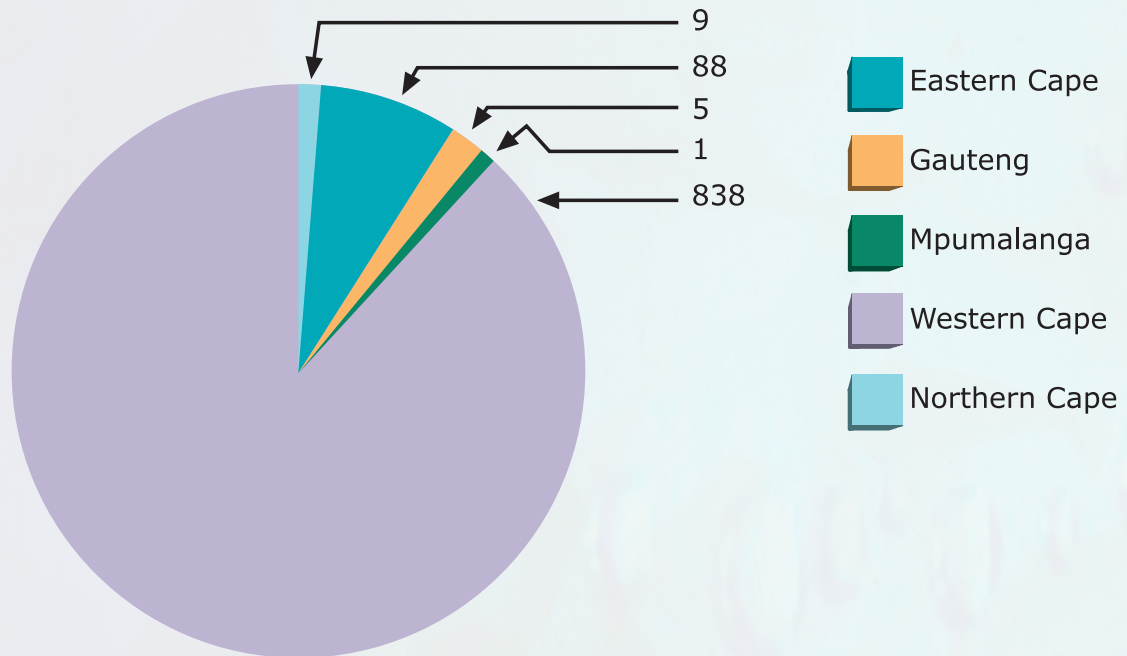
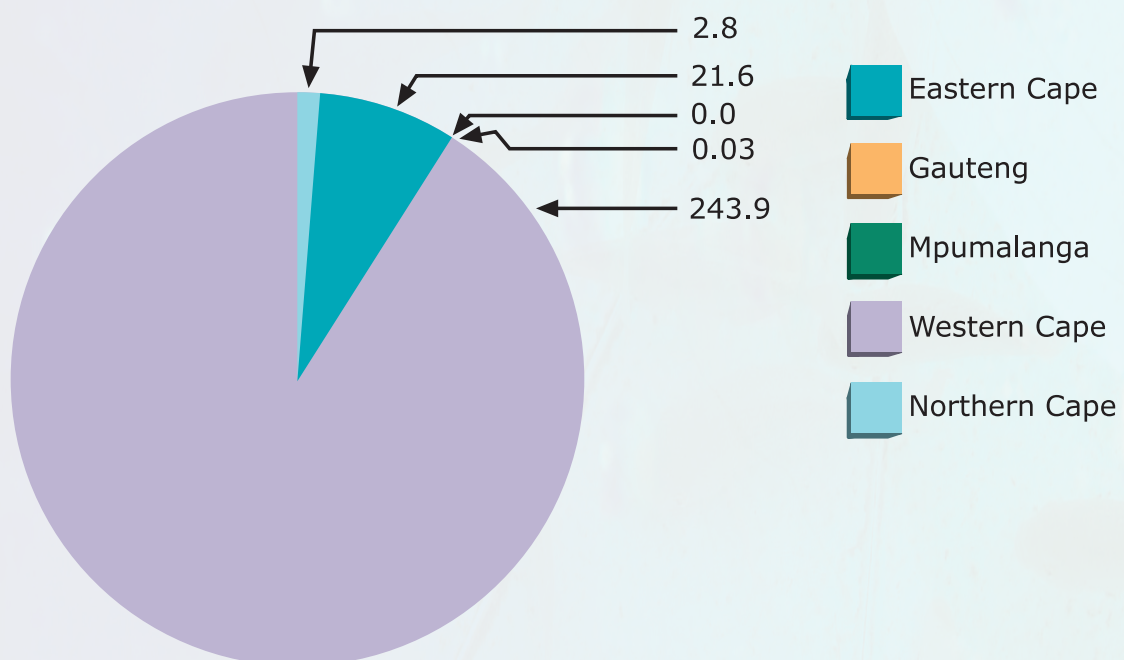


Figure 3.6 Value of South African aquaculture exports in 2008 by province.

Exports - value Rands



4. Enterprise Development

4.1 Form of Enterprise

The majority (52%) of enterprises in the South African aquaculture sector in 2008 were registered as proprietary limited companies (Table 4.1). There were more closed corporation and sole trader registered enterprises (20) in the freshwater sector than the marine sector (2), reflecting that the marine aquaculture enterprises tend to be more capital intensive, medium size enterprises. Trusts and cooperatives were used as vehicles for small farmer enterprises requiring joint management and marketing structures.

Table 4.1 Number and type of business enterprises in the South African aquaculture industry in 2008.

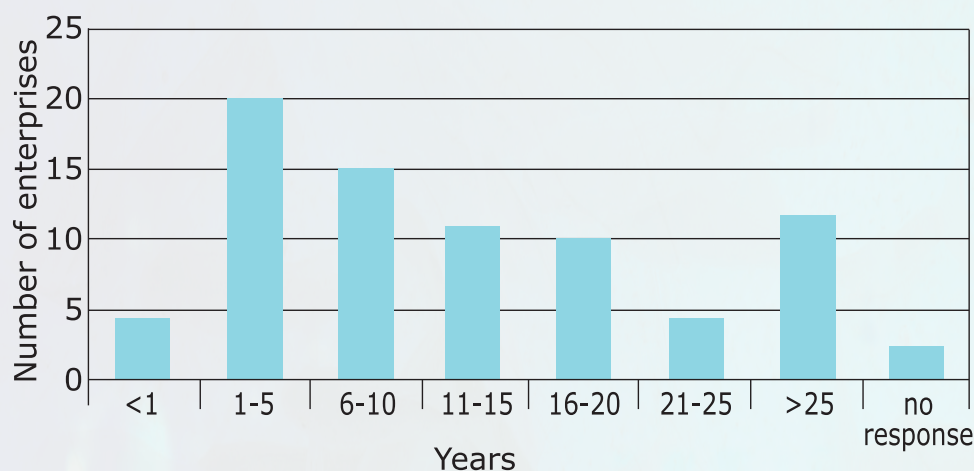
Entity type	Freshwater	Marine	n	%
Sole Trader	6	1	7	8.9
Closed Corporation	14	1	15	19.0
Pty Ltd	15	26	41	51.0
Trust	2	1	3	3.8
Co-operative	1	0	1	1.3
Other	4	2	6	7.6
No response	3	3	6	7.6
Total	45	34	79	100.0

4.2 Age of Aquaculture Enterprises

Most South African aquaculture enterprises were relatively young businesses, with 50% less than 10 years old, and 31% less than five years old (Tables 4.2 and 4.3, Figure 3.7). Only 20% of enterprises (mainly trout) were older than 20 years. The provincial distribution of the age of aquaculture ventures reflects 1) the relatively young, mainly marine dominated aquaculture sector in the Western and Eastern Cape Provinces and 2) the mature, stable trout production sector in Mpumalanga which developed in the 1980's.

Table 4.2 Age of aquaculture ventures in South Africa in 2008.

Years	Number of farms	%
<1	4	5
1-5	20	26
6-10	15	19
11-15	11	14
16-20	10	13
21-25	4	5
>25	12	15
no response	2	3
Total	78	100

Figure 3.7 Age of South African aquaculture enterprises in 2008.**Table 4.3 Provincial distribution of aquaculture enterprises by years in operation.**

Years in operation	Eastern Cape	KwaZulu Natal	Gauteng	Limpopo	Mpumalanga	North West	Northern Cape	Western Cape
<1	4	0	0	0	0	0	0	0
1-5	5	1	1	0	0	0	2	11
6-10	3	2	3	0	0	1	1	5
11-15	1	0	0	0	0	0	1	9
16-20	2	3	0	0	3	0	0	2
21-25	1	0	0	0	1	0	1	1
>25	2	1	0	1	5	0	0	3
no response	0	1	1	0	0	0	0	0
Total	18	8	5	1	9	1	5	31

4.3 Size of Aquaculture Enterprise

Most (76%) aquaculture enterprises were small businesses with a turnover of less than R5 million. Of the larger enterprises with turnover above R5 million, the majority (14) were marine and produced abalone. (Table 4.4) In terms of provincial distribution, most (13) larger commercial enterprises (R5 million turnover) were located in the Western Cape Province, while small scale commercial enterprises (< R5 million turnover) were more evenly distributed amongst the provinces (Table 4.5).

Table 4.4 Size of aquaculture enterprises in South Africa in 2008.

Nature of operation	Freshwater	Marine	N	%
Commercial/industrial production (>R5m p.a. turnover)	5	14	19	24
Small-scale commercial/smallholding (<R5m p.a. turnover)	31	14	45	58
Community project/cooperative	2	0	2	3
Other	2	6	8	10
No response	4	0	4	5
Total	44	34	78	100

Table 4.5 Provincial distribution of aquaculture enterprise types.

Nature of operation	East Cape	KZN	Gauteng	Limpopo	Mpumalanga	North West	North Cape	West Cape
Commercial/industrial (>R5m p.a. turnover)	4	0	1	0	1	0	0	13
Small-scale commercial/smallholding (<R5m p.a. turnover)	10	6	3	1	6	1	4	14
Community project/cooperative	1	0	0	0	0	0	0	1
Other	3	1	0	0	1	0	1	2
No response	0	1	1	0	1	0	0	1
Total	18	8	5	1	9	1	5	31

4.4 Percentage of Production Capacity

Fifty-one percent of South African aquaculture businesses reported that they were operating below 50% capacity, reflecting the young and developing nature of the sector (Table 4.6).

Table 4.6 Percentage of production capacity utilised on South African marine and freshwater aquaculture enterprises in 2008.

Percentage Capacity of Production	Marine	Freshwater	Total	% of respondents
<10	8.0	3.0	11.0	16
20	1.0	1.0	2.0	3
30	6.0	3.0	9.0	13
40	3.0	1.0	4.0	6
50	3.0	6.0	9.0	13
60	0.0	0.5	0.5	1
70	1.0	8.5	9.5	14
80	3.0	5.0	8.0	12
90	0.0	0.0	0.0	0
100	5.0	10.0	15.0	22
No response	8.0	7.0	15.0	N/A
Total*	38.0	45.0	83.0	100*

* Percentage distribution excludes the "no response" category

4.5 Sources of finance of aquaculture enterprises

South African aquaculture enterprises were primarily financed by a combination of private capital (67%) and loans (16%) (Table 4.7). Twelve percent of enterprises, which were located in the Eastern Cape, Gauteng and the Northern Cape received some form of government finance.

Table 4.7 Provincial distribution of sources of finance for aquaculture operations.

Source of Finance	Eastern Cape	KwaZulu Natal	Gauteng	Limpopo	Mpumalanga	North West	Northern Cape	Western Cape	% of respondents
Domestic investment and loans	4	1	0	0	0	0	0	8	16
Foreign investment	0	0	0	0	0	0	0	2	2
Foreign aid	1	0	0	0	0	0	0	1	2
Government assistance	3	0	2	0	0	0	2	3	12
Private capital	12	4	3	1	9	0	3	24	67
No response	1	3	1	0	0	1	0	2	N/A
Total	21	8	6	1	9	1	5	40	83

4.6 Value Chain Participation

All aquaculture enterprises were involved in some form of primary production and grow-out. A high degree of vertical integration was evident in primary production, with 69% of producers operating hatcheries, and 75% raising fry or early juveniles (Tables 4.8 and 4.9). Producers tended to be vertically integrated into secondary production activities as well, with almost half involved in packing and distribution, and 31% in processing. The trends were similar in the freshwater and marine sub-sectors, as well as by province.

Table 4.8 Participation of marine and freshwater aquaculture enterprises in value chain activities.

Business process	Freshwater	Marine	n = 78	% of respondents
Spawning	29	18	47	69.12
Fry-rearing/weaning	32	19	51	75.00
Grading	19	21	40	58.82
grow out	40	29	69	100.00
Processing	11	10	21	30.88
Packing	20	18	38	55.88
Distribution	21	12	33	48.53
Other	4	5	9	13.24
No response	2	0	2	N/A

Table 4.9 Number of aquaculture enterprise respondents in the value chain activities by province.

Business process	Eastern Cape	KwaZulu Natal	Gauteng	Limpopo	Mpumalanga	North West	Northern Cape	Western Cape	Total	% of respondents
Spawning	12	7	3	1	5	1	2	16	47	69
Fry-rearing/weaning	12	6	3	1	6	1	3	19	51	75
Grading	12	3	2	0	3	1	0	19	40	59
grow out	18	6	5	1	8	1	2	28	69	100
Processing	6	2	1	0	3	1	0	8	21	31
Packing	11	4	3	0	3	1	0	16	38	56
Distribution	12	3	4	1	3	1	0	9	33	49
Other	4	2	0	0	0	0	1	2	9	13
No response	0	1	0	0	1	0	0	0	2	N/A

4.7 Constraints to Aquaculture Enterprise Development

The response rate to producers rating a series of “constraints” to enterprise development differed markedly between freshwater and marine farmers, with an average of 58% freshwater producers offering “no response” for each issue, compared to only 23% of marine producers (Tables 4.10 and 4.11).

A majority of freshwater respondents ranked site selection, environmental regulatory requirements, permitting, access to finance, access to skilled labour and access to research and development as “very important” or of “some importance”. A third of freshwater producers, comprising importers of salmonid products and ornamental fish, rated import tariffs as a “very important” constraint, while 50% rated it as not important for their businesses.

A majority of marine aquaculture respondents ranked environment regulatory requirements, site selection, processing, permitting, access to finance, and access to research and development as “very important” or of “some importance”. Tariffs for imports were rated as “not important” by most respondents. Access to skilled labour was rated as being of “some importance” by a majority of respondents.

Table 4.10 Rating of constraints to enterprise development by freshwater aquaculture producers. The highest response rate is highlighted in bold. (imp. = importance)

Constraints	Not imp.	Little imp.	Neutral	Some imp.	Very imp.	No response	Total response
Environmental regulatory requirements	5	3	6	6	11	13	31
Site selection	5	3	4	4	13	15	29
Processing	12	3	4	2	3	15	24
Tariffs for imports	12	3	2	1	9	17	27
Permitting	5	1	3	8	11	16	28
Extension services	7	1	6	5	6	19	25
Access to finance	7	3	4	5	9	16	28
Access to skilled labour	3	2	6	9	7	17	27
Access to Research and Development	3	1	9	9	8	14	30

Table 4.11 Rating of constraints to enterprise development by marine aquaculture producers. The highest response rate is highlighted in bold. (imp. = importance)

Constraints	Not imp.	Little imp.	Neutral	Some imp.	Very imp.	No response	Total response
Environmental regulatory requirements	1	0	7	8	11	6	27
Site selection	5	1	2	8	12	6	28
Processing	6	2	6	6	11	8	31
Tariffs for imports	15	4	3	3	3	6	28
Permitting	5	1	7	3	12	6	28
Extension services	6	4	10	3	5	6	28
Access to finance	1	4	6	5	11	7	27
Access to skilled labour	4	1	7	10	6	6	28
Access to Research and Development	3	1	8	4	12	6	28

4.8 Interventions needed to Promote Enterprise Development

The highest number of marine aquaculture producers rated the following issues as “very important” interventions to promote the aquaculture sector (Table 4.12):

- Research, technology development and transfer
- Capacity to monitor and guarantee the safety of the aquaculture products
- Facilitation of access to finance
- Monitoring of water quality to ensure export of aquaculture product
- Promotion of aquaculture education, training and skills development

Table 4.12 Marine aquaculture producers ranking of the importance of interventions to promote aquaculture enterprise development. (imp. = importance). This highest number of respondents for category is in bold.

Government support	Not imp.	Little imp.	Neutral	Some imp.	Very imp	No response	Total response
Research, technology development and transfer	6	1	2	4	15	6	28
Facilitate access to finance and investment	4	2	6	4	12	6	28
National policy, strategic plan and implementation plan for the sector	2	8	6	4	8	6	28
Extension services	6	5	8	5	4	6	28
Infrastructure development	9	2	5	4	8	6	28
Promote South Africa aquaculture	4	6	6	4	8	6	28
Enhance industry-led development initiatives	2	1	10	6	9	6	28
Promote best practice management guidelines	4	3	11	3	7	6	28
Identify and zone areas for aquaculture development	3	1	8	7	9	6	28
Promote trade in aquaculture products	3	4	8	6	7	6	28
Capacity to monitor and guarantee the safety of the aquaculture products	2	5	6	2	13	6	28
Monitoring of water quality to ensure export of aquaculture product	4	4	5	5	10	6	28
Promote aquaculture education, training and skills development	3	2	3	7	13	6	28
Employees family support programme, for issues affecting work performance	5	2	10	5	6	6	28

Opinions of marine aquaculture producers surveyed were mixed on the importance of (Table 4.12):

- National policy, strategic plan and implementation plan for the sector
- Extension services
- Infrastructure development
- Promote South Africa aquaculture
- Enhance industry-led development initiatives
- Promotion of trade in aquaculture products
- Employees family support programme, for issues affecting work performance

A much higher proportion of freshwater producers (53%) did not respond to the ranking of government interventions to promote the aquaculture sector. The highest number of freshwater aquaculture producers rated the following issues as “very important” government interventions to promote the aquaculture sector (Table 4.13):

- Research, technology development and transfer
- Facilitation of access to finance
- National policy, strategic plan and implementation plan for the sector
- Promotion of South African aquaculture
- Identify and zone areas for aquaculture development
- Promotion of best practice management
- Promotion of trade in aquaculture products
- Capacity to monitor and guarantee the safety of the aquaculture products
- Promotion of aquaculture education, training and skills development

Opinions of freshwater aquaculture producers surveyed were mixed on the importance of (Table 4.13):

- Extension services
- Infrastructure development
- Enhance industry-led development initiatives
- Promote best practice management
- Monitoring of water quality to ensure export of aquaculture product
- Employees family support programme, for issues affecting work performance

Table 4.13 Freshwater aquaculture producers ranking of the importance of government interventions to promote aquaculture enterprise development. (imp. = importance). This highest number of respondents for category is in bold.

Government support	Not imp.	Little imp.	Neutral	Some imp	Very imp.	No response	Total response
Research, technology development and transfer	8	2	4	6	11	13	31
Facilitate access to finance and investment	12	0	2	5	11	14	30
National policy, strategic plan and implementation plan for the sector	4	1	3	6	16	14	30
Extension services	9	0	5	6	7	17	27
Infrastructure development	6	1	4	11	6	16	28
Promote South Africa aquaculture	3	2	4	10	10	15	29
Enhance industry-led development initiatives	8	1	5	8	7	15	29
Promote best practice management guidelines	4	1	10	7	6	16	28
Identify and zone areas for aquaculture development	3	4	5	6	11	15	29
Promote trade in aquaculture products	4	2	2	10	11	15	29
Capacity to monitor and guarantee the safety of the aquaculture products	3	2	7	7	9	16	28
Monitoring of water quality to ensure export of aquaculture product	5	5	7	5	6	16	28
Promote aquaculture education, training and skills development	3	0	4	11	12	14	30
Employees family support programme, for issues affecting work performance	7	4	9	1	7	16	28

4.9 BEE Score Awareness

In terms of the Black Economic Empowerment (BEE) Act, a scoring system for calculating the BEE status of an enterprise has been introduced. The survey determined the extent of awareness of the BEE scorecard amongst aquaculture enterprises.

In terms of government regulations under the BEE Act:

1. If you are a new company or have a turn-over of less than R5m p.a, you do not need to obtain a BEE Rating/Verification Certificate. You only require a Statement qualifying that you are Exempted from BEE Verification.
2. If your company has a turn-over of between R5m and R35m, you are defined as a Qualifying Small Enterprise (QSE).

The QSE BEE Scorecard has 7 Elements: i.e. ownership, management control, employment equity, skills development, preferential procurement, enterprise development and socio-economic development. QSE's only need to comply with 4 of these elements.

3. Companies with a turn-over of in excess of R35m p.a. must comply with all the elements of the Generic Score Card.

Seventy-eight percent of enterprises surveyed responded to the question on whether they were aware of the BEE scorecard system (Table 4.1.4). Of those who responded, the majority respondents (70%) were aware of the BEE scorecard system.

Table 4.14 Awareness of the BEE scorecard system by province. Respondents were asked whether they were aware of the BEE scorecard requirements (yes or no).

AWARENESS OF BEE SCORECARD SYSTEM			
Province	Number of farms		
	Yes	No	No response
Eastern Cape	8	5	5
Free State	0	0	0
Gauteng	2	1	2
KwaZulu Natal	2	4	2
Limpopo Province	0	0	1
Mpumalanga	6	2	1
Northern Cape	4	1	0
North West	0	0	1
Western Cape	21	5	5
Total	43	18	17

In response to whether they had calculated a BEE score, or whether they were required to calculate one, the benchmarking survey revealed that most aquaculture businesses are classified as small enterprises (turnover <R5 million), and hence do not have to calculate a BEE score to comply with the BEE Act (Table 4.15). Six qualifying small enterprises indicated that they had calculated a BEE scorecard, and nine indicated that they had not.

Table 4.15 Awareness of BEE scorecard in the aquaculture industry.

NUMBER OF FARMS THAT HAVE CALCULATED A BEE SCORE				
Province	Number of farms			
	Yes	No	Don't need one-less than R5 million turnover	No response
Eastern Cape	0	4	11	3
Free State	0	0	0	0
Gauteng	0	0	2	3
KwaZulu Natal	0	1	6	1
Limpopo Province	0	0	0	1
Mpumalanga	1	0	7	1
Northern Cape	0	0	5	0
North West	0	0	0	1
Western Cape	5	4	15	7
Total	6	9	46	17

5. Employment

5.1 Employment by species group

The survey revealed that the South African aquaculture industry employed 1837 full-time, and 355 part-time/ temporary workers, in 2008 (Tables 5.1 and 5.2). This figure excludes the aquaculture secondary services and is only reflective of the primary producers. The abalone sub-sector was the largest employer with just over 1000 full time employees, and 141 part-time. Second was trout production with 346 full time and 163 part-time. The higher proportion of part time employees can be ascribed to the seasonal nature of trout hatchery operations, and in some instances grow-out. The ornamental fish and oyster production industries were relatively labour intensive for their size, with 199 and 100 full time employees respectively. Although marine fish farming is still in a pilot commercial phase, the sub-sector already employed 68 people in 2008, indicating the substantial investment into its development.

Employment in the aquaculture sector grew by approximately 80% between 2005 and 2008, and was highest in the abalone sector where the number of people employed rose by 234% (Tables 5.1 and 5.2). Employment in the marine fish sector more than trebled, although it was coming off a low base on the newly established pilot production units. Modest growth in employment was evident in the trout, ornamental, and oyster sub-sectors.

Table 5.1 Full time employment in the South African aquaculture industry by species group for the period 2005-2008.

TOTAL FULL-TIME EMPLOYMENT PER SPECIES				
Species	Total Employment			
	2005	2006	2007	2008
Trout	283.5	309.5	327.0	346.0
Abalone	440.0	836.0	973.0	1,040
Ornamentals	137.0	162.0	182.0	199.0
Koi carp	42.0	42.0	41.0	44.0
Mussels	26.0	26.0	26.0	26.0
Oysters	69.0	79.0	91.0	100.0
Marine fish	19.0	31.0	34.0	68.0
Catfish	6.0	6.0	6.0	8.0
Tilapia	2.0	2.0	2.0	2.0
Marron	5.0	5.0	4.0	4.0
Total	1,029.5	1,498.5	1,686.0	1,837.0

Table 5.2 Part-time employment in the South African aquaculture industry by species group for the period 2005-2008.

TOTAL PART-TIME EMPLOYMENT PER SPECIES				
Species	Total Employment			
	2005	2006	2007	2008
Trout	147	151	156	163
Abalone	56	67	86	141
Ornamentals	5	5	5	5
Koi carp	13	13	13	15
Mussels	0	0	0	0
Oysters	6	6	11	11
Dusky kob	0	6	6	17
Catfish	8	3	3	3
Tilapia	0	0	0	0
Marron	0	0	0	0
Total	235	251	280	355

5.2 Employment by Province

On a regional basis, the Western Cape Province was the largest employer with 1022 permanent and 286 part-time employees in 2008 (Table 5.3 and 5.4). Second was the Eastern Cape (384 full time; 12 part-time) and third Gauteng (185 full-time; 8 part-time). The balance was made up by the other provinces with substantially lower numbers. The growth in employment in the aquaculture sector was highest in the Western and Eastern Cape Provinces, with strong growth also evident in Gauteng Province (Tables 5.3 and 5.4). Modest growth was evident in KwaZulu-Natal, Northern Cape, and Mpumalanga.

Table 5.3 Full time employment in the South African aquaculture industry by province for the period 2005-2008.

TOTAL FULL-TIME EMPLOYMENT PER REGION				
Province	Total Employment			
	2005	2006	2007	2008
Eastern Cape	201	227	318	384
KwaZulu Natal	63	77	82	82
Western Cape	535	900	979	1022
Mpumalanga	106	114	108	112
Northern Cape	15	32	33	39
Gauteng	107	146	163	185
North West	3	3	3	4
Total	1,030	1,499	1,686	1,828

Table 5.4 Part-time employment in the South African aquaculture industry by province for the period 2005-2008.

TOTAL PART-TIME EMPLOYMENT PER REGION				
Province	Total Employment			
	2005	2006	2007	2008
Eastern Cape	27	12	17	12
KwaZulu Natal	6	12	12	12
Western Cape	170	183	201	286
Mpumalanga	21	21	21	21
Northern Cape	6	18	24	16
Gauteng	5	5	5	8
Total	235	251	280	355

5.3 Seasonal Employment

The survey revealed that very few (<10%) aquaculture farms employed seasonal labour (Table 5.5). Of those that did, there was no strong trend in aggregate seasonal employment in both the marine and freshwater sectors. Slightly higher numbers of freshwater farms recorded temporary employees in the July to December period - which coincides with the trout hatchery and harvesting periods (Table 5.5). The provincial breakdown of the number of farms employing seasonal workers is provided in Table 5.6. Most seasonal workers were employed by farms in the Western and Eastern Cape Provinces, but once again no clear monthly trends were evident.

Table 5.5 Seasonal employment in the South African aquaculture industry by province. The data indicate the number of farms which employ temporary employees by month.

SEASONAL EMPLOYMENT: NUMBER OF FARMS				
Months	Number Freshwater farms employing temps	Number Marine farms employing temps	Total Number farms employing temps	% of farms employing temps
January	5	6	11	7.5
February	5	5	10	6.9
March	5	5	10	6.9
April	6	5	11	7.5
May	7	5	12	8.2
June	7	5	12	8.2
July	8	6	14	9.6
August	7	4	11	7.5
September	9	4	13	8.9
October	10	5	15	10.2
November	9	5	14	9.6
December	7	6	13	8.9

Table 5.6 Seasonal employment in the South African aquaculture industry by province. The data indicate the number of farms which employ temporary employees by month.

SEASONAL EMPLOYMENT BY PROVINCE							
Months	Eastern Cape	KwaZulu Natal	Gauteng	Mpumalanga	Northern Cape	Western Cape	Total
January	2	0	0	0	2	6	10
February	2	0	0	0	2	6	10
March	3	0	0	1	2	4	10
April	3	0	0	0	2	6	11
May	4	0	0	0	2	6	12
June	4	1	0	0	2	5	12
July	5	1	1	0	2	5	14
August	3	1	1	0	2	4	11
September	4	1	1	0	2	6	14
October	3	0	1	0	2	9	15
November	3	0	0	0	2	9	14
December	2	0	0	0	2	8	12

5.4 Employment by Skills Level and Race

The national profile of employment by skills level and race in the aquaculture sector is provided in Tables 5.7 and 5.8. As is the case in most South African primary industries, the professional skills level was mainly white, while the semi-skilled and unskilled categories comprised predominantly of black and coloured employees. A more balanced racial profile was evident in the "skilled" and "middle services" categories.

If the provincial profile of employment by skills and race is considered, the general pattern is similar to the national one, however, coloured and black employees are better represented in the "skilled" and "middle services" categories in the Western Cape and Eastern Cape Provinces, perhaps reflecting the generally higher level of skills required in the abalone farming industry (Table 5.9). Temporary and part-time employment was low in all provinces (≤ 21 employees per province), with the exception of the Western Cape where part-time/ temporary employment constituted approximately 20% of the total labour force (Figure 5.10).

Table 5.7 National breakdown of full-time employment in the South African aquaculture industry by skills level and race (numbers).

NATIONAL FULL-TIME EMPLOYMENT PATTERNS																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	2	2	0	67	5	6	0	99	5	7	0	105	5	6	0	126
Skilled	18	11	3	26	31	26	3	38	36	28	3	41	42	31	3	50
Middle services	17	11	0	15	27	20	1	19	28	20	2	19	34	20	2	27
Semi-skilled	170	190	0	10	220	220	0	15	230	206	1	12	255	222	1	11
Unskilled	402	76	0	11	608	152	0	10	784	153	0	7	817	171	0	5
Total	609	290	3	129	891	424	4	181	1,083	414	6	184	1,153	450	6	219

Table 5.8 National breakdown of part-time employment in the South African aquaculture industry by skills level and race (numbers).

NATIONAL PART-TIME EMPLOYMENT PATTERNS																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	0	0	1	4	0	0	2	4	0	0	5	4	0	0	10	4
Skilled	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Middle services	0	0	0	2	0	0	0	2	1	0	0	2	1	4	0	4
Semi-skilled	13	4	0	1	11	0	0	2	12	1	0	2	16	9	0	4
Unskilled	82	125	0	2	92	136	0	2	112	139	0	2	145	152	0	5
Total	95	129	1	10	103	136	2	10	125	140	5	10	162	165	10	18

Table 5.9 Full time employment in the aquaculture primary production sub-sector by province, skills level, and race for the period 2005-2008.

FULL-TIME EMPLOYMENT: EASTERN CAPE																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	0	0	0	16	1	0	0	18	1	0	0	19	1	0	0	32
Skilled	5	2	1	6	6	2	1	6	8	2	1	7	11	3	1	10
Middle services	5	2	0	4	5	2	0	4	7	2	0	4	7	2	0	4
Semi-skilled	43	9	0	0	47	6	0	0	51	0	0	1	62	1	0	1
Unskilled	108	2	0	0	129	2	0	0	213	2	0	0	243	6	0	0
Total per group	161	15	1	26	188	12	1	28	280	6	1	31	324	12	1	47
Total	203				229				318				384			

FULL-TIME EMPLOYMENT: KWAZULU NATAL																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	0	0	0	6	0	0	0	7	0	0	0	7	0	0	0	7
Skilled	0	0	0	0	2	0	0	0	2	0	0	1	2	0	0	1
Middle services	0	0	0	1	0	0	1	1	0	0	2	0	0	0	2	0
Semi-skilled	13	0	0	0	20	0	0	0	24	0	0	0	25	0	0	0
Unskilled	43	0	0	0	46	0	0	0	46	0	0	0	45	0	0	0
Total per group	56	0	0	7	68	0	1	8	72	0	2	8	72	0	2	8
Total	63				77				82				82			

FULL-TIME EMPLOYMENT: WESTERN CAPE																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	1	2	0	27	1	6	0	52	1	7	0	56	1	6	0	64
Skilled	4	9	1	16	12	22	1	27	13	23	1	27	14	24	1	30
Middle services	6	9	0	6	14	18	0	9	12	18	0	11	15	18	0	17
Semi-skilled	77	175	0	9	98	204	0	14	100	201	1	10	106	213	1	10
Unskilled	112	66	0	10	269	137	0	7	363	139	0	5	361	143	0	3
Total per group	200	261	1	68	394	387	1	109	489	388	2	109	497	404	2	124
Total	530				891				988				1,027			

Table 5.9 (cont.) Full time employment in the aquaculture primary production sub-sector by province, skills level, and race for the period 2005-2008

FULL-TIME EMPLOYMENT: MPUMALANGA																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	1	0	0	8	1	0	0	9	1	0	0	9	1	0	0	10
Skilled	6	0	0	2	6	0	0	2	7	0	0	2	8	0	0	2
Middle services	6	0	0	1	7	0	0	1	7	0	0	1	8	0	0	2
Semi-skilled	29	0	0	0	33	0	0	0	32	0	0	0	35	0	0	0
Unskilled	53	0	0	0	55	0	0	0	49	0	0	0	46	0	0	0
Total per group	95	0	0	11	102	0	0	12	96	0	0	12	98	0	0	14
Total	106				114				108				112			

FULL-TIME EMPLOYMENT: NORTHERN CAPE																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	0	0	0	2	0	0	0	3	0	0	0	4	0	0	0	2
Skilled	0	0	0	0	0	1	0	0	0	2	0	0	0	2	0	0
Middle services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Semi-skilled	0	6	0	1	0	6	0	1	0	8	0	1	0	9	0	0
Unskilled	0	0	0	1	2	8	0	1	2	14	0	2	2	23	0	2
Total per group	0	6	0	4	2	15	0	5	2	24	0	7	2	34	0	4
Total	10				22				33				40			

FULL-TIME EMPLOYMENT: GAUTENG																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	0	0	0	7	2	0	0	8	2	0	0	9	2	0	0	10
Skilled	3		1	2	5	0	1	3	6	1	1	4	7	2	1	7
Middle services	0	0	0	3	1	0	0	3	2	0	0	3	4	0	0	4
Semi-skilled	6	0	0	0	18	0	0	0	20	0	0	0	24	0	0	0
Unskilled	85	0	0	0	105	0	0	0	115	0	0	0	124	0	0	0
Total per group	94	0	1	12	131	0	1	14	145	1	1	16	161	2	1	21
Total	107				146				163				185			

Table 5.9 (cont.) Full time employment in the aquaculture primary production sub-sector by province, skills level, and race for the period 2005-2008

FULL-TIME EMPLOYMENT PATTERNS FOR THE NORTH WEST																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1
Skilled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middle services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Semi-skilled	3	0	0	0	3	0	0	0	3	0	0	0	3	0	0	0
Unskilled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total per group	3	0	0	1	3	0	0	1	3	0	0	1	3	0	0	1
Total	3				3				3				4			

Table 5.10 Part time employment in the aquaculture primary production sub-sector by province, skills level, and race for the period 2005-2008.

PART-TIME EMPLOYMENT: EASTERN CAPE PROVINCE																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1
Skilled	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Middle services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Semi-skilled	2	4	0	1	1	0	0	1	1	0	0	1	1	0	0	1
Unskilled	13	0	0	0	8	1	0	0	8	1	0	0	9	0	0	0
Total per group	15	4	0	3	9	1	0	2	9	1	0	2	10	0	0	3
Total	22				12				12				13			

PART-TIME EMPLOYMENT: KWAZULU NATAL																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skilled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middle services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Semi-skilled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unskilled	6	0	0	0	12	0	0	0	12	0	0	0	12	0	0	0
Total per group	6	0	0	0	12	0	0	0	12	0	0	0	12	0	0	0
Total	6				12				12				12			

Table 5.10 (Cont.) Part time employment in the aquaculture primary production sub-sector by province, skills level, and race for the period 2005-2008.

PART-TIME EMPLOYMENT: WESTERN CAPE PROVINCE																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	0	0	1	2	0	0	2	2	0	0	5	2	0	0	10	2
Skilled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middle services	0	0	0	2	0	0	0	2	1	0	0	2	1	0	0	2
Semi-skilled	9	0	0	0	10	0	0	1	10	1	0	1	11	4	0	1
Unskilled	38	113	0	2	48	117	0	2	70	120	0	4	95	128	0	5
Total per group	47	113	1	6	58	117	2	7	81	121	5	9	107	132	10	10
Total	167				184				216				259			

PART-TIME EMPLOYMENT: MPUMALANGA																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1
Skilled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middle services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Semi-skilled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unskilled	17	3	0	0	21	3	0	0	17	3	0	0	17	3	0	0
Total per group	17	3	0	1	21	3	0	1	17	3	0	1	17	3	0	1
Total	21				25				21				21			

PART-TIME EMPLOYMENT: NORTHERN CAPE PROVINCE																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skilled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middle services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Semi-skilled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unskilled	0	6	0	0	0	16	0	0	0	16	0	0	0	16	0	0
Total per group	0	6	0	0	0	16	0	0	0	16	0	0	0	16	0	0
Total	6				16				16				16			

Table 5.10 (Cont.) Part time employment in the aquaculture primary production sub-sector by province, skills level, and race for the period 2005-2008.

PART-TIME EMPLOYMENT: GAUTENG																
Employment category	2005				2006				2007				2008			
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W
Professional	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skilled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Middle services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Semi-skilled	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unskilled	5	0	0	0	5	0	0	0	5	0	0	0	8	0	0	0
Total per group	5	0	0	0	5	0	0	0	5	0	0	0	8	0	0	0
Total	5				5				5				8			

6. Products and Markets

6.1 Market Channels

The “small to medium size enterprise” characteristic of many aquaculture ventures was reflected in the market channels utilised (Table 6.1, Figure 6.1). The survey revealed that the most commonly used market channel was wholesalers, with 35 primary aquaculture enterprises utilising this option. However, a relatively high number of enterprises (26) sold directly to consumers, particularly trout and koi producers. A high proportion of trout and oyster producers sold their product to restaurants and hotels. For trout enterprises, the highest number (14) sold their product to processors, whereas in the abalone sector, only four sold to processors, with most (11) selling to wholesalers or exporters. Where abalone processing is required, the farmers usually pay a factory a fee to can their product under their own brand, and then market it themselves.

Table 6.1 Market channels used by enterprises in aquaculture sub-sectors.

MARKET CHANNELS USED PER SECTOR											
Channel used	Trout	Abalone	Ornamental fish	Koi carp	Mussels	Oysters	Dusky kob	Catfish	Tilapia	Marron	Total
Direct to consumers	10	1	3	5	0	4	1	2	0	0	26
Wholesalers	7	9	5	5	1	4	2	1	0	1	35
Restaurants/hotels	7	2	0	0	0	4	2	0	0	0	15
Processors	14	4	0	0	1	2	2	0	0	0	23
Supermarkets	4	1	0	0	0	1	2	0	0	0	8
Exporters	1	2	0	1	0	0	0	0	0	0	4
Other	1	1	3	1	0	3	0	1	0	0	10
Not applicable	3	3	2	1	0	1	3	0	1	1	15

6.2 Form of Product

Two thirds of respondents sold their product as either live or freshly killed, whereas only one third employed some form of processing or value adding (Table 6.2). If the respective sub-sectors are considered, a similar split was evident for trout producers, however an approximately equal number of abalone producers sold live/freshly killed and processed products. All ornamental and koi producers sold their products alive. Two oyster producers employed some form of value adding.

Table 6.2 Form of product sold by producers in the respective aquaculture sub-sectors.

FORM OF PRODUCT PER SECTOR											
Form of product	Trout	Abalone	Ornamental fish	Koi carp	Mussels	Oysters	Dusky kob	Catfish	Tilapia	Marron	total
Live/whole freshly killed	20	12	8	7	1	8	4	1	0	1	62
Some form of processing and value adding	11	11	0	0	1	2	1	2	0	0	28
Not applicable	3	2	0	0	0	1	3	0	1	1	11

6.3 Determination of Price

The majority of respondents (58%) negotiated the price of their product with the buyer, while 32% set their price themselves. No aquaculture products were auctioned.

Table 6.3 Determination of the price of products sold by primary aquaculture producers for the period 2005-2008.

DETERMINATION OF PRICE	
Options	Number of farms
Producer sets price	24
Auction	0
Bargain and negotiate with buyer	43
Other	10
Not applicable	7

6.4 Domestic Market for Aquaculture Products

The largest volume of trout (45%), mussels (55%) and oysters (61%) was sold in the Western Cape Province, while Gauteng provided the biggest market for ornamentals (28%), koi carp (53%), catfish (99%) and dusky kob (100%) (Table 6.4). The second biggest market for trout was KZN (19.5%), with Gauteng third (11.6%).

6.5 International Markets for Aquaculture Products

The main aquaculture export from South Africa was abalone, either in a live form for the Japanese market, but increasingly in a canned or frozen form for the Chinese market through Hong Kong. Small quantities of dried abalone were occasionally supplied to the Chinese market.

Other aquaculture exports were so small that they were economically insignificant but included:

- Trout ova and milt to Europe.
- Trout fingerlings to Lesotho.
- Koi and goldfish to Europe.
- Koi to Europe.
- Catfish to Botswana.

Table 6.4 Provincial breakdown of the domestic market for South African aquaculture products.

DOMESTIC MARKET FOR SPECIES PER PROVINCE										
% Volume										
Market	Trout	Abalone	Ornamentals	Koi Carp	Mussels	Oysters	Dusky Kob	Tilapia	Catfish	Marron
Eastern Cape	5.1	0	13.2	8.1	5	21.5	0	0	0	50
Free State	0.6	0	2.2	2.6	0	0.6	0	0	0	0
Gauteng	11.6	0	27.8	52.7	30	14.5	100	0	99	0
KwaZulu Natal	19.5	0	25.11	9.7	10	2.1	0	0	0	0
Limpopo Province	0.6	0	2.5	0	0	0	0	0	0	0
Mpumalanga	14.7	0	9.2	8.5	0	0	0	0	0	0
Northern Cape	1.9	0	0	0.4	0	0	0	0	0	0
North West	0.6	0	0	2.3	0	0	0	0	0	0
Western Cape	45.3	0	20	15.7	55	61.3	0	0	1	50

6.5 Product Standards

The vast majority of producers (83%) reported that they were able to meet product standards. Thirteen percent reported that they sometimes had problems, and only two percent of producers had difficulties in meeting product standards.

Table 6.5 Producers ability to meet product standards.

DIFFICULTIES MEETING REQUIRED STANDARDS				
Species	Number of farms			
	Yes	No	Sometimes	No response
Trout	1	15	4	4
Abalone	0	13	3	1
Ornamentals	1	5	0	3
Koi carp	0	5	0	1
Mussels	0	1	0	0
Oysters	0	5	1	3
Dusky kob	0	4	0	3
Tilapia	0	0	0	1
Catfish	0	1	0	1
Marron	0	1	0	1
Total	2	50	8	18

6.6 Product Grades

Approximately two-thirds of respondents sold their products according to different grades and one third did not.

Table 6.6 Number of aquaculture producers selling products according to different grades.

IS PRODUCT SOLD ACCORDING TO DIFFERENT GRADES				
Species	Number of farms			
	Yes	No	Sometimes	No response
Trout	10	11	0	3
Abalone	9	6	1	1
Ornamentals	4	3	1	1
Koi carp	6	0	0	0
Mussels	1	0	0	0
Oysters	6	1	0	2
Dusky kob	2	2	0	3
Tilapia	0	0	0	1
Catfish	2	0	0	0
Marron	0	0	0	2
Total	40	23	2	13

6.7 Marketing Activities

Thirty-three percent of respondents reported that they undertook marketing activities, with a further 25% stating that they did sometimes. Forty-three percent of respondents did not undertake any marketing activities. In the trout sector, a higher proportion of producers did not do marketing perhaps reflecting long established relationships with processors. A high proportion of abalone farmers undertook marketing activities, which are regarded by many as essential to selling product into overseas markets.

Table 6.7 Marketing activities undertaken by producers.

MARKETING ACTIVITIES UNDERTAKEN				
Species	Number of farms			
	Yes	No	Sometimes	No response
Trout	5	10	6	3
Abalone	9	4	3	1
Ornamentals	2	4	1	2
Koi carp	3	0	3	0
Mussels	1	0	0	0
Oysters	1	4	2	2
Dusky kob	0	4	0	3
Tilapia	0	1	0	0
Catfish	1	1	0	0
Marron	0	0	0	2
Total	22	28	15	13

6.8 Government Assistance in Accessing Markets

The survey revealed that five abalone exporters had availed themselves of assistance offered by government in accessing markets.

Table 6.8 Producers assisted by government in accessing markets.

GOVERNMENT/PUBLIC SECTOR LINKAGE TO MARKET				
Species	Number of farms			
	Yes	No	Don't know	No response
Trout	0	20	0	4
Abalone	5	10	0	2
Ornamentals	0	7	0	2
Koi carp	0	5	1	0
Mussels	0	1	0	0
Oysters	0	7	0	2
Dusky kob	0	4	1	2
Tilapia	0	1	0	0
Catfish	0	2	0	0
Marron	0	0	0	2
Total	5	57	2	14

7. Producer Views and Interviews

The survey process provided the author of the report with an opportunity to talk to a broad range of producers in short period of time, which facilitated insights into issues and experiences within each sub-sector. The semi-structured interviews allowed the capture of individual views and anecdotes on the realities of running an aquaculture enterprise in South Africa. The perspective provided below is a personal one, based on the interviews and my experience in promoting aquaculture sector development

7.1 The business environment

The over-riding impression gained from interview after interview, was that the odds are stacked heavily against the entry of small businesses into aquaculture. This should be a serious cause for concern to policy makers who favour small business development, which is seen as the backbone of job creation and a prosperous society. Fourteen respondents indicated that they were no longer in production, and a further 14 were not producing any product at the time of the survey. There was a net exodus of small producers over the survey period, juxtaposed with a phase of consolidation and expansion of larger producers. Apart from government sponsored small scale farmers, there were few small scale entrants into the aquaculture industry. In verbal interviews, many small producers listed factors beyond their control, that threatened the viability of their enterprises. Most of the constraints related to the application of environmental legislation and permitting, and compliance with health and product quality standards. Perhaps the most telling comment by a dedicated small scale producer was that he felt very lonely and unsupported in his business. These are clearly issues within the ambit of government which can be addressed to create a more conducive environment for small business development in the aquaculture sector.. It needs to be recognised that the aquaculture industry is small and fragmented, in fact it is not yet an industry;- as it does not yet have the requisite services sector, and the cost of doing business is high. A set of industrial incentives and support measures will be required to kick start investment into the industry until it is competitive. To an extent this is being realised with schemes to link disadvantaged small scale farmers with established producers and markets. But much more comprehensive and sustained support from government will be required.

The back bone of the South African aquaculture industry is clearly the established medium size enterprises, which have achieved the critical mass to run vertically integrated operations. As such, they are resilient enough to be a market force, self sufficient in the provision of many elements of the value chain and services, and to comply with an increasing array of legislative and product quality requirements. Medium size producers interviewed were generally optimistic about market prospects for aquaculture products, but were acutely aware of the dynamic nature of markets which are increasingly affected by global forces. The medium size enterprises are the foundation from which satellite small producers, and a service sector can grow. The medium size aquaculture entrepreneurs are dynamic, innovative and have an appetite for risk. They are the pioneers of the South African aquaculture sector and need to be nurtured and encouraged as their success will breed further success.

7.2 Abalone

The biggest success story is the abalone industry which has done particularly well over the survey period. It is based on a substantial capital investment and long term commitment. The industry players exhibited a high level of cooperation and had invested many initiatives to improve their efficiency and reduce risk. The interviews were conducted in a time of financial uncertainty following the global financial crisis. Abalone producers felt particularly exposed as they were completely reliant on the export market, as well as externalities such as exchange rates. Concerns were expressed about downward pressure on prices due to rising production in Korea. However, the fundamentals of the abalone sector appeared sound, as producers had invested in promoting a unique brand identity and in efficient technology. Some were of the opinion that production was no longer demand driven and that production was beginning to level off. Several were using their

foundation in the abalone business to explore new aquaculture opportunities.

Industry representatives commented: "We impress upon the government controlling body to develop a proper reportable disease monitoring structure as is available in the Department of Agriculture for the Agricultural Sector".

7.3 Trout

The trout production sector is the longest established in South Africa with several producers having been in business for over 25 years. There was a stable base of producers with few new entrants.

On the positive side, all producers reported strong demand for large trout (>1kg) - in fact they could not meet demand which was increasingly being supplied by imports. Producers were seeking innovative means such as recirculation, to grow more fish with less water, and to hold fish through the summer season. A desire was expressed for more research support to improve the technology for South African environmental conditions.

The NEMBA biodiversity zoning regulations were identified as a major issue affecting trout farmers. While KZN trout farmers were largely satisfied with the proposed zones to control the use of trout – due to a good consultative process, Mpumalanga Province farmers were concerned that the zones are being made as small as possible and that some existing trout operations had been excluded. Concern was expressed that many existing and potential trout waters, where no biodiversity harm could be done, would be excluded due to the restrictive zonation. This would make it difficult for small enterprises to start a trout fishery on a dam as they would have to undertake risk assessments and/or a full EIA.

Water quality and quantity were also negatively affecting trout production. Increasing development such as urban development, agriculture and golf estates means that trout farms downstream get less water, and water quality is degraded. Production is shrinking at some localities as a result. Total production in Mpumalanga and KZN was reported to be stagnant, maybe reducing. Disease issues are an ongoing concern for many farmers.

In Mpumalanga, government red tape and regulation were cited as the main reason preventing new aquaculture development, particularly small farmer cage culture. While established farmers were prepared to invest in and mentor small farmer projects, a lack of response from the Department of Environmental Affairs and Department of Water Affairs discouraged proposers. It was alleged that departments were not talking to each other, and that there was no development focus and no decision making. A respondent said that after four and a half years and a lot of money spent, BEE candidates had been trained for the project, but no decision was made by the responsible government agencies about a cage culture project. The view was expressed that this was not really an environment in which small business could flourish.

An innovative new source of trout production and small scale enterprise was the "Hands-On Cooperative" sponsored by the Department of Science and Technology's "Technology for Sustainable Livelihoods" programme under the auspices of Stellenbosch University. The cooperative comprised of some 32 production units on dams in the Western Cape Province, producing 142 tons of trout in 2008. While the project had been effective in the roll out of production units and achieving a significant tonnage of trout, there were concerns about the viability of some of the units. Not all had produced fish in 2008, and a lack of skills and motivation were pervasive issues. In some units it was felt that there were too many beneficiaries for the project to be viable. These issues were being addressed by the Western Cape Department of Agriculture at Elsenburg.

One trout producer reported that he had been successful in accessing the Department of Trade and Industry's SMEDP incentive scheme for aquaculture with the help of a consultant which provided over R1 million/ year subsidy.

Further comments from producers included:

- "Financial assistance would assist in the improvement of infra-structure to increase output and diversify the range aquaculture products to make better use of facilities."
- "Our Project is well established and has paid most of the school fees to be a smooth running operation. (As smooth running as aquaculture can be!)"
- "Very little work done on trout in the veterinary field. Need state support."

7.4 Marine Fish

Marine fish producers were generally positive about the prospects for commercialisation. Valuable experience had been gained from the Department of Science and Technology's pilot kob cage aquaculture project with Irvin & Johnson at Port Elizabeth. This experience emphasised that the costs to pioneer farmers are very high due to high transaction costs, lack of dedicated infrastructure and lack of services. For example, feed was cited as a major cost factor, and business profitability was particularly sensitive to this. Imported feed was subject to duties but local feeds were not of a good quality. It costs millions to set up an aquaculture feed mill and at least a 10,000 tons feed volume would be required. Access to finance was an issue raised by marine fish producers (and respondents in all other sub-sectors).

Possible interventions and incentives suggested for government to stimulate establishment of marine fish sector included:

- Support joint industry actions. e.g. subsidise companies collaborating to establish service sector such as feed companies, health management services.
- Put in infrastructure. e.g. facilities at ports to service cages offshore. Service vessels are very expensive – can be shared between companies. Possibly subsidise.
- Environmental certification – is becoming paramount for market access. Government should facilitate certification schemes.
- Remove import tax on feed.
- Biosecurity. Lack of EU certification currently inhibiting industry growth. Water quality monitoring currently subsidised by industry. There was not enough money to do it properly.
- Government could play a leading role in facilitating the process of exporting.
- A Government hatchery would create opportunities for smaller Aquaculture entrepreneurs to enter the industry.
- There is a need for Government Aquaculture veterinary support as is available to the Agricultural sector.

7.5 Oysters

Oyster producers reported gradual market growth, and that the production sector had not yet realized its full potential. One producer stated: "After twenty years of bivalve cultivation, I am hoping to see some real progress in our industry – value adding, export product development, organic accreditation to name but a few". Water quality monitoring and achieving EU accreditation were seen as important government led interventions which could assist the development of the oyster industry. Small oyster farmers found it very difficult to carry the cost of water quality monitoring and product testing. Once again, if government wants to stimulate the growth of small producers, the barriers to entry need addressing. Oyster spat importers stated that there appeared to be no rational reason for renewing their import permits every three months, along with all the requisite paperwork including tax clearance certificates. They asked "why could it not be done annually along with their marine aquaculture permit?"

Producer comments included:

- "Permitting is far too complicated, e.g. tax certificate should not be an issue to withhold a permit especially when the party concerned has a tax dispute."
- "EIA's are taken too far in mined out areas."
- "The industry needs to also take into account small farmers and not only large cooperate businesses."
- "Permit applicators should have the right to appeal their application in person in the event of a permit being rejected. Those rejecting the permit without good reason need to be held accountable."
- "Some of the bureaucracy and compliance factors have become totally unreasonable and do little to ensure enthusiasm within the industry, and create the envisaged "enabling environment" that I have heard being mentioned on a few occasions. A minor example that I will mention is that our permit conditions restrict our farm to a production figure similar to 2008, which was a bad year owing to the loss of 60% of our stock due to floods during the previous season. Now, surely this is similar to instructing any farmer in agriculture, after a bad drought, that he should curtail his production during a year of high rainfall. If this principal was applied, we would soon be starving and without farmers in this country. I fail to see the logic."
- "The oyster cultivation industry in South Africa needs to become pro-active in eliminating unintended negative environmental effects, notably the introduction of potentially invasive organisms, pathogens and diseases. In order to do so, there should be strong state support for a hatchery or hatcheries in South Africa. Oyster imports should be restricted to larvae or small post larval oysters that have been reared in controlled hatcheries where contact with the natural ecosystem is prevented."
- "The state needs to do far more to create an enabling environment for our industry. Exports are severely restricted by the failure of the state to put in place internationally compliant regulatory and monitoring systems."

7.7 Mussels

Mussel production was reported to be fairly stable. The Masiza small farmer empowerment scheme in association with a commercial producer in Saldanha Bay was working well, with all four small production units working well and on business lines. Mentorship and management support by the commercial partner was cited as the key to its success.

7.8 Ornamental Fish and Koi Carp

The bulk of locally produced ornamental fish were grown by a small number of well established, medium sized enterprises. The number of small scale/part time growers appeared to have decreased over the survey period. The major ornamental fish producers supplemented their production with imported fish in order to offer variety. In fact, it was reported that local ornamental fish production only meets approximately 20% of demand. Producers agreed that there was scope for growing local production, but that knowledge of production techniques as well as the market are essential. Government was generally viewed as an impediment to the ornamental sector:

- It was reported that it was becoming increasingly difficult to import fish due to difficulties in getting them through customs, and that only the larger, regular importers could now do it effectively.
- A producer stated: "The value of ornamental fish sold in SA is equal to that of the trout industry, yet the state does nothing to promote the local production of species that are being imported. The size of local production could easily be doubled with consequent social and economic benefits."
- An ESKOM sponsored marine ornamental fish project aiming to promote community based grow-out units was reported to be on hold, as they could not get workable permitting arrangements with MCM for small satellite growers. They reported that it was feasible for a medium size enterprise to comply, but that there was too much red tape and costs for a

small business. For example, an environmental impact assessment was beyond the means of a small producer, as was the R150 permit required for each sale and the veterinary health certificate.

- A black producer in KZN was disillusioned with unfulfilled promises of government support for his business, and now avoided officials.
- A producer stated: "Government is attempting to promote aquaculture to benefit the rural poor, but there is a lack of coordination, even within Mapumalanga's Agriculture Department. The former DWAF has policy guidelines which include the support and promotion of aquaculture as a duty of officials. Yet the policy regarding aquaculture as a non-consumptive use seems not to be understood, other than it is not to be viewed as irrigation."
- A producer stated: "NEMBA poses threats to certain operations. Rather than supporting and facilitating aquaculture, it seems it will become more and more difficult to survive"
- A producer stated: "Our country does not appropriately support ornamental fish production, despite the significant potential for export earnings. The focus is on food fish production. Nationally we do not have a policy and protocols in place to deal with the OIE or EU requirements for ornamental species. Veterinary services refuse to issue health certificates due to lack of understanding of complex documentation or unwillingness to commit in the absence of official guidelines or procedure. Veterinary services do not have the capacity to prepare or issue compliance protocols nor appropriately monitor producers. We do not survey and monitor for OIE reportable diseases of ornamental fish, and do not have action plans in place. In short, we officially prevent the export of certain farmed ornamental fish species."
- A producer stated: "The Ornamental fish sector has the potential to achieve the following for the promotion of aquaculture in South Africa:
 - It is an established industry in South Africa and thus a stable market already exists locally.
 - The production of ornamental fish is well suited to SME's and small biosecure units that do not require large amounts of capital for start up.
 - Setting up numerous SME's will help to promote a culture of aquaculture amongst communities in South Africa. This is possible due to the market chain that already exists and large variety of species and varieties that are available for production.
 - The more fish that are produced locally the fewer fish will be imported."
- "Currently a large number of ornamental fish are imported into South Africa by consolidators. These importers order fish on behalf of large end users and send them onto their customers without any form of disease control apart from a health certificate issued in the country of origin. This could pose a problem in the future for the international recognition of aquaculture products from South Africa."
- "The pet trade is currently experiencing problems with the trade in imported ornamental birds with regards to Avian Influenza and the poultry industry. I feel that we need to be proactive and innovative with regards to aquaculture in such a way that both food fish and the ornamental fish trade can benefit."
- "South Africa needs to develop more specialists in the field of aquaculture who are directly involved with disease and their control."
- "Food security is not solely the provision of food items to people. It is also the ability to provide people with a means of generating disposable income in order to purchase food items. Ornamental fish can achieve this."
- "We are seeing an increasing trend towards 'underground unregulated operations'. Government bungling of the regulation of the industry is costing us opportunity costs on a massive scale. Frankly, there is far too much regulation and red tape which is choking the Aquaculture industry on a massive scale and such legislation is simply likely to be ignored."

7.9 Catfish

The number of catfish producers had declined and only one was actively selling fish. The African immigrant community in Gauteng from Ghana, Zaire, Nigeria who traditionally eat catfish were the main target market.

7.10 Marron

All marron farmers were not in active production for various reasons.

7.11 Access to Finance

Access to finance was seen as a major constraint to aquaculture development by producers in all sectors.

A producer commented: "Most HDI's do not have assets and find it impossible to get finance from traditional sources. Banks discriminate shamelessly. Access to finance for BEE projects requires a paradigm shift to ensure success."

8. Consumer Survey

8.1 Sample Demographic Profile

The majority (56%) of interviewees home language was English, followed by Afrikaans (27%), isiXhosa (7%), IsiZulu (6%), Sesotho (3%), Setswana (1%) and Tshivenda (1%). The age profile was normally distributed with the majority between the ages of 25 and 54 years (Figure 8.1). Fifty eight percent of respondents were married; 25% single (but living with others); 10% single (living on their own); and 7% living with partner. Forty-one percent of respondents earned between R5-15000 pm; 28% between R15-25000; 14% refused to answer; 12% between R25-50000; and 1% more than R50 000 (Figure 8.2). The majority (54%) had completed matric; 19% had some high school education but did not complete matric; 16% had an undergraduate degree; and 11% a postgraduate degree. Fifty five percent of those interviewed worked in the private sector; 19% in the public sector; and 17% were home executives. Among the working people, 26% were first tier managers, 26% were middle management and 22% were tradesmen. Thirty nine percent worked for companies with 5-50 employees, 24% with 51-500 employees; and 23% less than 5 employees.

Figure 8.1 Age profile of consumers interviewed

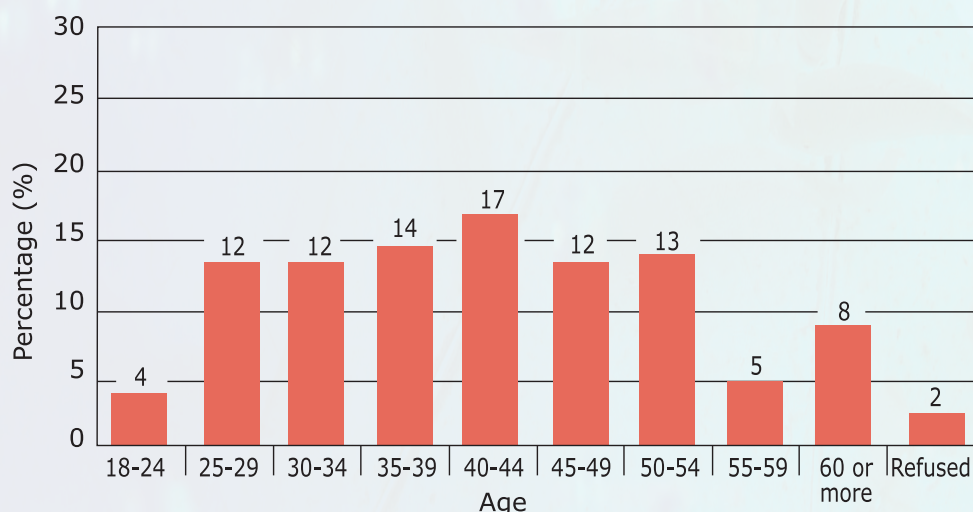
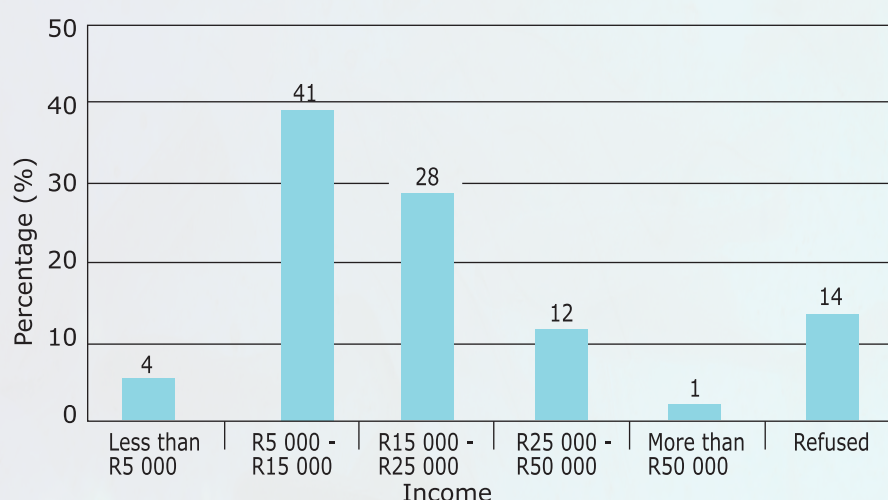


Figure 8.2 Monthly income of consumers interviewed.

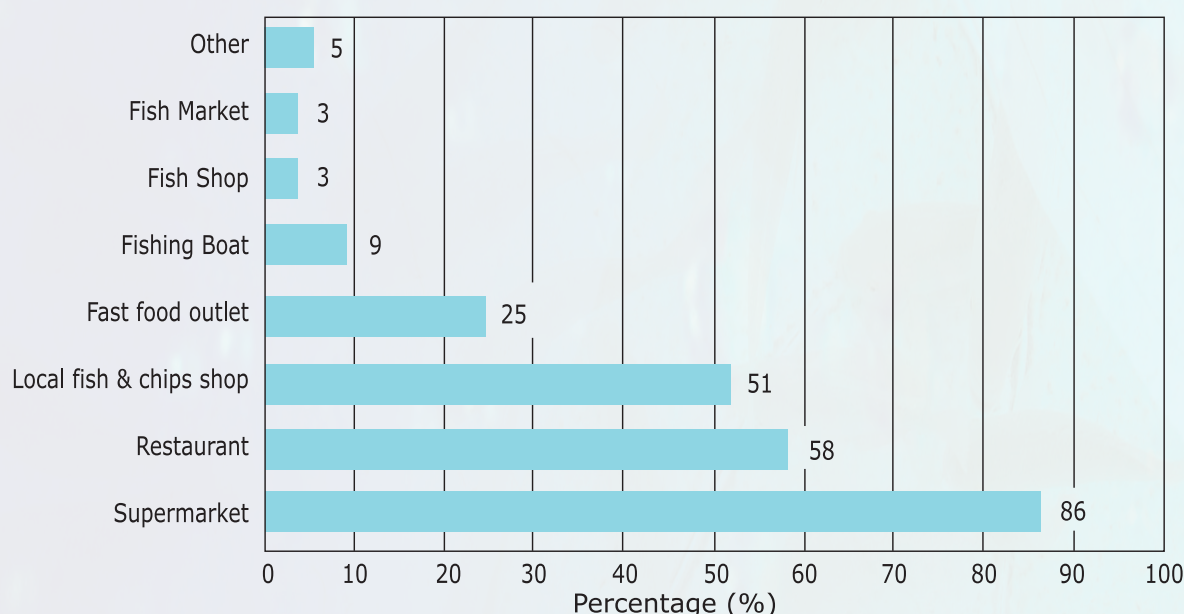
8.2 Seafood Purchasing Behaviour

8.2.1 Responsibility for household shopping

Eighty-seven percent of consumers interviewed were responsible for doing most of the house shopping. The percentage responsible for household shopping was however higher among female respondents (97%) compared to male (61%).

8.2.2 Where seafood is purchased

The most common outlet for purchasing seafood was supermarkets, followed by restaurants, fish and chips shops and fast food outlets (Figure 8.3). A relatively small percentage of consumers (<10%) purchased seafood from fishing boats, fish shops, fish markets and other sources.

Figure 8.3. Percentage of consumers utilising different seafood outlets

8.2.3 Type of seafood purchased when eating at home

Hake, snoek and kingklip were the most frequently purchased products when eating at home. Aquaculture products were however popular with significant percentages of consumers purchasing prawns/shrimps (29%), salmon (21%), mussels (21%), oysters (5%) and trout (3%) (Figure 8.4b). The relatively scarcity of "linefish" (apart from snoek) was reflected in the generally low percentage of consumers (mostly <10) purchasing available species (Figure 8.4b).

Provincial differences were evident in consumer purchase of seafood to eat at home (Figure 8.5). Fewer consumers in KZN (78%) bought hake to eat at home compared to the other provinces. Snoek and mussels were most popular in the Western Cape with 80% of consumers purchasing it, compared to only 18% and 10% respectively in KZN. Similarly, the purchase of kingklip was most frequent amongst Western Cape (41%), and Eastern Cape (35%) consumers, compared to only 14% of consumers in KZN. Frequency of purchase of prawns/shrimp was highest in KZN (42%), compared to less than 30% other provinces. The purchase of calamari was highest (53%) in the Eastern Cape Province, compared to <30% for the other provinces.

Figure 8.4a and b Type of seafood bought when eating at home.

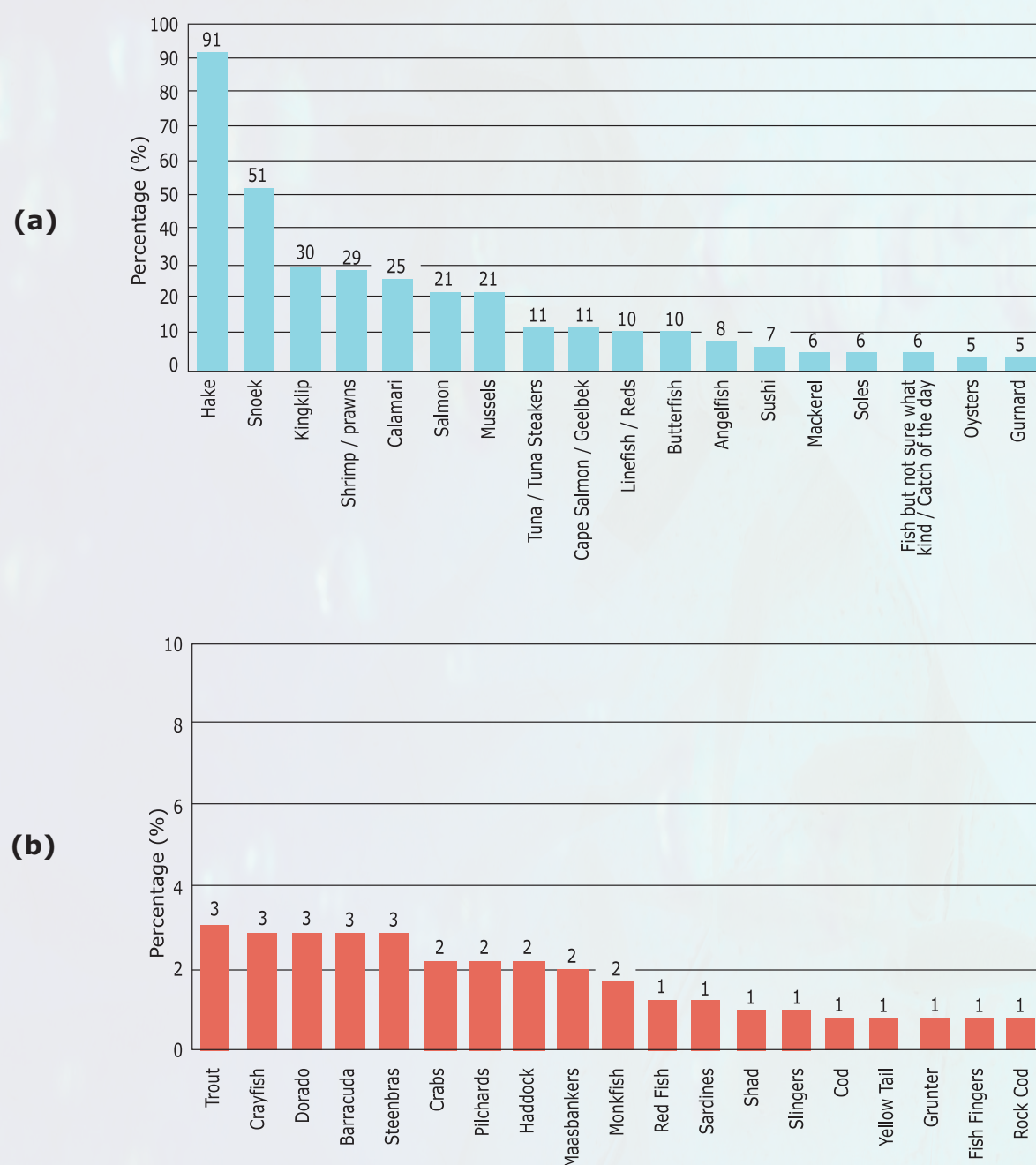
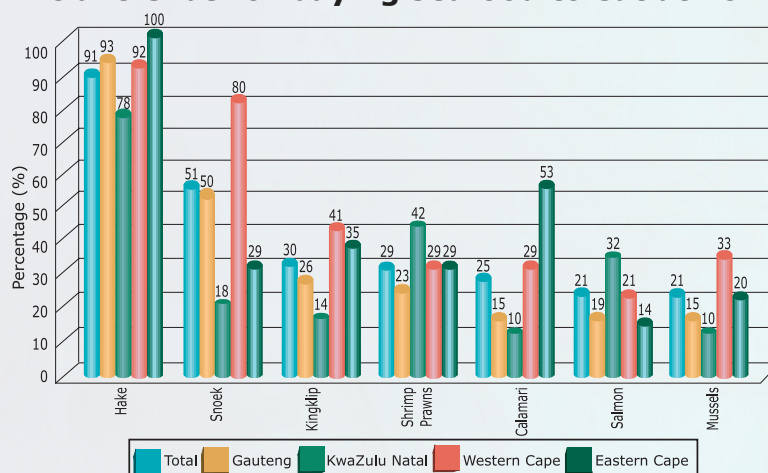
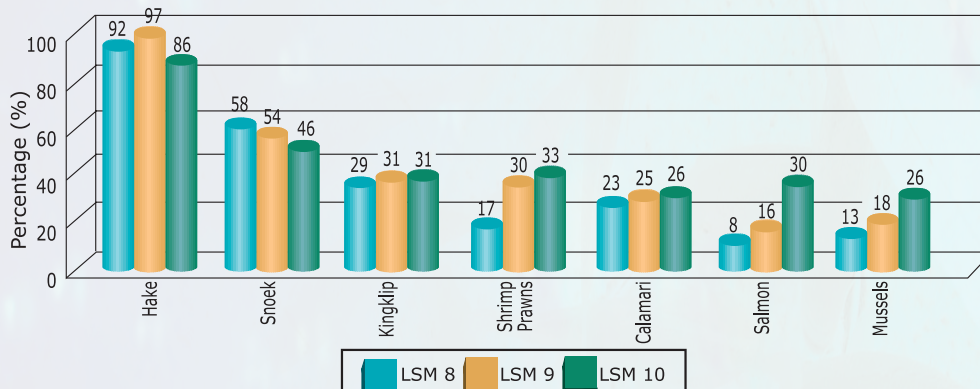
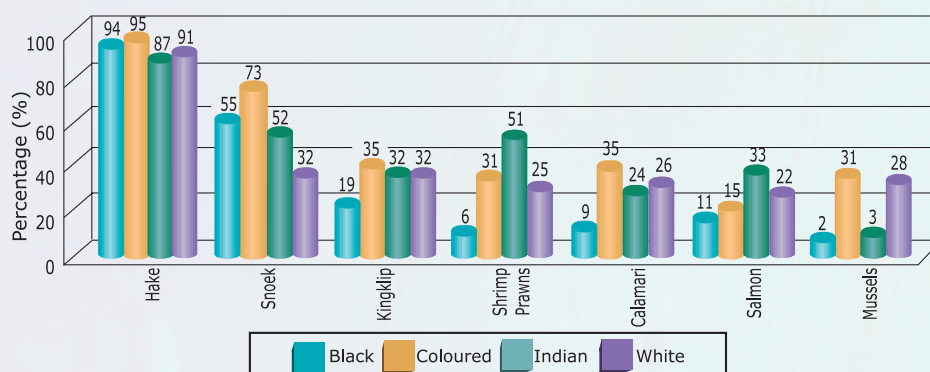


Figure 8.5 Provincial trends for buying seafood to eat at home.

The Living Standards Measure (LSM) categories did not reveal any clear trends in purchasing behaviour for hake, kingklip and calamari (Figure 8.6). However, the percentage of consumers purchasing the relatively economical snoek product decreased as LSM increased from LSM 8 to 10. Conversely, the percentage of consumers purchasing the more “luxury” products, such as shrimps/prawns, salmon, and mussels, increased as the LSM increased from 8 to 10.

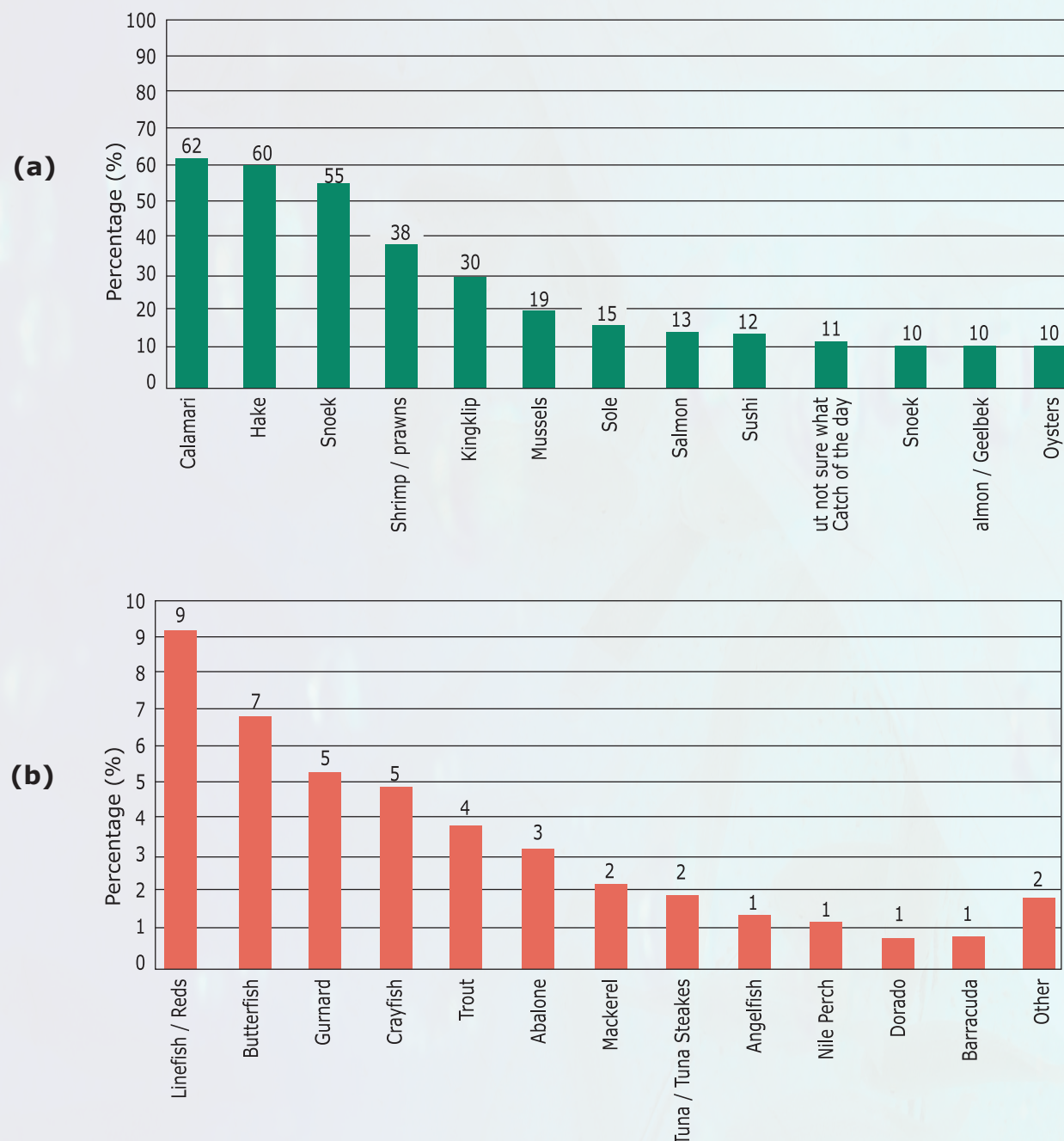
Interesting racial differences were evident in the patterns of seafood purchase for eating at home (Figure 8.7). The percentage of consumers purchasing hake was similar for all race groups, indicating its wide acceptance as a white fish commodity product. The purchase of snoek and calamari were clearly highest amongst coloured consumers, probably due to the traditional Cape culture of consuming snoek and calamari. Other than for hake, the white consumer’s purchasing behaviour is fairly consistent amongst the various products. Black consumers were more conservative in their seafood choices, with a low percentage of black consumers purchasing kingklip (19%), and more “exotic” seafood such as shrimps/ prawns (6%), calamari (9%), salmon (11%), and mussels (2%). The purchase of shrimp/prawn products was highest amongst Indian consumers (51%), probably also reflecting traditional cuisine patterns.

Figure 8.6. Consumer Living Standards Measure (LSM) trends for purchasing seafood to eat at home.**Figure 8.7 Consumer choice by race group in purchasing seafood to eat at home**

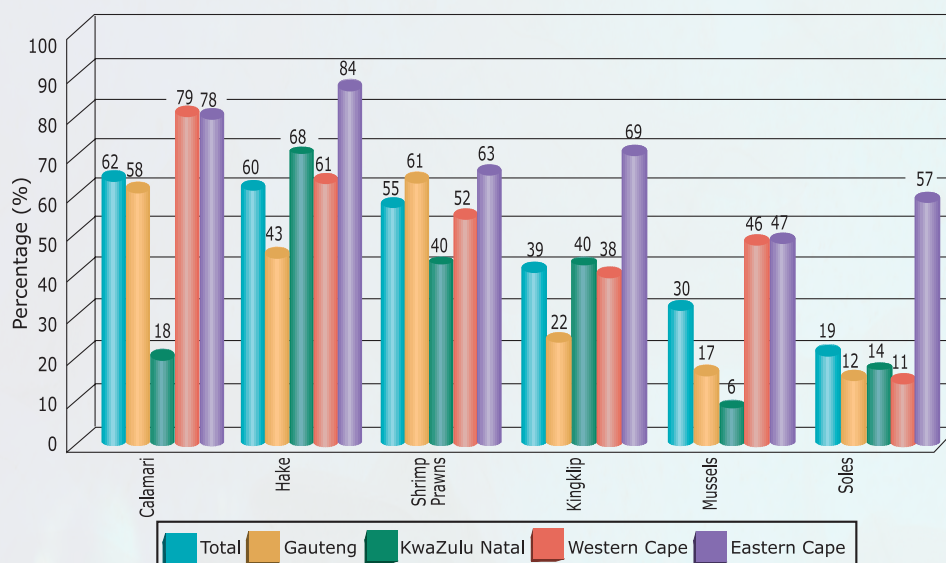
8.2.4 Seafood purchased when eating out

Slightly different trends were evident for seafood purchase when eating out, with a higher frequency of purchase of more “exotic” commodity items such as calamari (62%), shrimps (55%), and mussels (30%) (Figure 8.8). Nonetheless, traditional trawled fish such as hake (60%), kingklip (38%), and sole (19%) remained popular choices. Less than 15% of consumers reported having purchased salmon, sushi, “catch of the day”, snoek, Cape salmon, oysters, trout and linefish.

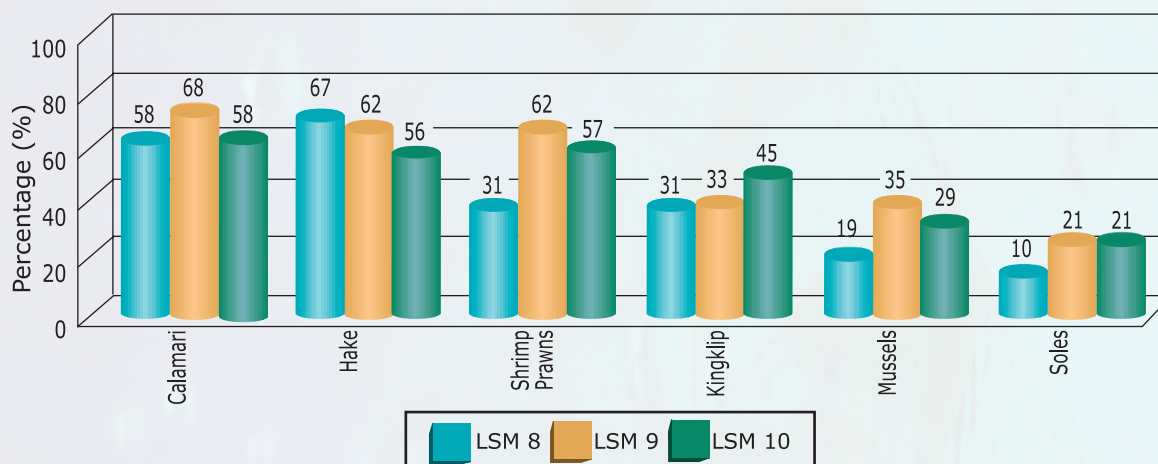
Figure 8.8 a&b Trends in seafood purchase when eating out.



Provincial differences were evident in seafood purchase trends when eating out, however, some appear anomalous and may be sampling artefacts (Figure 8.9). Overall, the highest percentages of consumers of purchasing the top six selling products were from the Eastern and Western Cape Provinces. Gauteng had a relatively low percentage of consumers purchasing hake (43%), kingklip (22%), and mussels (17%). In KZN, relatively low numbers of consumers purchased calamari (18%), shrimps/prawns, and mussels.

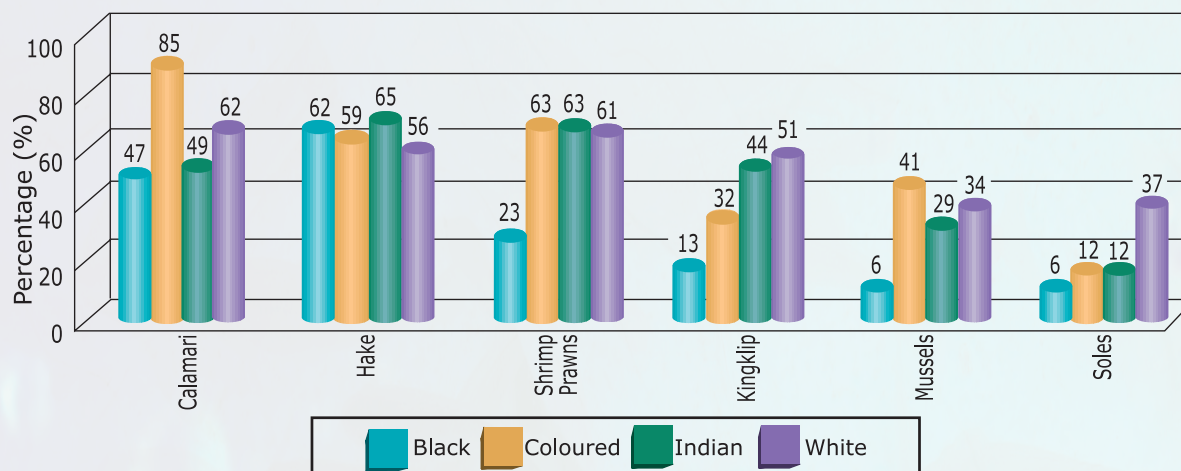
Figure 8.9 Provincial trends in seafood purchase when eating out.

The Living Standards Measure (LSM) revealed some trends in seafood purchasing behaviour when eating out (Figure 8.10). The lowest frequency of seafood purchase when eating out was recorded for LSM 8, with the exception of the lower priced hake; - probably reflecting a higher product price sensitivity in this lower earning LSM group. There seem to be a preference in LSM 8 for calamari and hake, whereas in LSM 9 there seem to be a preference for calamari, hake and shrimp/prawns. In LSM 10 there seem to be a wider preference for calamari, hake, shrimp/prawns and kingklip. Kingklip purchase increased in frequency from LSM 8 to 10.

Figure 8.10 Living Standards Measure trends in the purchase of seafood when eating out.

There were clear seafood purchasing differences between race groups when eating out. Hake was the most frequently purchased product among black consumers (62%), followed by calamari (47%), while the frequency purchase of other products (shrimp/prawns, kingklip, mussels and soles) was considerably lower in comparison to the other race groups. The highest frequency of purchasing kingklip and sole most was reported by white consumers. The ubiquitous hake was purchased in a similar proportion by all race groups. The highest frequency of calamari purchase was recorded among coloured respondents. Shrimp/prawns was a popular eating out purchase among white (61%), coloured (63%) and Indian (63%) consumers.

There seem to be a general preference (when eating out) for calamari and hake by the Black respondents, whereas the Coloured and Indian respondents seem to prefer calamari, hake and shrimp/prawns. The White respondents seem to be more diverse in their choices, with a substantial proportion of consumers purchasing calamari, hake, shrimp/prawns and kingklip.

Figure 8.11 Seafood purchase trends when eating out among race groups.

8.2.5. Seafood versus meat and poultry

Consumers ranked poultry as the most important protein, with 89% of respondents categorising it as the most important or 2nd most important protein type in their diet, compared to 60% for seafood and 51% for meat (Figure 8.12). This preference is almost certainly influenced by price, as poultry was considered the most affordable protein (Figure 8.13). Seventy-two of respondents ranked poultry as most affordable, compared to 15% for seafood and 13% for meat.

8.2.6 Culture, religion, and health factors in determining seafood buying

Culture and religion were not considered influential factors in terms of why people choose to eat fish/ seafood, while health was considered as an influential factor by 36% of respondents (Figure 8.14). Most people (56%) who were influenced by health factors in purchasing seafood, purchased fish because they feel "it's healthier" (Figure 8.15). Lower percentages (<25%) of interviewees provided more specific health reasons such as "it contains protein", it has "omega-3 oil", "doesn't contain fat", "it's low in cholesterol". It is interesting to note, the number of people who purchased seafood because they perceived it to be healthy increased with age (Figure 8.16).

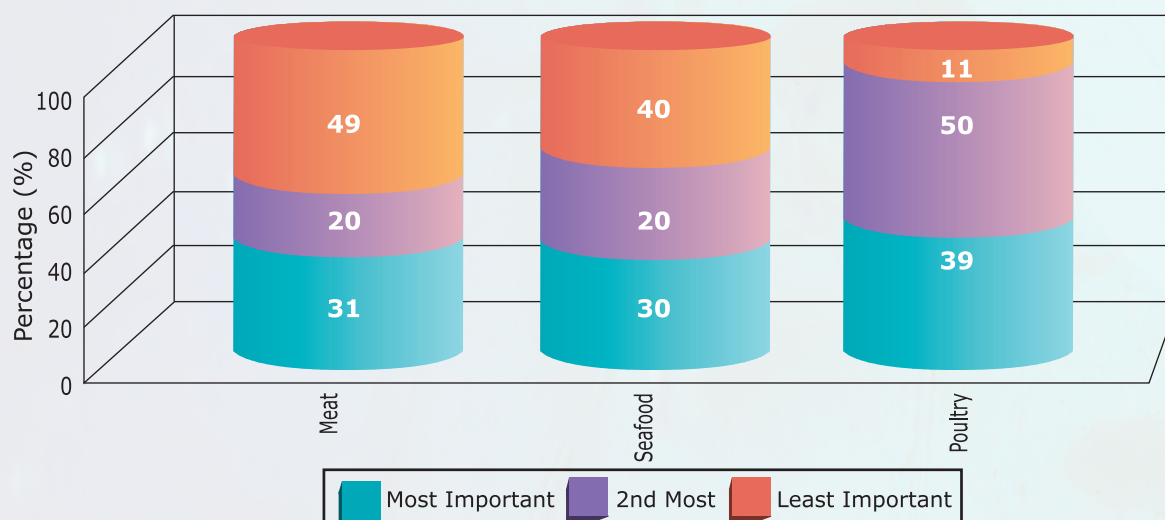
Figure 8.12 Consumer ranking of the importance of meat, seafood and poultry in their diets.

Figure 8.13 Consumer ranking of the affordability of meat, seafood and poultry in their diets.

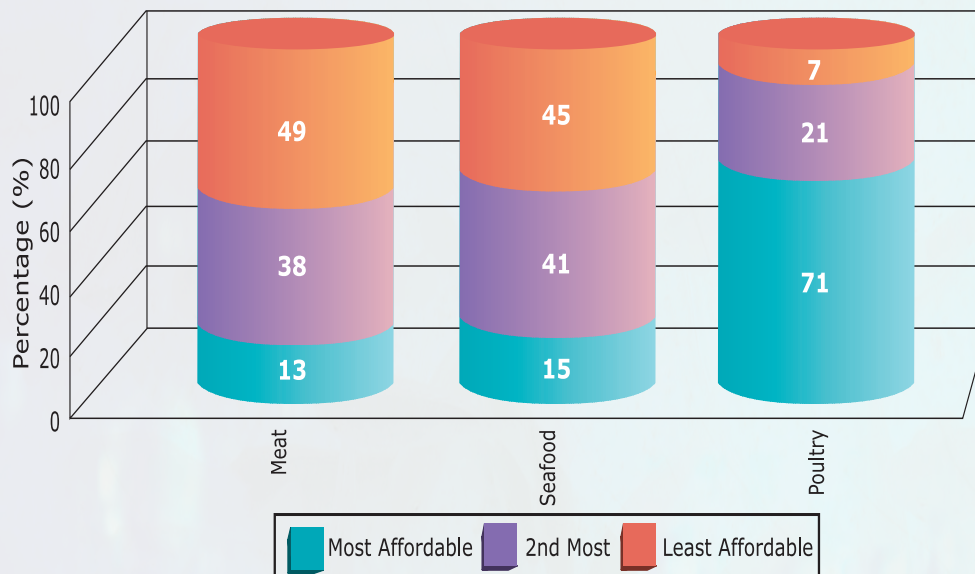


Figure 8.14 Consumer ranking of factors influencing their choices in purchasing seafood.

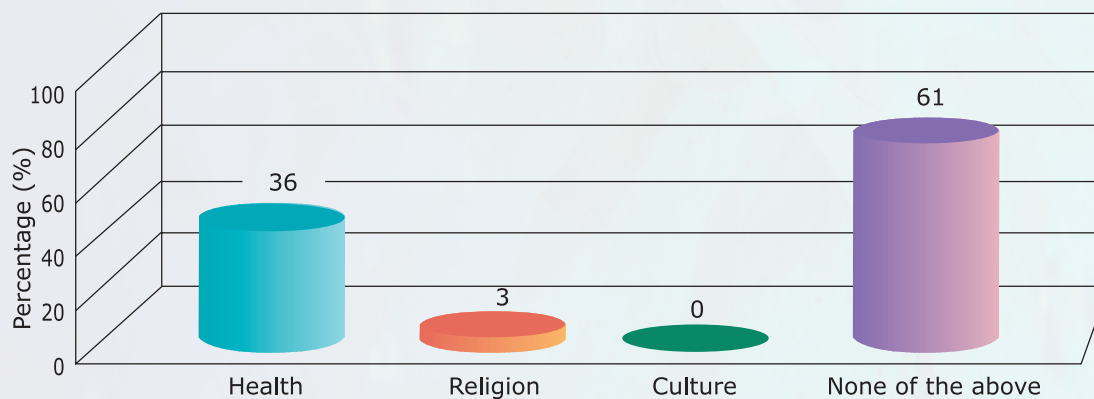


Figure 8.15 Consumer ranking of health factors influencing their choices in purchasing seafood.

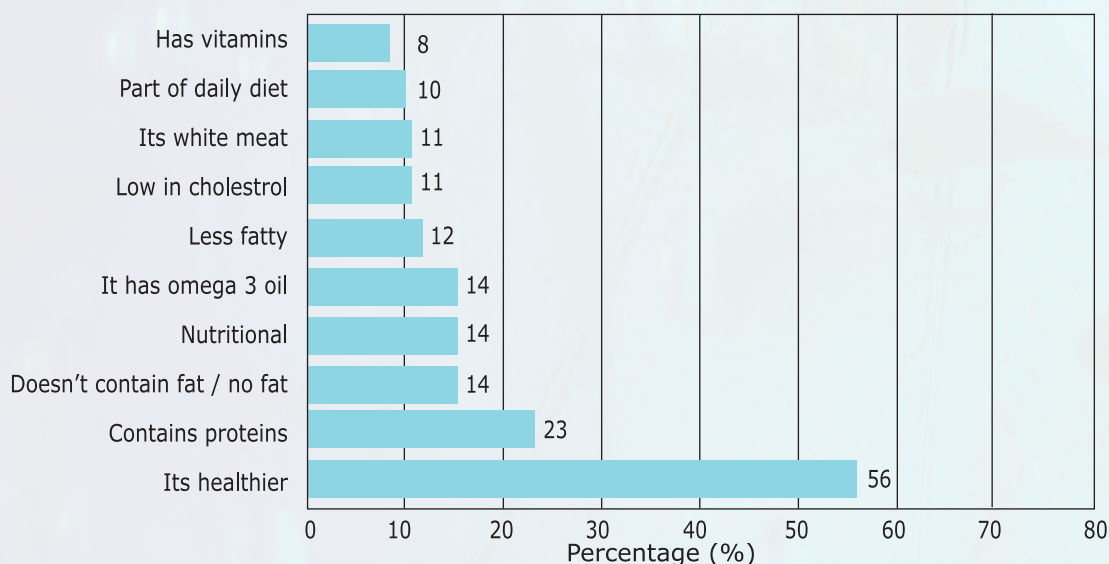
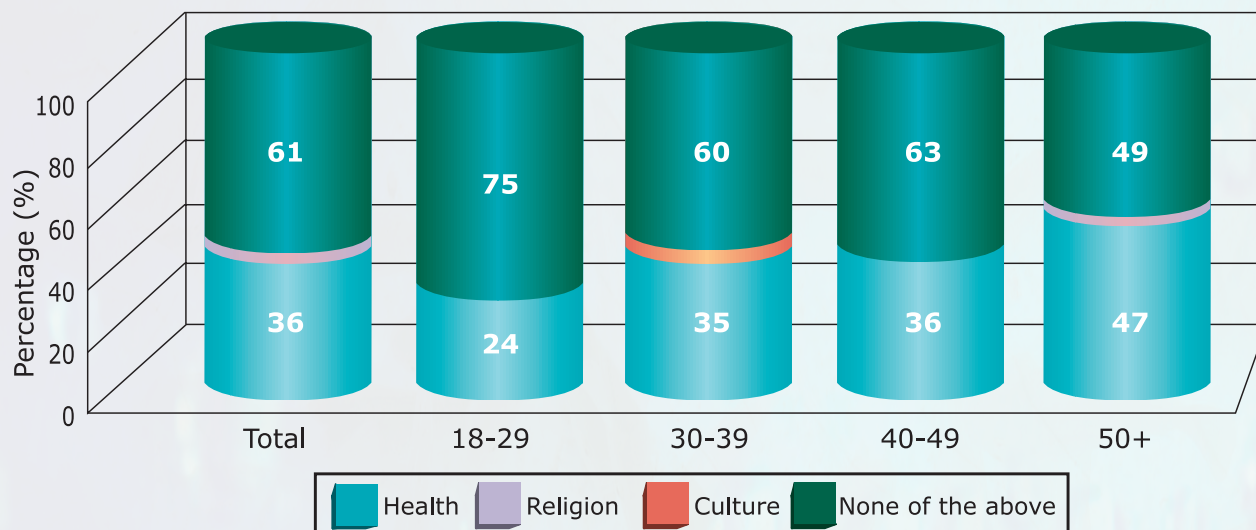


Figure 8.16 Factors influencing why consumers purchase seafood by age group.**8.2.7 Product Familiarity**

Ninety-one percent of consumers stated that when they purchase seafood in a supermarket, they tended to stick with products that they were familiar with. Eighty five percent of consumers tended to purchase familiar seafood products when eating out in restaurants.

8.2.8 Local versus imported products

In response to the question: "On a scale of 1-10, how important is it to you whether you buy local or imported seafood"; 53% of respondents felt the distinction was important (ranking 8-10) (Figure 8.17). Correspondingly, 54% of respondents felt that it was important to have information (ranking 8-10) on whether seafood was local or imported (Figure 8.18).

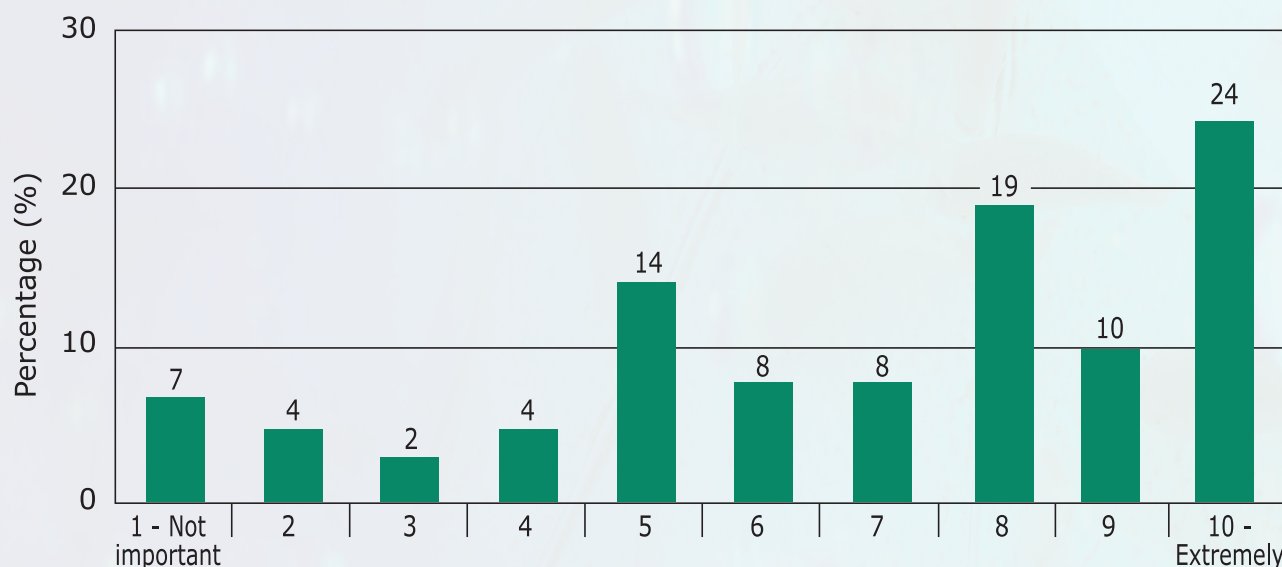
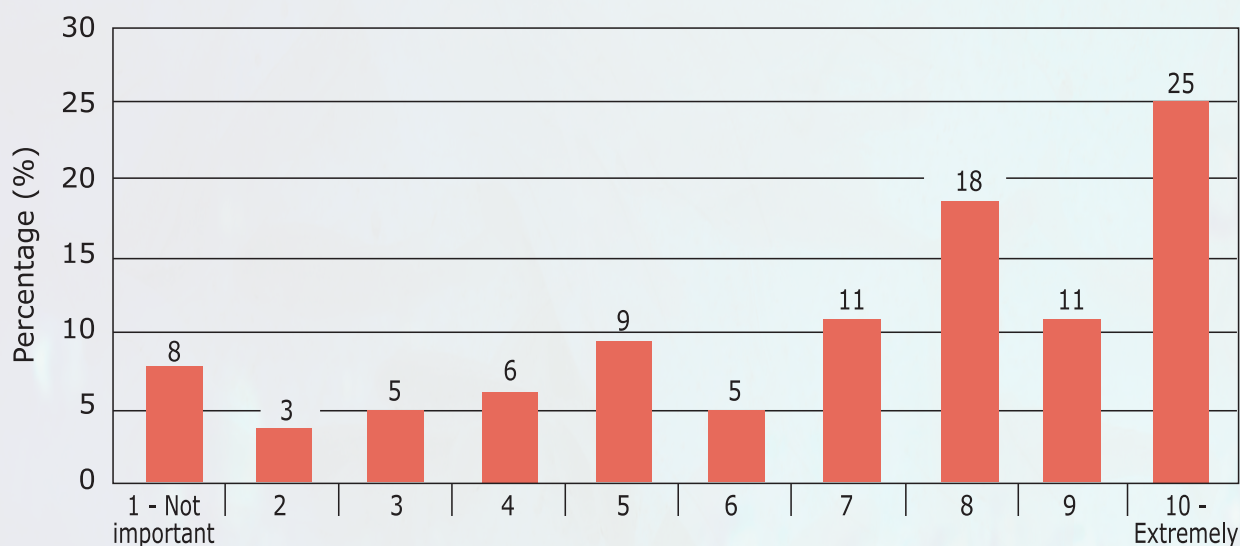
Figure 8.17 Consumer ranking of importance of whether they buy local or imported seafood.

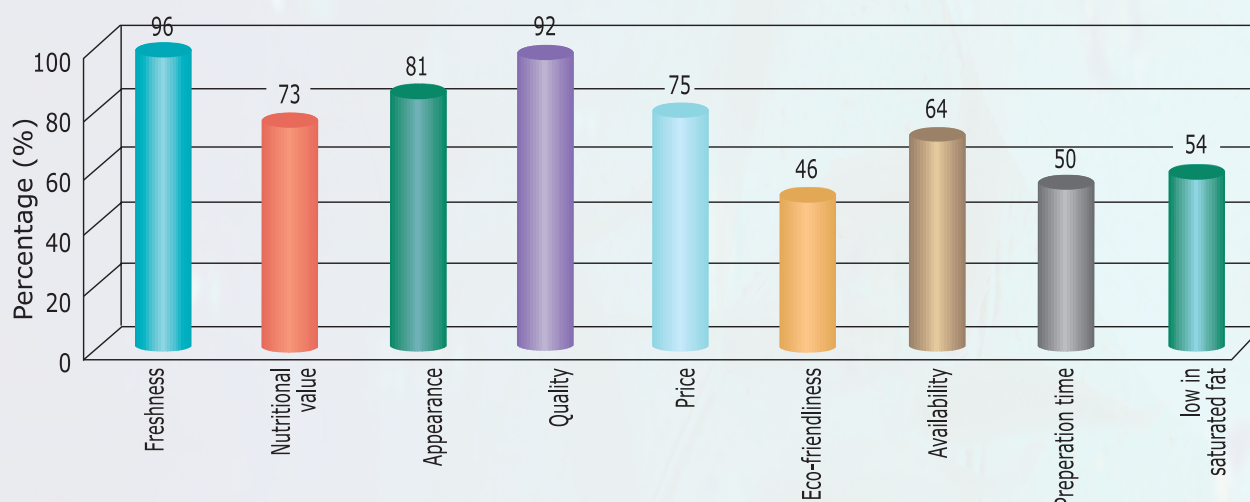
Figure 8.18 Consumer ranking of the importance of having information on whether seafood products were local or imported.



8.2.9 Product attributes determining seafood purchase decisions

The highest proportion of consumers ranked “freshness” and “quality” as important product attributes when purchasing seafood. “Eco-friendliness”, “preparation time” and “low in saturated fat” were not ranked as important by >45% of consumers (Figure 8.19).

Figure 8.19 Relative importance of product attributes influencing consumer decisions to purchase seafood products.



8.3 Consumer Perceptions of Aquaculture

8.3.1 Awareness of Aquaculture

A remarkable 85% of consumers interviewed had never heard of the term “aquaculture” (Figure 8.20). Awareness of aquaculture was highest in the Western Cape Province with 30% of interviewees having heard of the term (Figure 8.21). In terms of consumer racial group, awareness of aquaculture was highest amongst white and coloured consumers, and lowest amongst Indian and black consumers (Figures 8.22). A higher number of consumers with a post-matric education were aware of aquaculture compared to those with matric or some high schooling (Figure 8.23).

Figure 8.20 Proportion of consumers who had heard of the term “Aquaculture”.

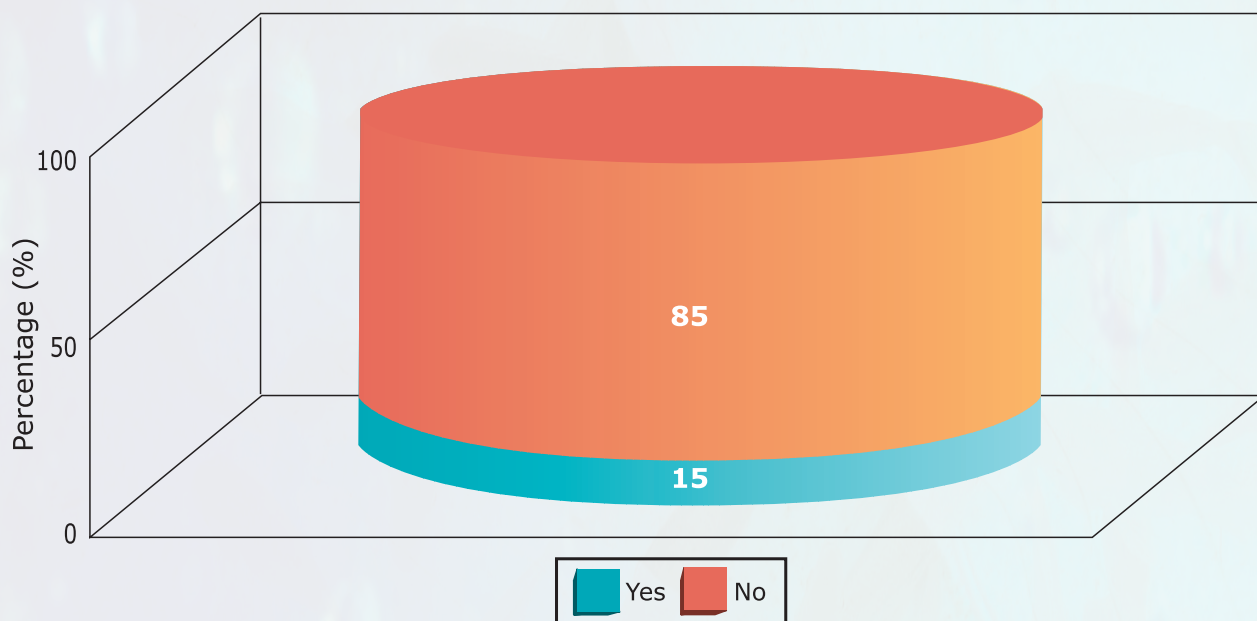


Figure 8.21 Consumer awareness of the term “aquaculture” by province.

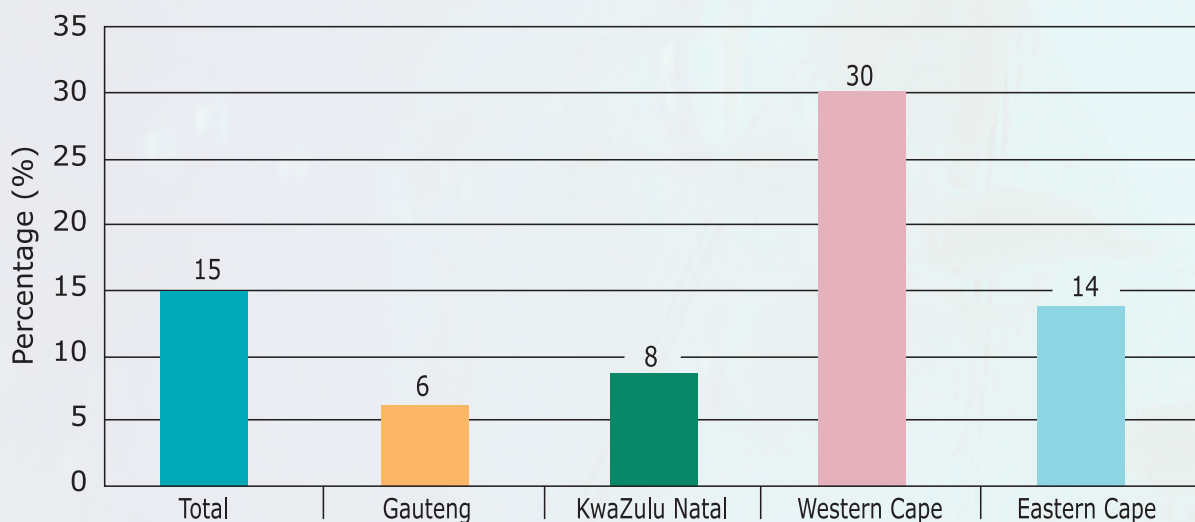
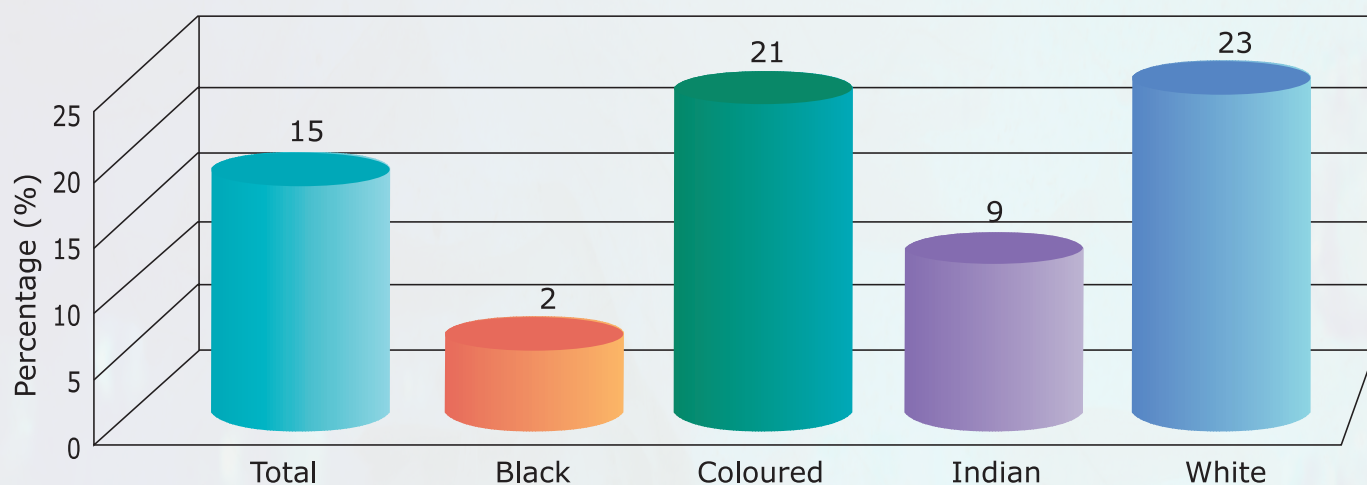
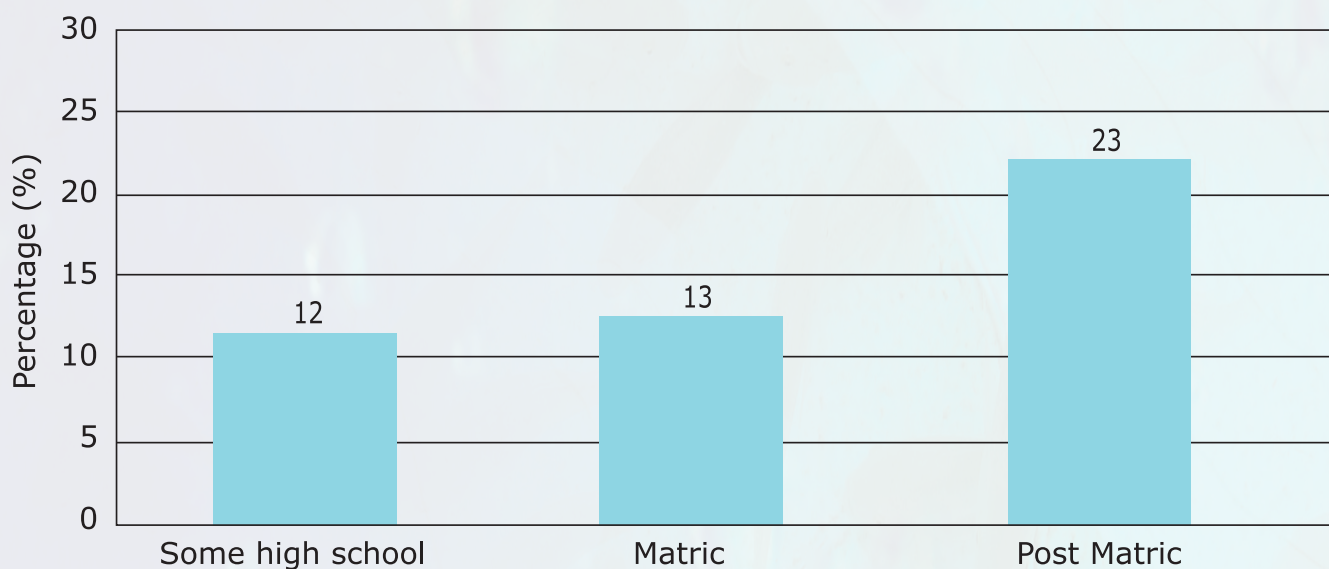
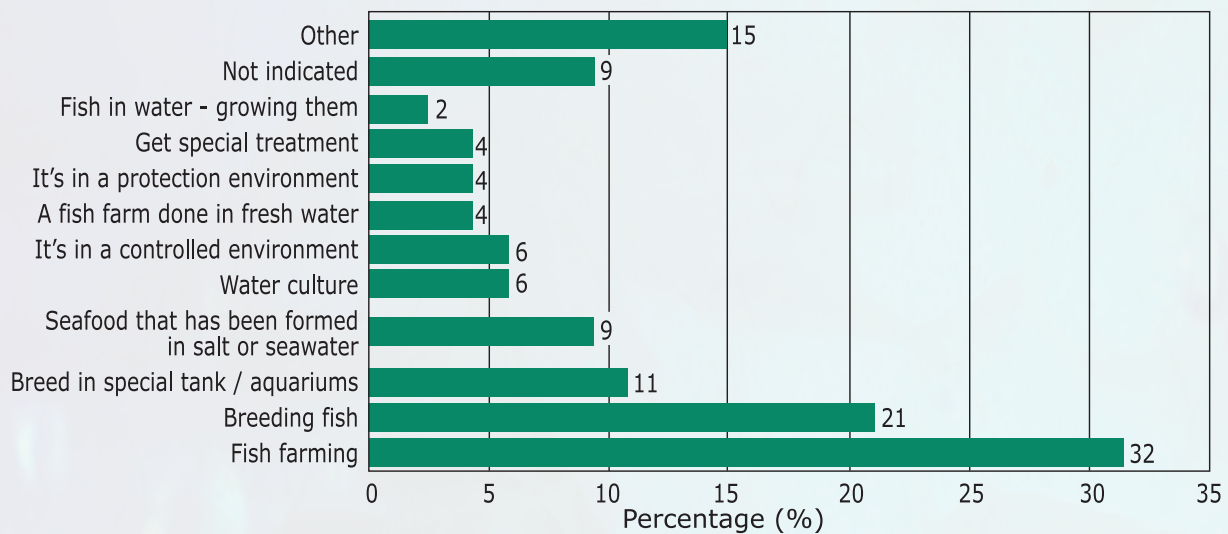
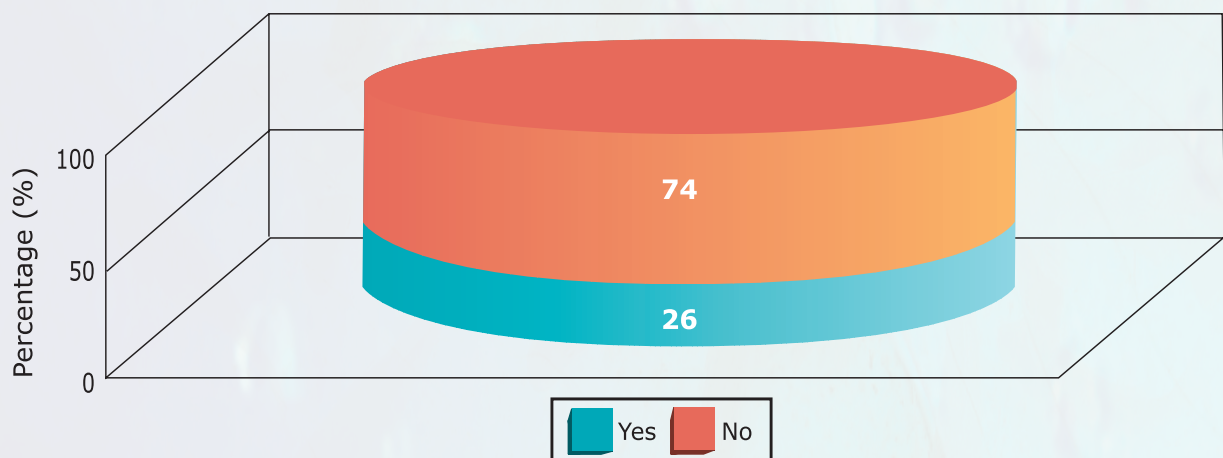
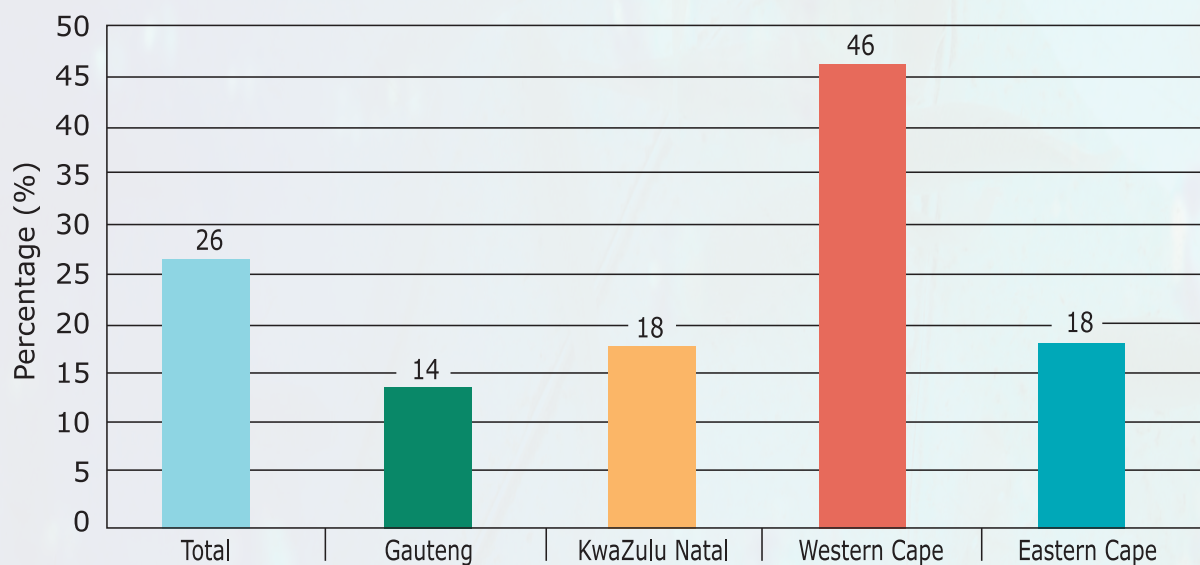


Figure 8.22 Awareness of the term “aquaculture” by consumer’s race.**Figure 8.23 Awareness of the term “aquaculture” by consumer’s education level.**

8.3.2 Understanding of Aquaculture

Of the 15% who had heard of the term “aquaculture”, the majority (37%) responded that their understanding of the word was “fish farming”, 21% responded as “breeding fish”, and 11% “breeding in tanks or aquariums” (Figure 8.24). Twenty six percent of respondents knew that aquaculture seafood products were not removed from their natural ocean habitat (Figure 8.25). The proportion of consumers knowing that aquaculture products were not sourced from their natural ocean habitat, but were farmed, was highest in the Western Cape Province (46%) (Figure 8.26).

Figure 8.2 Consumer understanding of the term “aquaculture”.**Figure 8.25 Proportion of consumers who knew that aquaculture seafood products were not taken out of their natural ocean habitat.****Figure 8.26 Proportion of consumers who knew that aquaculture seafood products were not taken out of their natural ocean habitat by province.**

8.3.3 Preference for Wild versus Farmed Seafood

The majority (56%) of respondents stated that they preferred to buy wild seafood; 5% preferred farmed and 39% had no preference (Figure 8.27). A higher proportion of Indian (72%) and coloured (71%) consumers stated that they preferred wild seafood (Figure 8.28). The preference for wild seafood increased as the Living Standards Measure increased from LSM 8 to 10 (Figure 8.29). The most common reason for preferring wild seafood, cited by 28% of respondents, was that it originated from a "natural" environment or was "more natural" (Figure 8.30). The second and third most commonly cited reasons were "not fed man-made products and chemicals" (19%) and "tastes better" (16%) (Figure 8.31). In response to the question "On a scale of 1-10, how important is it you to buy wild or farmed seafood", 33% of consumers rated the distinction as very important (ranking 8-10; Figure 8.31). Fifty-one percent of respondents felt it was important (ranking 8-10) to have information on whether seafood products were wild or farmed (Figure 8.32).

Figure 8.27 Consumer preference for wild or farmed seafood.

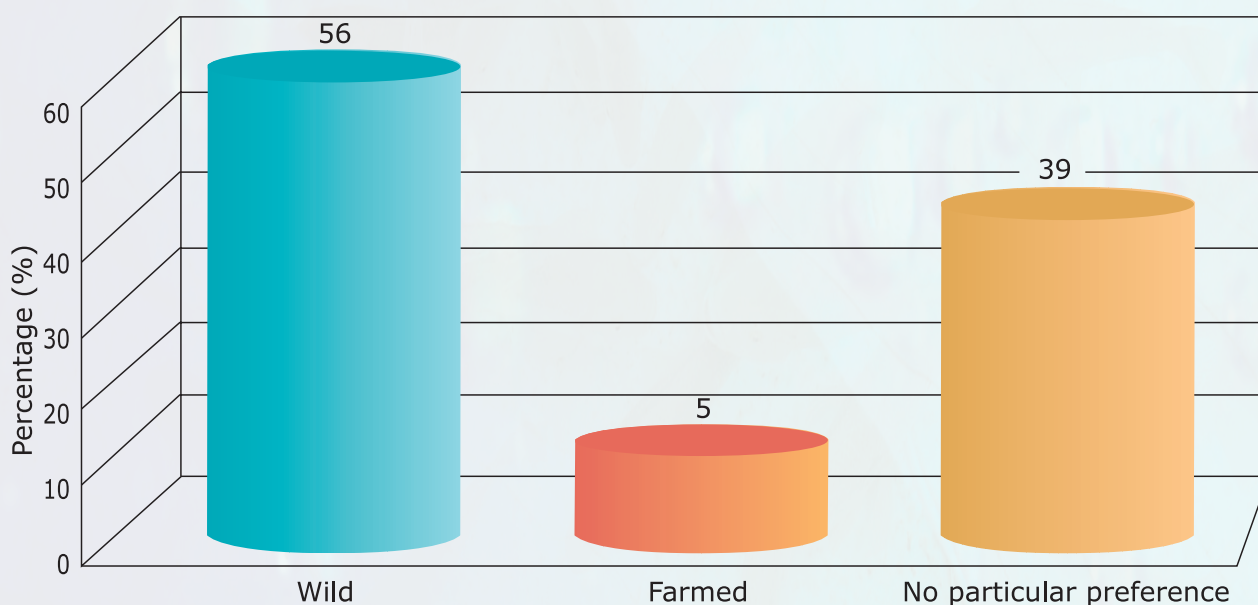


Figure 8.28 Preference for wild of farmed seafood by consumer racial group.

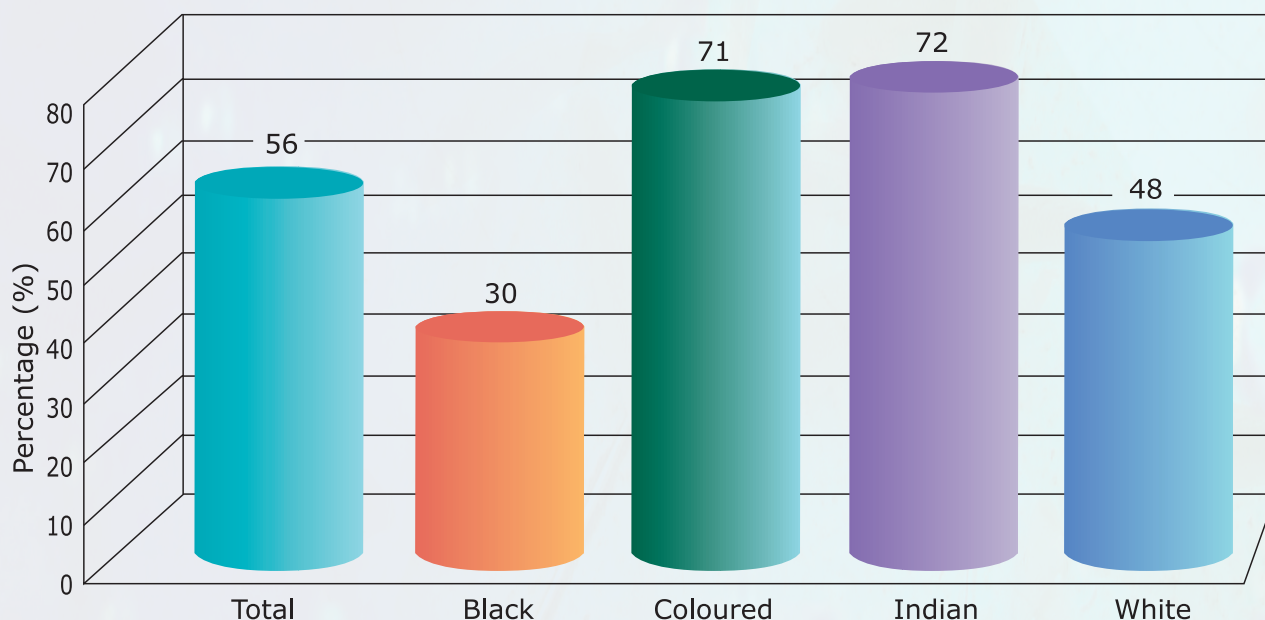


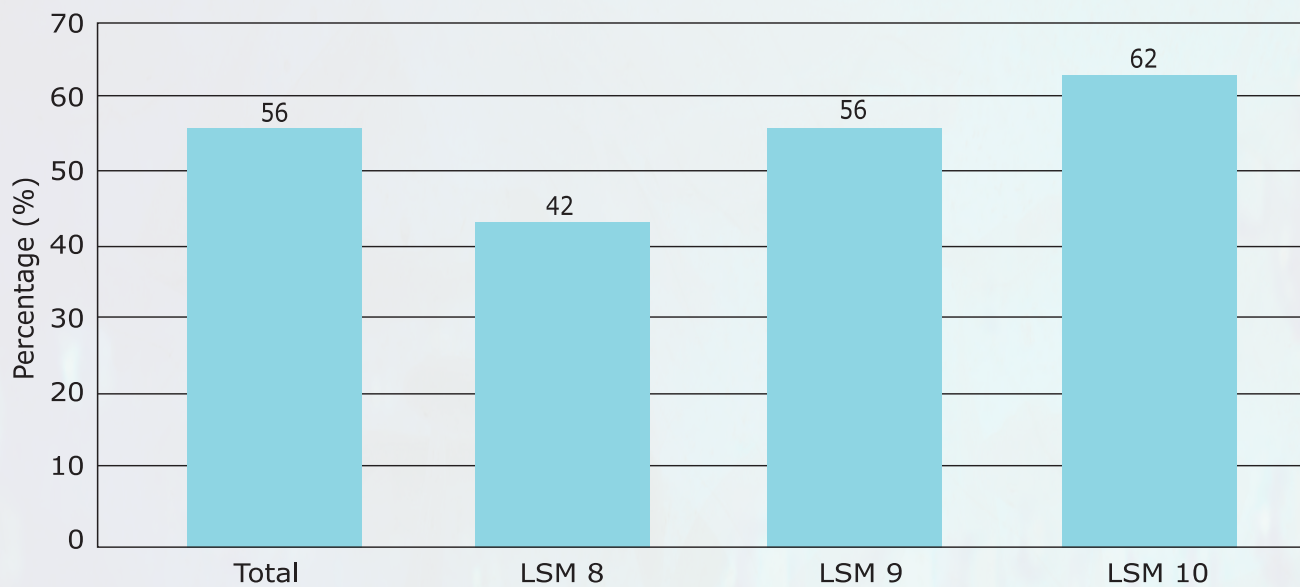
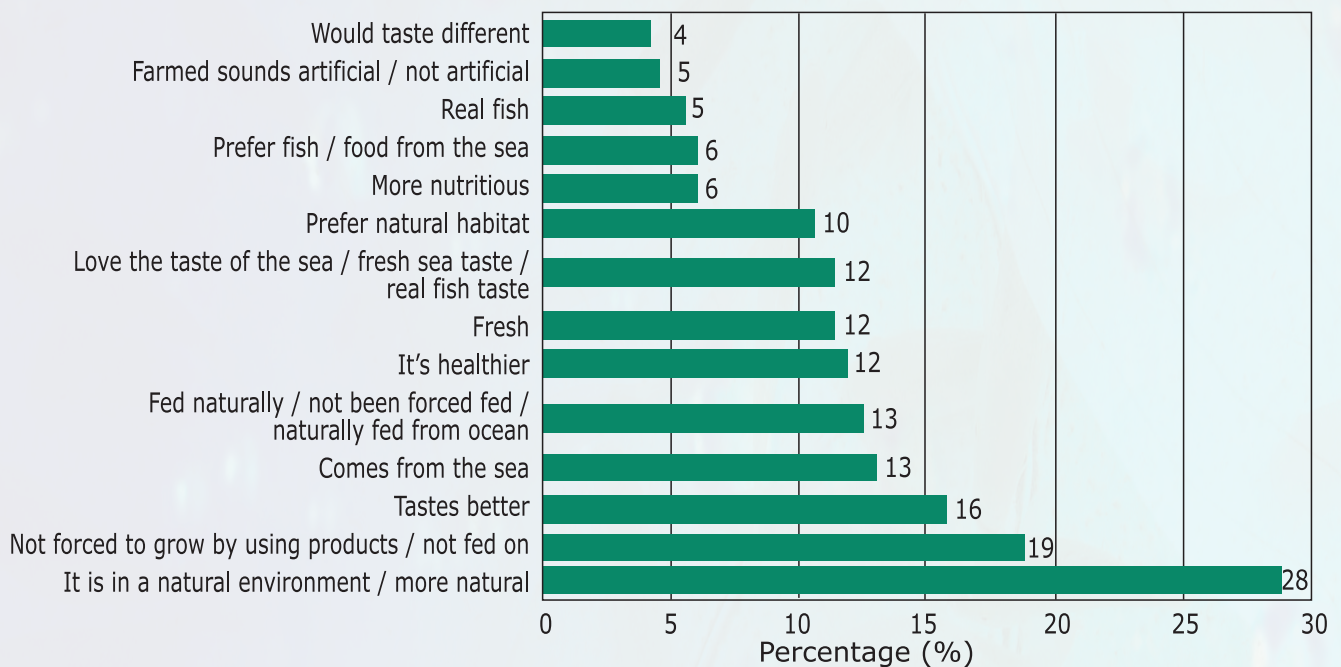
Figure 8.29 Preference for wild of farmed seafood by Living Standards Measure.**Figure 8.30 Reasons for preferring wild seafood to farmed.**

Figure 8.31 Relative importance of wild versus farmed in consumer purchasing decisions.

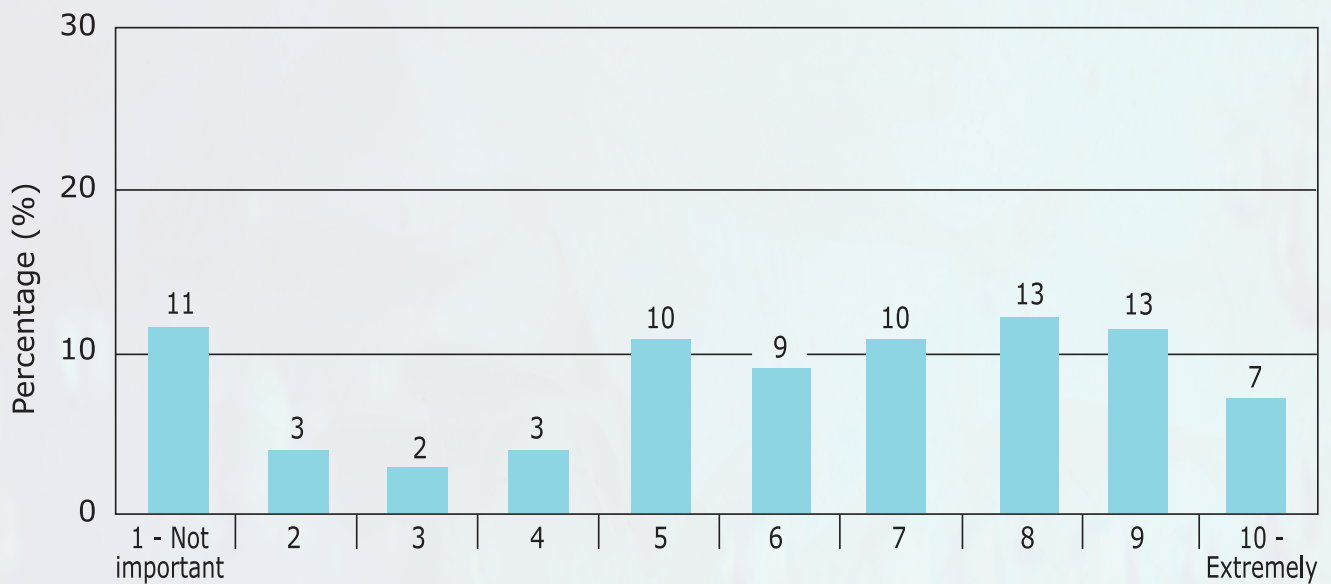
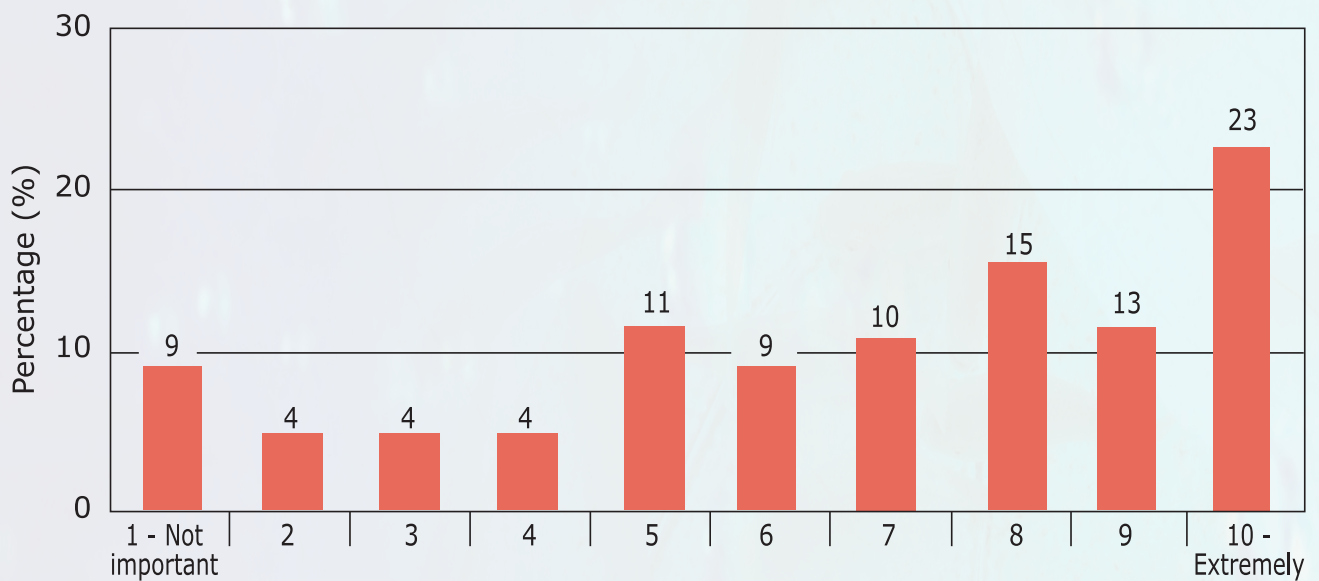


Figure 8.32 Relative importance of wild versus farmed in consumer purchasing decisions.



8.3.4. Importance of salmon colour

Of the 32% of consumers that purchased salmon, 53% regarded the flesh shade of pink/red as important. Of the respondents that deemed flesh colour to be important, 66% felt that the colour "indicates freshness" and 24% felt the intensity of the colour indicated the degree of freshness (Figure 8.33). In terms of consumer race, a higher proportion of Indian and white consumers rated the colour of salmon as important (Figure 8.34). On a provincial basis, a higher proportion of consumers from KZN and the Western Cape rated salmon colour as important, perhaps reflecting cultural preferences and traditional knowledge associated with the product (Figure 8.35). The rating of the importance of flesh colour increased with the level of the respondent's education (Figure 8.36); probably reflecting that salmon is predominantly purchased by consumers with higher educational levels.

Figure 8.33 Consumer rating of reasons why flesh colour is important in purchasing salmon products.

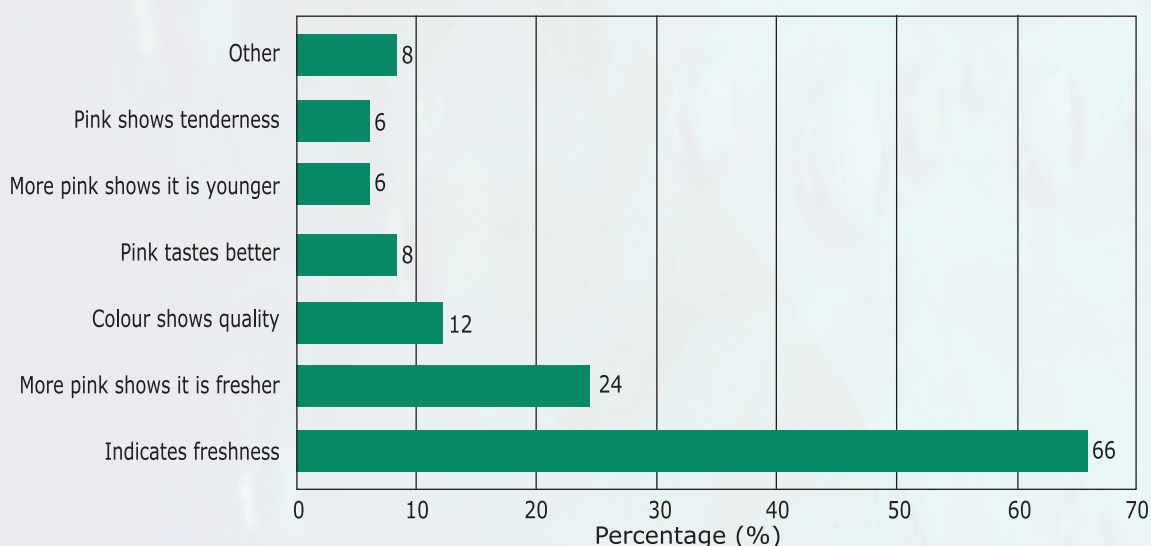


Figure 8.34 Influence of consumer racial group on the ranking of importance of colour in salmon flesh.

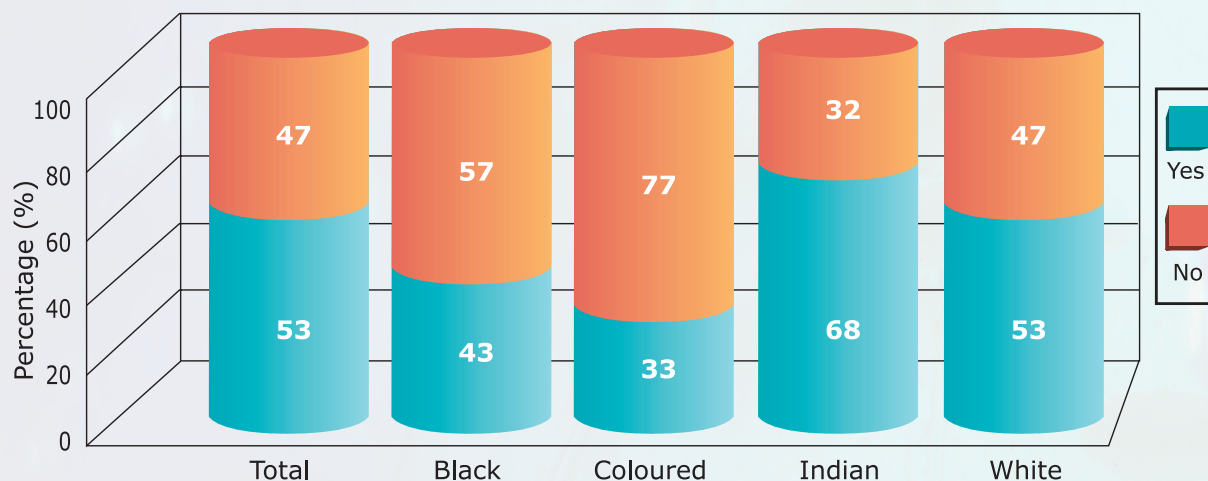


Figure 8.35 Influence consumer's provincial location on the ranking of importance of colour in salmon flesh.

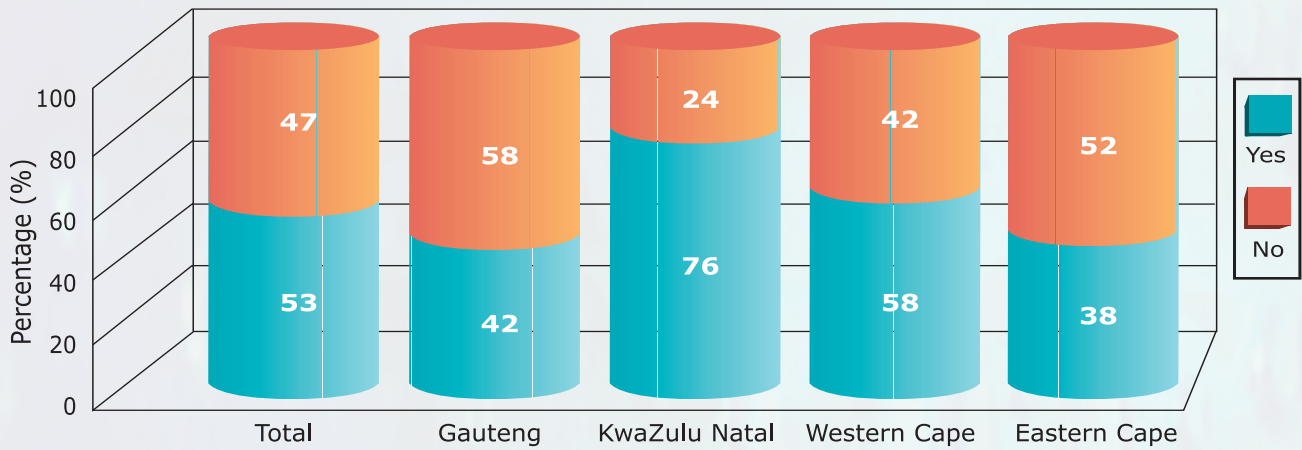
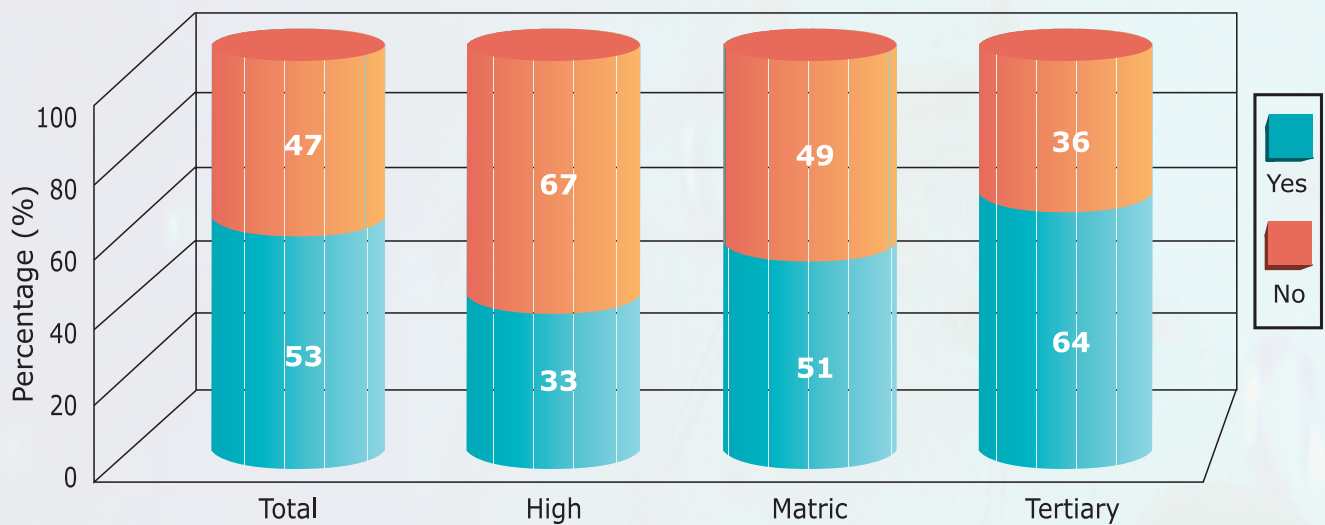


Figure 8.36 Effect of consumer educational level on the ranking of the importance of flesh colour in salmon products.



8.4 Frequency of Seafood Purchase

8.4.1 Fresh seafood

The majority of respondents (60%) purchased fresh seafood once a month or more often (Figure 8.37). Sixty percent of interviewed consumers reported buying the same quantity fresh seafood compared to a year ago; 22% were buying more, and 19% buying less. A significantly higher proportion of black consumers reported that they buy more fresh fish than a year ago, perhaps reflecting a growing awareness of seafood products amongst black consumers (Figure 8.38).

3.4.2 Frozen Seafood

Seventy percent (70%) of respondents buy frozen seafood once a month or more often. The majority (67%) reported buying the same quantity of frozen seafood compared to a year ago, 18% more, and 16% less. The proportion of black and Indian consumers buying more frozen fish was higher than a year ago (Figure 8.39), again possibly reflecting a growing awareness of seafood products amongst black consumers.

Figure 8.37 Frequency of purchase of fresh seafood by South African consumers.

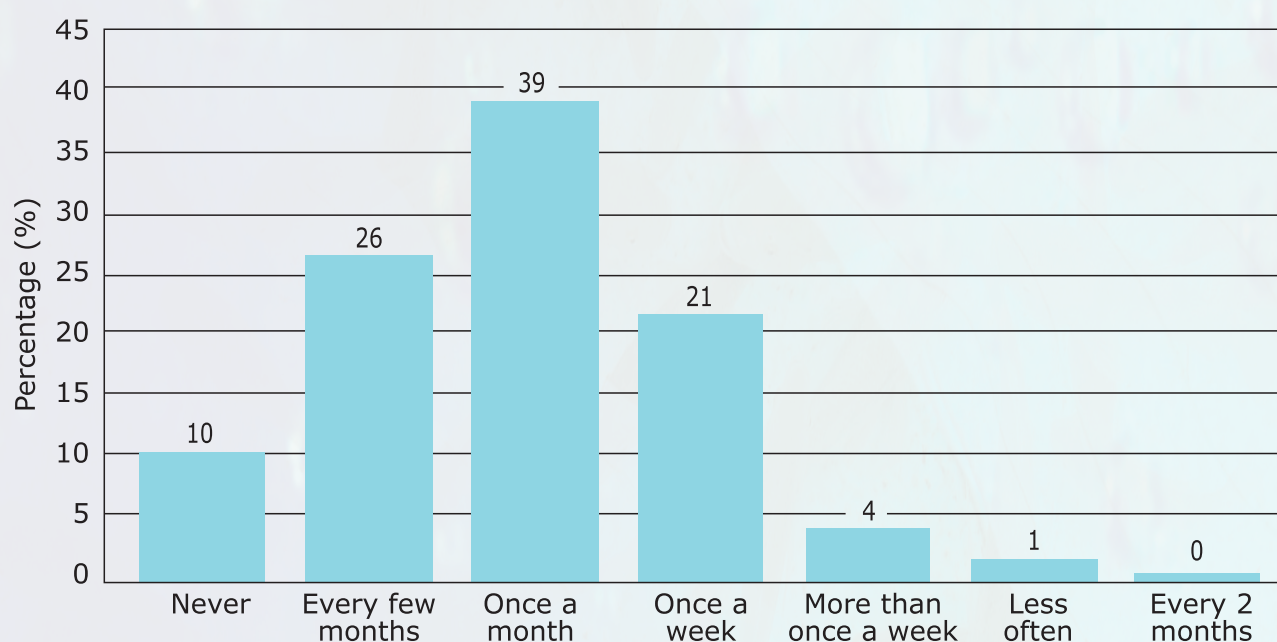


Figure 8.38 Comparative purchase of fresh seafood compared to a year ago by consumer race group.

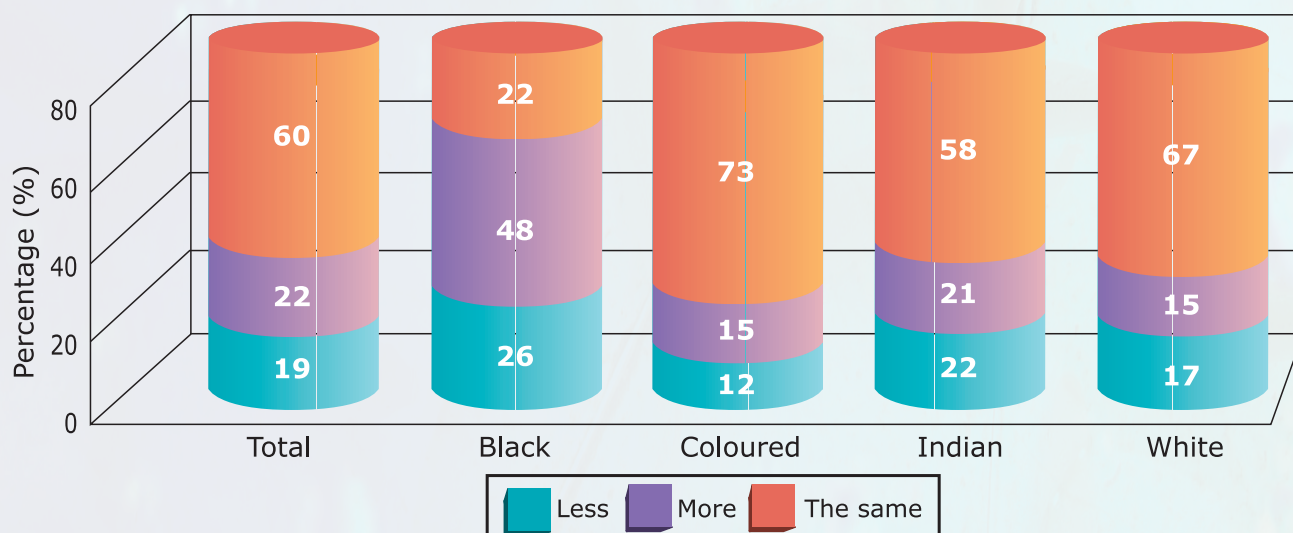
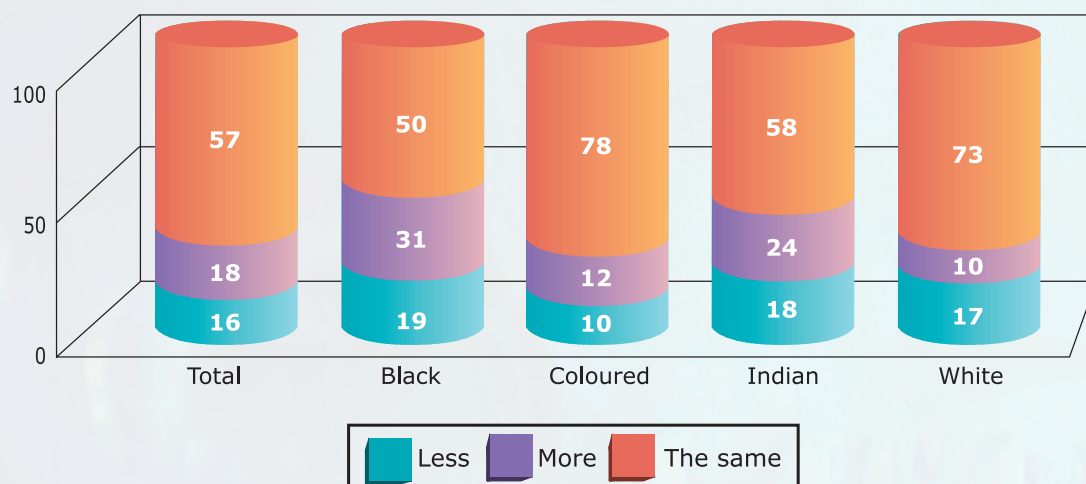


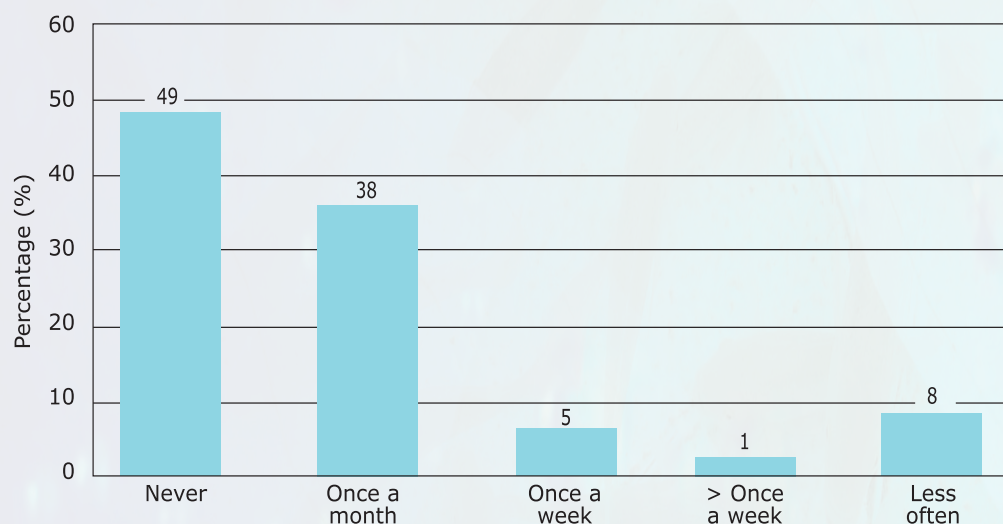
Figure 8.39 Comparative purchase of frozen seafood compared to a year ago by consumer race group.



8.4.3 Whole fish

Forty-nine percent (49%) of consumers reported that they never buy whole fish, and 38% stated that they purchase whole fish once a month (Figure 8.40).

Figure 3.40 Frequency of purchase of whole fish by South African consumers.



8.4.4 Fillets

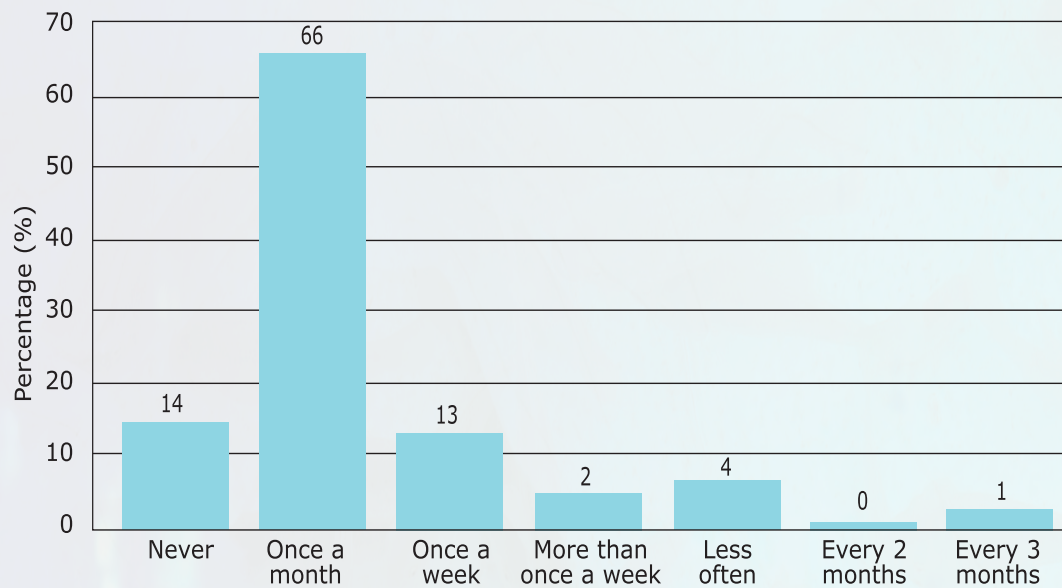
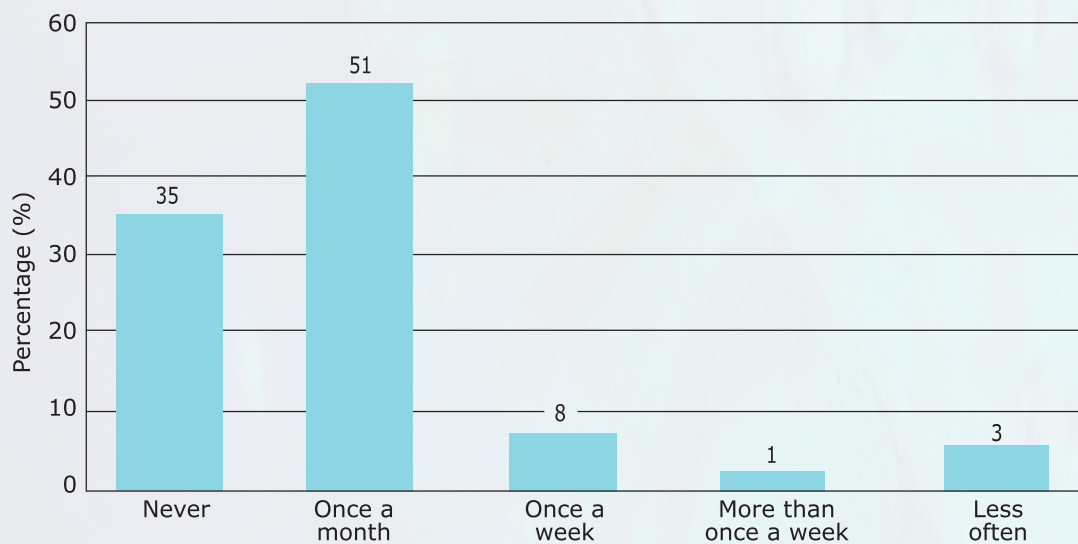
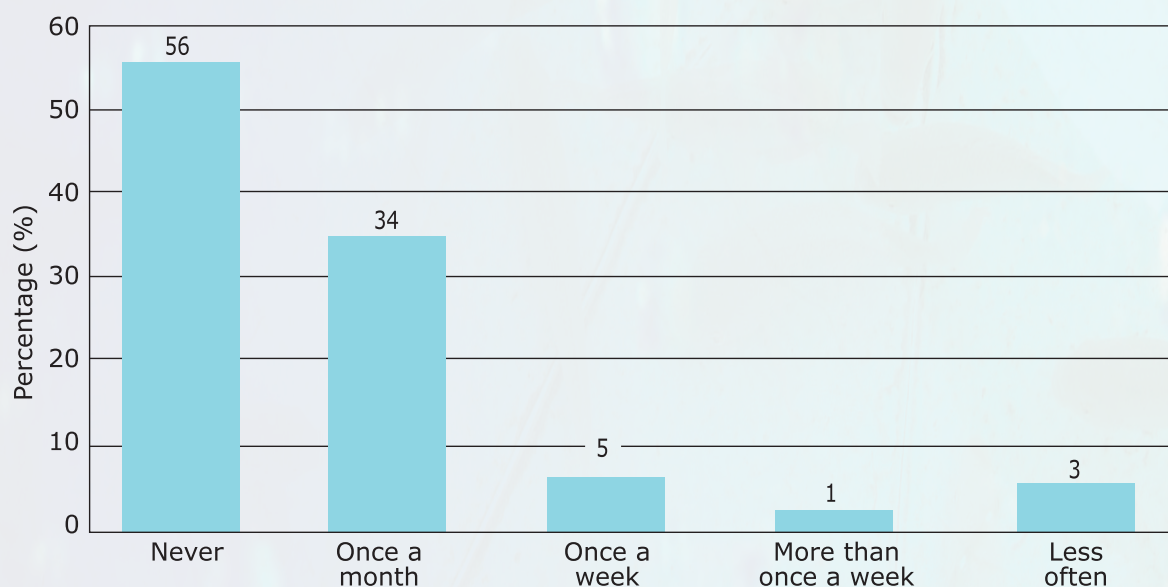
A high proportion (66%) of consumers bought fillets once a month; 14% never bought them, and 13% purchased once a week (Figure 8.41).

8.4.5 Cutlets

Fifty-one percent of respondents reported buying cutlets once a week and 35% never purchased cutlets (Figure 8.42).

8.4.6 Smoked seafood

A high percentage of consumers (56%) reported that they never buy smoked seafood; 34% buy once a month; and 5% once a week (Figure 8.43).

Figure 8.41 Frequency of purchase of fish fillets by South African consumers.**Figure 8.42 Frequency of purchase of fish cutlets by South African consumers.****Figure 8.43 Frequency of purchase of smoked seafood by South African consumers.**

8.4.7 Tinned seafood

Tinned seafood is a popular choice, with 63% of respondents reporting buying tinned seafood once a month; 18% once a week and 11% never buying (Figure 8.44).

8.4.8 Value added seafood

Approximately two-thirds of consumers (63%) never purchased “seafood with a sauce” (Figure 8.45). Ready to eat/value added seafood meals were a more popular seafood product, with 47% of consumers purchasing these products once a month or more frequently (Figure 8.46), and a further 26% purchasing “every few months”. The majority (63%) reported buying the same quantity compared to a year ago, 25% were buying less, and only 12% were buying more. Black consumers were an exception to this trend with 33% buying more “ready to eat/ precooked seafood” than a year ago, compared to 26% buying less (Figure 8.47). Sushi was never purchased by 78% of surveyed consumers. Only 12% purchased sushi once a month or more frequently (Figure 3.48). Thirty one percent of respondents reported buying sushi less frequently than a year ago, versus 24% who reported buying it more frequently.

Figure 8.44 Frequency of purchase of tinned seafood by South African consumers.

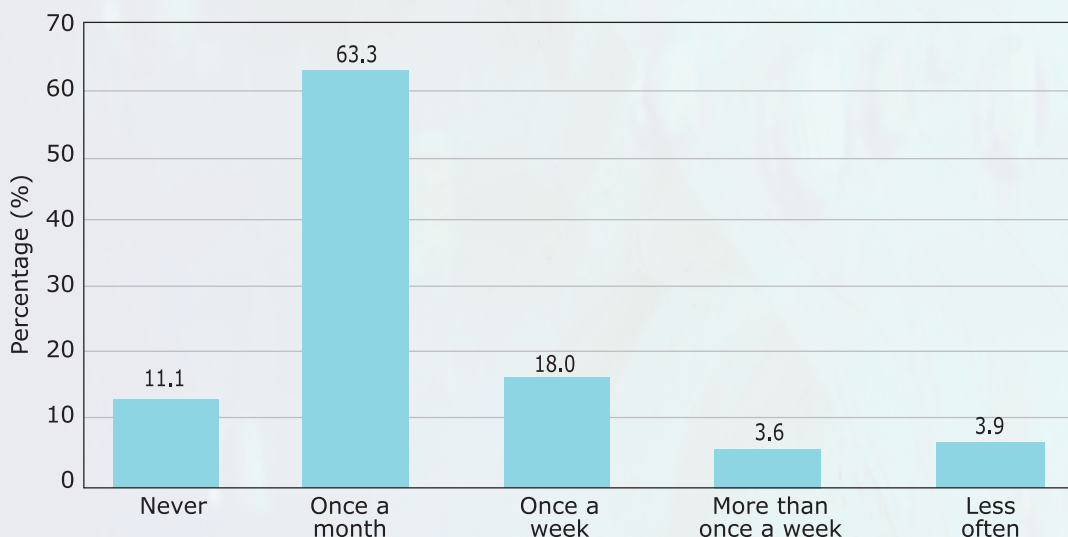


Figure 8.45 Frequency of purchase of value-added seafood with sauce by South African consumers.

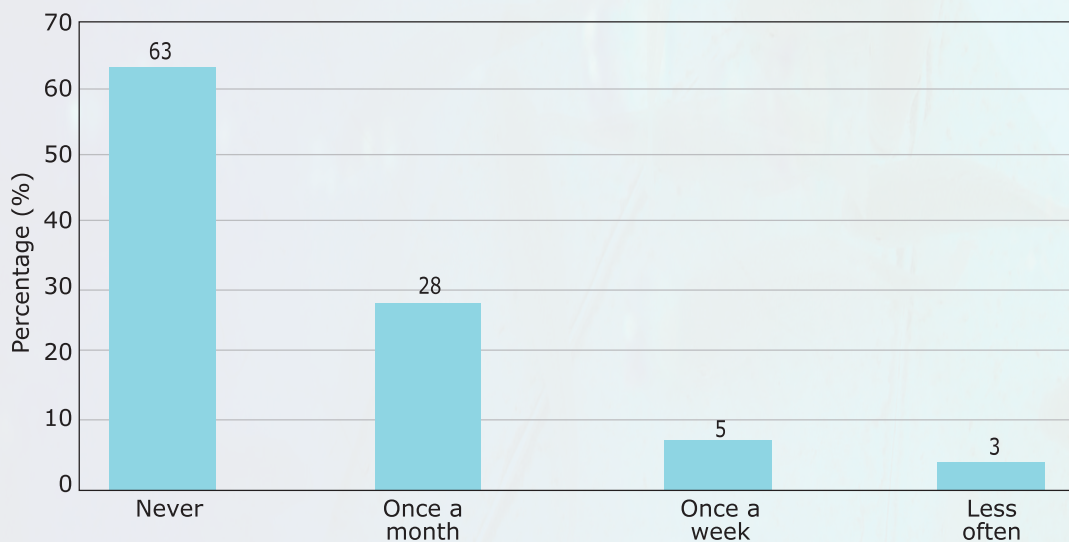


Figure 8.46 Frequency of purchase of ready to eat/pre-cooked seafood by South African consumers.

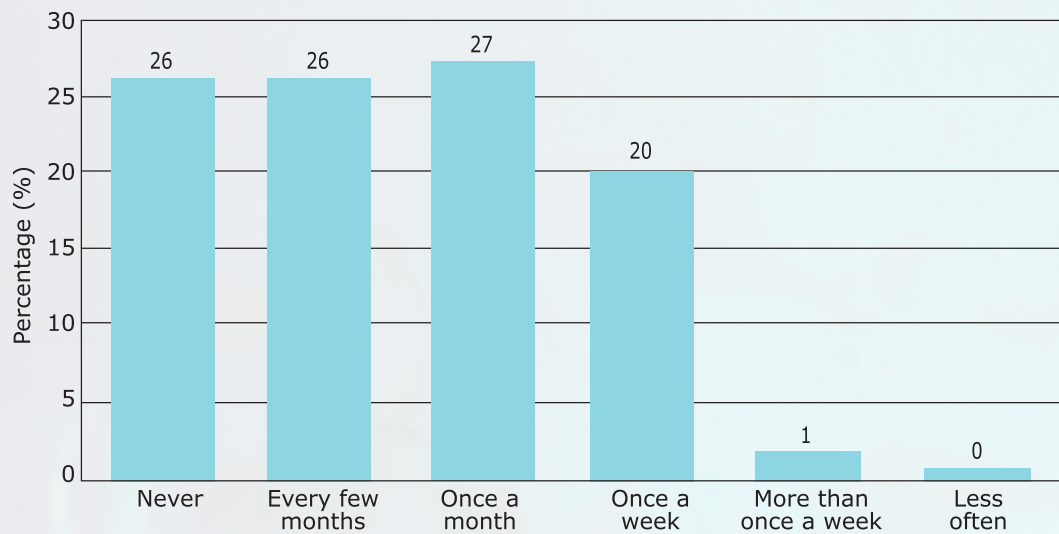


Figure 8.47 Proportion of South African consumers by race group buying more or less "ready to eat/ precooked seafood" compared to a year ago.

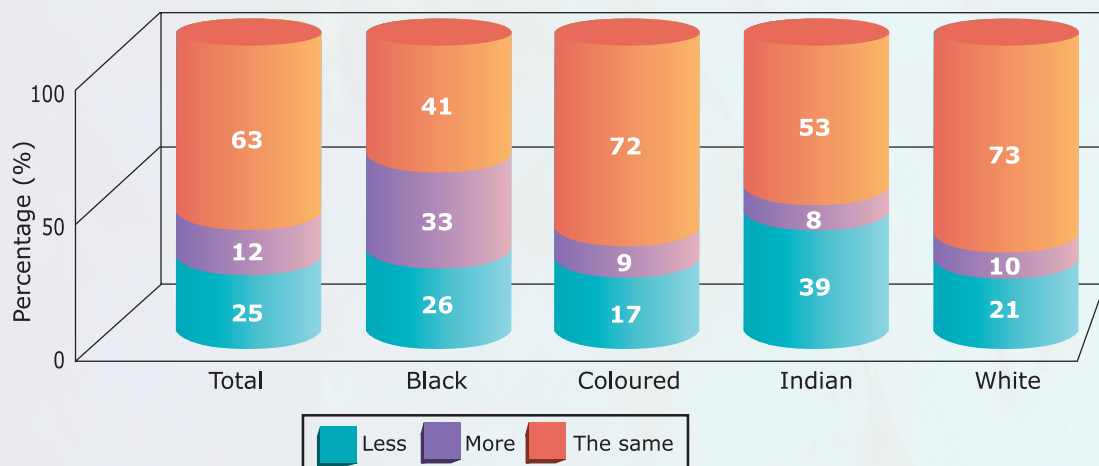
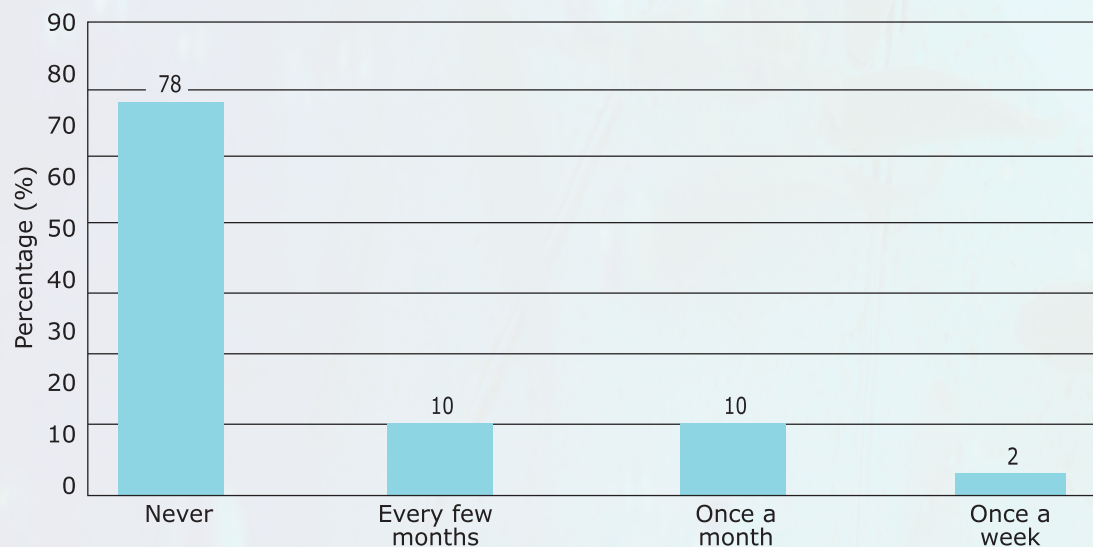


Figure 8.48 Frequency of purchase of sushi by South African consumers.



9. Seafood Buyer Survey

9.1 Restaurant Buyers

Of the five restaurant buyers that were contacted, three responses were received from restaurant buyers; - two from seafood franchise chains, and one from a “white table cloth” restaurant.

9.1.1 Aquaculture awareness

All had a good general knowledge of seafood products and their characteristics. They were well aware of what aquaculture products were, the differences between aquaculture products and those originating from the wild. The responses of the buyers indicated an awareness of environmental issues associated with wild fisheries and aquaculture. One buyer felt that aquaculture products offered a sustainable alternative to wild seafood, while another commented that “unfortunately, aquaculture can suffer from similar problems that intensive agriculture has such as pollution, disease and toxic contamination, especially when antibiotics are fed to stocks”. Two buyers supported WWF’s South African Sustainable Seafood Initiative.

9.1.2 Aquaculture Product Characteristics

Two of the three buyers indicated an awareness of the positive aquaculture product attributes, citing “consistent product quality and sustainable supply”, and “control over product characteristics”. One buyer indicated that they were not aware of any positive characteristics associated with aquaculture products.

9.1.3 Demand for Seafood/Fish

All three buyers were of the opinion that the demand for seafood/fish was growing.

9.1.4 Seafood availability

Two of the three buyers were of the opinion that the demand for fresh seafood/fish exceeds the available supply. The white table cloth restaurant buyer commented that “a variety of fresh fish is generally scarce:- sardines, mackerel, monkfish, anchovies, and all of the smaller, more sustainable species are never made available to restaurants. The two franchise buyers listed hake, kingklip, sole, and prawns as being in short supply.

9.1.5 Shift to Aquaculture Products

Two of the three buyers confirmed that there was a trend in the South African market towards buying more aquaculture products, compared to seafood products originating from the wild.

9.1.6 Farmed Versus Wild Caught

None of the buyers discriminated between farmed and wild caught seafood in their buying decisions. The “white table cloth” restaurant buyer stated:

“Our priority/concern is not whether fish is farmed or wild caught but whether or not it is fresh. Our biggest problem is regular access to fresh fish. Norwegian salmon is hugely popular because it is always available (editors emphasis), and not because it is a superior product – the quality of local “salmon” trout is far superior and obviously fresher”

9.1.7 Aquaculture products purchased

Aquaculture products featured prominently in the mix of products purchased by the restaurant buyers, and included: shrimp/prawns, mussels, oysters, salmon, trout, tilapia, and basa pangasins (Vietnamese catfish) (Table 9.1). Aquaculture products featured in the top three products sold by all restaurants (Table 9.2). For the seafood franchise buyers, cultured prawns were one of their top sellers. The “white table cloth” buyer required top quality fresh fish for sushi, and relied heavily on culture Norwegian salmon, as tuna, other wild fish, and trout were in short supply.

Table 9.1 Sea products sold by wholesalers surveyed with origin and form of products. Key: wld = wild; cult = cultured; loc = local; imp = imported; frsh = fresh; frzn = frozen.

Seafood type	White table cloth restaurant	Sea Food Franchise #1	Sea Food Franchise #2
Hake	X (wld, loc, imp, frsh, frzn)	X (wld, loc, frzn)	X wld, loc, frzn
Kingklip	X (wld, loc, imp, frsh, frzn)	X (wld, loc, frzn)	X wld, loc, frzn
Linefish/reds	X (wld, loc, frsh, frzn)	X wld, loc, frzn	
Snoek	X (wld, loc, frsh, frzn)	X wld, loc, frsh	
Monkfish	X (wld, loc?, imp?, frzn)		
Gurnard	X (wld, frsh, frzn, loc?)		
Soles	X (wld, loc, frsh, frzn)	X wld, imp, frzn	X wld, loc, frzn
Angelfish	X (wild, loc, frsh, frzn)		
Butterfish	X (wild, loc, imp?, frzn)		
Dorado	X (wild, frzn, loc?, imp?)	X wld, imp, frzn	
Mackerel			
Cape salmon/geelbek	X (wld, loc, frsh, frzn)	X wld, loc, frsh	
Shrimp/ prawns	X (wld, cult, imp)	X cult, imp, frzn	X cult, imp, frzn
Calamari	X (wld, imp. frsh, frzn)	X wld, imp, frzn	X wld, imp, frzn
Abalone			
Oysters	X (cult, loc, frsh)	X wild, frsh	
Mussels	X (cult, loc, frsh, frzn)	X cult, imp, frzn	
Salmon	X (cult, imp, frsh, frzn)		
Trout	X (cult, loc, frsh, frzn)		
Tilapia	X (cult, imp, frzn)		
Nile Perch			
Basa/ Pangasins			X cult, imp, frzn
Sushi	X (cult, wld, loc, imp)		
Any other seafood types, not listed above, that you can think of?			

Most aquaculture products purchased were imported (shrimp/prawns, mussels, salmon, tilapia and basa pangasins), with a small volume of local aquaculture products purchased (mussels, oysters, trout). Availability of suitable products was seen as the only factor limiting the purchase of South African aquaculture products as the market demand existed. The white table cloth restaurant buyer stated:

"Access to more farmed products (fresh & processed i.e. smoked) would be welcomed by all in the industry – at present, trout, mussels & oysters are the only farmed products that are widely available locally. Turbot is or was being farmed on the West coast, but all of that was exported. I am aware of yellowtail being farmed, but none of my suppliers have access to stocks, and all of the perlemoen is prohibitively expensive".

Table 9.2 Top three selling types of seafood in restaurants, with product origin.

Question	White table cloth restaurant	Seafood franchise restaurant #1	Seafood franchise restaurant #2
Please list your top 3 best selling seafood types:	1: Norwegian salmon (cultured, imported) 2: Prawns (wild or cultured, imported) 3: Oysters (cultured, local)	No 1: Hake (wild, local) No 2: Prawns (cultured, imported) No 3: Calamari (wild, imported)	No 1: Hake (wild, local) No 2: Calamari (wild, imported) No 3: Prawns (cultured, imported)

9.1.8 Informing the Customer

None of the restaurant buyers informed the customer whether the products they served were wild or farmed. The reasons for this were that “there have never been requests for information regarding the origins of seafood products”, and “non specific identification of (products on the) menu offering”. One buyer did however comment that providing information on whether the product was wild or farmed was a future proposition which could be used in a promotional way on the menu.

9.1.9 Seafood attributes determining purchase decisions

The three restaurant buyers were unanimous in that product freshness, availability and quality were extremely important determinants of their buying decisions (Table 9.3). Price and appearance were deemed extremely important by two out of the three buyers, however, the white table cloth restaurant buyer's decisions were not as influenced by price as the seafood franchise buyers. Similarly, product form was very important to the franchise seafood buyers, but not as highly ranked by the white table cloth restaurant buyer, probably because the chefs prepare the raw the product into various forms. Eco-friendliness was rated as extremely important by two of the buyers, both of whose restaurants supported the WWF South African Sustainable Seafood Initiative. Factors such as, preparation time, nutritional value, and low in unsaturated fat were considered less influential in seafood purchase decisions. One of the buyers regarded the shade of pink/red of salmon/trout as important since it is used for sushi and therefore influenced the presentation.

9.1.10 Fresh versus Frozen

The ratio of fresh versus frozen seafood purchased varied;- the white table cloth restaurant, with its primary focus on fresh salmon for sushi, purchased approximately 90% of its seafood fresh; while the two seafood franchises purchased mainly frozen seafood (88% and 100% frozen respectively).

9.1.11 Proportion of imported and local products purchased

The ratio of locally purchased seafood to imported ranged between 40 and 60% for the three buyers.

Table 9.3 Rating of factors determining seafood purchase decisions by restaurant buyers. Buyers were asked the question: "**When buying fish/seafood products, how important are the following factors to you when making your decision?**". "Importance" was rated on a scale of 1-10 (1= not important; 10 = extremely important).

Product attribute	White table cloth restaurant buyer	Seafood franchise restaurant #1	Seafood franchise restaurant #2
Freshness	10	10	10
Availability	10	10	10
Quality	10	10	10
Price	7	10	10
Appearance	10	10	5
Eco-friendliness	10	9	5
Product form	1	8	10
Nutritional value	5	8	5
Low in saturated fat	1	8	5
Prep time	2	8	1

9.1.12 Smoked Seafood Products

The franchise restaurant buyers stated that there was no demand for smoked seafood products in their market, however, the white table cloth restaurant buyer observed that: "Smoked products have become increasingly popular, with high end restaurants doing a lot of the smoking themselves".

9.1.13 Awareness of International Seafood Trends

The buyer's comments highlighted a growing awareness of sustainability issues, including;- the global overexploitation of wild stocks; the problem of the growing scarcity of seafood worldwide; and the growing trend towards eco-labels and organic food. When asked "which countries are setting the trends the buyers listed: "United Kingdom, Australia and Europe".

9.1.14 South African Seafood Trends

Two buyers commented that much of what is produced locally is exported and not made available to the local market. When asked if South Africa was setting any trends, the buyers commented that the country appears to be at the forefront of innovation with regards to sustainability initiatives, mentioning specifically the WWF's S.A. Sustainable Seafood Initiative.

9.1.15 Colour of Trout and Salmon

Two restaurant buyers stated that the pink colour of trout and salmon was not important in their buying decisions; while the third stated that the pink colour was important for the presentation of sushi products.

9.2 Wholesale Buyers

Of the four wholesale buyers, three responses were received.

9.2.1 *Aquaculture awareness*

All three wholesale buyers were knowledgeable and aware of the difference between aquaculture products and products originating from the wild.

9.2.2 *Aquaculture Product Characteristics*

The wholesale buyers were well aware of the positive product attributes associated with aquaculture products, including: - Consistency of supply, availability, consistency of quality, logistical efficiencies, and sustainability.

9.2.3 *Demand for Seafood/Fish*

All three buyers felt that the demand for seafood was growing in South Africa. However, two qualified their statements commenting that growth was slow and in line with population growth.

9.2.4 *Seafood availability*

All three buyers were of the opinion that availability of various seafood types was not an issue. One commented that the “price-driven” South African market restricted the local availability of certain seafood types, not the availability of the seafood products *per se*.

Responses were mixed on whether the demand for fresh seafood exceeded the supply. One buyer felt demand exceeded supply, another did not, and a third said it was a price linked issue.

When asked if there were any unavailable seafood types they would like to purchase, no products were listed by the buyers. Products in short supply included kob and linefish in general, locally caught hake and sole.

9.2.5 *Shift to Aquaculture Products*

Two of the three buyers felt there was a shift to aquaculture products in certain categories, compared to wild products.

9.2.6 *Farmed Versus Wild Caught*

Two buyers stated that their choice of seafood type was not influenced by whether the product originated from the wild or whether it is an aquaculture product, and one stated that it was.

9.2.7 *Aquaculture products purchased*

Aquaculture products featured prominently in the mix of products purchased by the wholesale buyers, and included: shrimp/prawns, mussels, oysters, salmon, trout, tilapia, and basa pangasins (Vietnamese catfish) (Table 9.4). Aquaculture products dominated the top three products sold by the seafood wholesalers who responded to the survey (Table 9.5). Most aquaculture products purchased were imported (shrimp/prawns, mussels, salmon, tilapia and basa pangasins), with a small volume of local aquaculture products purchased (mussels, oysters, trout).

9.2.8 *Informing the Customer*

All three wholesale seafood enterprises informed their customers whether the seafood products originated from aquaculture products or the wild.

Table 9.4 Sea products sold by wholesalers surveyed with origin of products. Seafood wholesaler #1 did not specify the product origins and form of products. Key: wld = wild; cult = cultured; loc = local; imp = imported; frsh = fresh; frzn = frozen.

Seafood type	Seafood Wholesaler #1	Seafood Wholesaler #2	Seafood Wholesaler #3
Hake	X	X wld, loc, imp, frsh, frzn	X wld, loc, frsh, frzn
Kingklip	X	X wld, loc, imp, frsh, frzn	X wld, loc, frsh, frzn
Linefish/reds	X	X wld, loc, imp, frsh, frzn	
Snoek		X wld, loc, imp, frsh, frzn	X wld, loc, frsh, frzn
Monkfish	X	X wld, loc, frsh, frzn	
Gurnard		X wld, loc, frsh, frzn	
Soles	X	X wld, loc, imp, frsh, frzn	X wld, loc, frsh, frzn
Angelfish	X	X wld, loc, frsh, frzn	
Butterfish	X	X wld, loc, frsh, frzn	
Dorado	X	X wld, loc, imp, frsh, frzn	
Mackerel		X wld, loc, frzn	X wld, imp, frzn
Cape salmon/ geelbek	X	X wld, loc, frsh, frzn	
Shrimp/prawns	X	X cult, imp, frzn	X wld, cult, loc, imp, Frzn
Calamari	X	X wld, loc, imp, frsh, frzn	X wld, loc, imp, frsh, frzn
Abalone		X wld, cult, loc, frsh, frzn	
Oysters	X	X wld, cult, loc, imp, frsh, frzn	X cult, loc, frsh
Mussels	X	X cult, loc, imp, frsh, frzn	X cult, loc, frzn
Salmon	X	X wld, cult, imp, frsh, frzn	X cult, imp, frzn
Trout	X	X wld, cult, loc, imp, frsh, frzn	X cult, loc, imp, frzn
Tilapia		X cult, imp, frzn	
Nile Perch		X wld, imp, frzn	
Basa/Pangasins	X	X cult, imp, frzn	
Sushi			
Any other seafood types, not listed above, that you can think of?			

Table 9.5 Top three selling types of wholesale seafood, with product origin.

Question	Seafood Wholesaler #1	Seafood Wholesaler #2	Seafood Wholesaler #3
Please list your top 3 best selling seafood types:	1: Norwegian salmon (cultured, imported) 2: Prawns (wild or cultured, imported) 3: Oysters (cultured, local)	No 1: Oysters (cultured, local) No 2: Mussels (cultured, local?) No 3: Salmon trout (cultured, local?)	No 1: Hake (wild, local) No 2: Prawns (cultured, imported) No 3: Calamari (wild, imported)

9.2.9 Seafood attributes determining purchase decisions

Freshness, quality, appearance and availability were ranked as extremely important determinants of the wholesale seafood suppliers buying decisions (Table 9.6). Eco-friendliness, price and product form were regarded as important product attributes. Nutritional value, preparation time and low-fat content were ranked to be less important.

9.2.10 Fresh versus Frozen

The ratio of fresh versus frozen seafood also varied greatly between seafood wholesalers. One only dealt in frozen seafood; a second sold 50% frozen and 50% fresh; while the third sold 80% fresh seafood and 20% frozen.

Table 9.6 Rating of factors determining seafood purchase decisions by wholesale buyers. Buyers were asked the question: **"When buying fish/seafood products, how important are the following factors to you when making your decision?"**. "Importance" was rated on a scale of 1-10 (1 = not important; 10 = extremely important).

Product attribute	Seafood Wholesaler #1	Seafood Wholesaler #2	Seafood Wholesaler #3
Freshness	10	10	10
Quality	10	10	10
Appearance	10	10	10
Availability	8	10	10
Eco-friendliness	8	10	8
Price	6	9	8
Product form	1	8	10
Nutritional value	4	3	8
Prep time	4	2	5
Low in saturated fat	1	1	8

9.2.11 Proportion of imported and local products purchased

The ratio of local to imported seafood purchased by wholesale buyers varied. One buyer reported 70% imported to 30% local, a second 2% imported to 98 local, and the third did not specify a proportion

9.2.12 Sushi

All three buyers reported that sushi consumption was increasing. One ascribed the trend to a growing consumer awareness of healthy eating.

9.2.13 Smoked Seafood Products

Demand for smoked products was reported to be steady, mainly for traditional smoked snoek products.

9.2.14 Awareness of International Seafood Trends

Trends listed included healthier eating, sustainable eating, an increase in aquaculture innovation, more reliance on aquaculture, more competition, higher quality. Countries setting trends were listed as Europe and Asia.

9.2.15 South African Seafood Trends

The same trends as listed above for international seafood trends were listed. When asked whether international trends were influencing South Africa, one buyer stated: "yes": one "no"; and a third "don't know – I suppose so".

9.2.16 Colour of Trout and Salmon

The pink colour of trout and salmon was deemed an important product characteristic by all three wholesale seafood buyers. One stated that the colour was an indicator of quality as well as taste. One stated that it was because the customer associates the pink colour with quality and lacks product knowledge, and the third stated it was important for their sushi products.

9.3 Supermarket Buyers

Of the four supermarket buyers contacted, two responses were received.

9.3.1 Aquaculture awareness

The supermarket buyers were knowledgeable and aware of the difference between aquaculture products and products originating from the wild. One buyer stated that her buying decisions were influenced by whether product was farmed or wild caught, while the others were not.

9.3.2 Aquaculture Product Characteristics

The supermarket buyers cited some of the positive product attributes associated with aquaculture products, including:- Consistency of supply, supplemental supply to wild fisheries, and "takes pressure off the sea". Quality advantages associated with aquaculture products were not mentioned.

9.3.3 Demand for Seafood/Fish

One buyer was of the opinion that the demand for seafood was "increasing" in South Africa, while the other commented that demand in his market was "stable".

9.3.4 Seafood availability

Both buyers stated that the demand for fresh seafood exceeded the supply. Both buyers listed seafoods which were currently unavailable which they would like to purchase, including: tuna, smoked snoek, and fresh fish in general.

9.3.5 Shift to Aquaculture Products

Both buyers felt there was not a shift to aquaculture products compared to wild products in South Africa.

9.3.6 Farmed Versus Wild Caught

One buyer stated that the choice of seafood type was not influenced by whether the product originated from the wild or whether it is an aquaculture product, and one stated that it was.

9.3.7 Aquaculture products purchased

Fewer aquaculture products were sold in the supermarket surveyed compared to the restaurants and seafood wholesalers. Aquaculture products purchased by the supermarket buyers, and included: shrimp/prawns, mussels, oysters, salmon, and trout (Table 9.4). Salmon was the only aquaculture product in the top three seafood products sold by the supermarkets who responded to the survey (Table 9.5).

9.3.8 Informing the Customer

One supermarket chain was in the process of developing product labels which would specify the products origin and whether it was wild caught or farmed. The second supermarket did inform customers on whether its products were wild or farmed through sales staff and signage, although it was stated that the effectiveness of this policy was inconsistent and unreliable. Lack of staff training and implementation at store level were cited as the main constraints.

Table 9.7. Seafood products sold by supermarkets surveyed with origin of products. Seafood wholesaler #1 did not specify the product origins and form of products. Key: wld = wild; cult = cultured; loc = local; imp = imported; frsh = fresh; frzn = frozen. Supermarket buyer #2 did not specify the origin or form of most products purchased.

Seafood type	Supermarket #1	Supermarket #2
Hake	X wld, loc, frsh, frzn	X wld, loc, frsh
Kingklip	X wld, loc, frsh, frzn	X wld, loc, frsh
Linefish/reds	X wld, loc, frsh	
Snoek	X wld, loc, imp, frsh, frzn	X wld, imp, frzn
Monkfish	X wld, imp, frzn	
Gurnard	X wld, loc, frsh, frzn	
Soles	X wld, loc, frzn	X
Angelfish	X wld, loc, frsh, frzn	X
Butterfish	X wld, loc, frzn	X
Dorado	X wld, imp, frzn	X
Mackerel	X wld, imp, frzn	X
Cape salmon/ geelbek	X wld, loc, frsh	X
Shrimp/prawns	X wld, imp, frzn	X
Calamari	X wld, imp, frzn	X
Abalone		
Oysters	X cult, loc, frsh	
Mussels	X cult, imp, frzn	X
Salmon	X cult, wld, imp, frsh, frzn	X
Trout	X cult, loc, frsh, frzn	X
Tilapia		
Nile Perch		
Basa/Pangasins		
Sushi	X	
Any other seafood types, not listed above, that you can think of?	Yellowtail	Yellowtail

Table 9.9 Top three selling types of wholesale seafood, with product origin.

Question	Supermarket chain #1	Supermarket chain #2
Please list your top 3 best selling seafood types:	1: Norwegian salmon (cultured, imported) 2: Crumbed and coated fish fillets	No 1: Calamari rings for frying (wild, imported) No 2: Hake (wild, local) No 3: Snoek (wild, local)

9.3.9 Seafood attributes determining purchase decisions

Freshness, quality, price, and availability were ranked as extremely important determinants of the supermarket chain buyers purchase decisions (Table 9.6). Eco-friendliness, availability and product form were also regarded as important product attributes. Nutritional value, preparation time and low-fat content were ranked to be less important.

9.3.10 Fresh versus Frozen

The proportion of fresh to frozen seafood was for the two supermarket chains was 10-15%/85-90% and 40%/60% respectively.

Table 9.10 Rating of factors determining seafood purchase decisions by supermarket buyers. Buyers were asked the question: **"When buying fish/seafood products, how important are the following factors to you when making your decision?"**. "Importance" was rated on a scale of 1-10 (1= not important; 10 = extremely important).

Product attribute	Supermarket chain #1	Supermarket chain #2
Freshness	8	10
Quality	10	10
Price	7	10
Availability	6	10
Eco-friendliness	9	5
Appearance	5	8
Product form	4	8
Nutritional value	3	1
Prep time	1	1
Low in saturated fat	2	1

9.3.11 Proportion of imported and local products purchased

The ratio of local to imported seafood purchased by the two supermarket chains was 70% imported/30% local, and >50% imported.

9.3.12 Ready-to-Eat Meals

Both buyers reported an increasing trend towards precooked, "ready-to-eat" seafood meals. The demand for value added products with sauces was reported to be "stable" and that these products were not popular with consumers.

9.3.12 Sushi

One buyer reported that the demand for sushi products was increasing, but also stabilising in existing markets. The second did not express an opinion.

9.3.13 Smoked Seafood Products

One buyer responded that a demand existed for smoked products but supply was constrained by the lack of “high risk” suppliers. The second stated that it was important to get the recipes right.

9.3.14 Awareness of International Seafood Trends

Trends listed included an expected shift to aquaculture products and the establishment of sustainability certification schemes such as the MSC (Marine Stewardship Council). Europe was mentioned as an international seafood trend setter.

9.3.15 South African Seafood Trends

One supermarket seafood buyer observed that seafood products for frying, particularly calamari, were outselling fresh and frozen. The other buyer commented on the trend to adopting the WWF South African Sustainable Seafood Initiative.

9.3.16 Colour of Trout and Salmon

One buyer commented that the colour of trout or salmon did not affect the quality or taste and hence his buying decisions. A second commented colour was an issue because they sell a variety of salmon products to provide the consumer with what they wanted.

10. Market Survey Implications for Aquaculture Development

Key findings from the consumer and seafood buyer marketing surveys, which have implications for aquaculture development, were:

Consumers:

- Consumers lack awareness of aquaculture and the associated product characteristics. Eighty-five percent (85%) of consumers have not heard of aquaculture, and do not distinguish wild from farmed seafood/aquaculture products. If offered a choice between wild and farmed seafood products, they would choose wild – due to perceived more “natural” product qualities. Consumers in the Western Cape displayed the greatest awareness of aquaculture.
- South African consumers are conservative in their seafood choices, sticking to what they know. Black consumers are the most conservative in their seafood product choices, but displayed a strong growth in seafood buying compared to other race groups.
- Better educated, and higher LSM group consumers were more aware of what aquaculture was, and purchased a greater variety of seafood including sushi.
- Consumers would like more information about whether their products were farmed or imported and indicated a preference for local seafood products.
- Fifty-four percent (54%) of consumers felt the “pink” colour of salmonid flesh was important, associating it with “freshness”. Among consumers with tertiary education, 64% felt colour was important.

Seafood buyers:

- Seafood buyers for restaurants, wholesalers, and supermarkets, were familiar with aquaculture products and their positive product characteristics. They expected a greater proportion of the market to be supplied by aquaculture products in the future.
- Buyers do not distinguish between aquaculture and wild products, but buy on the basis of required product characteristics. They generally do not inform the customer whether a product is of farmed or wild origin.
- Aquaculture products feature prominently in the mix of products purchased by restaurants and wholesale seafood outlets. Fewer aquaculture products are stocked by supermarkets,

which sell mainly frozen, wild seafood products. The highest selling aquaculture products are imported products, namely, salmon, prawns and mussels.

- The supply of certain wild seafood products was becoming increasingly limited, particularly items such as fresh tuna and linefish.
- Restaurant and seafood wholesale buyers would purchase more aquaculture products, particularly fresh products, if they were available.
- Seafood buyers were aware of seafood sustainability issues, and generally supported awareness and labelling schemes such as SASSI, and the MSC certification in their purchase choices. Aquaculture products were perceived as a potentially sustainable supply of seafood.

The surveys confirmed that the seafood market is in a period of transition, with declining supplies of traditional local wild fish, and increasing market share by imported wild and cultured products. There is an opportunity for local cultured products to gain a greater market share in the fresh, high value product markets. It is unlikely that locally cultured products will be competitive in the frozen, commodity type product niches – with the possible exception of mussels. There is a trend to pre-cooked, ready to eat products in supermarkets, which aquaculture producers may be able to exploit.

The conservatism of consumers in their seafood choices in general, probably constrains the diversity of seafood products sold, and the growth of the local sea food market. That said, there is a trend amongst better educated and higher LSM group consumers towards being more adventurous in their seafood choices, for example, with the purchase of sushi and fresh salmon products. The lack of awareness of aquaculture in particular, is a cause for concern, which may lead to misperceptions about aquaculture. Consumer education will assist in promoting awareness and acceptance of aquaculture products. The growth in seafood buying amongst more affluent black consumers, is an encouraging trend which can be encouraged through education and promotion of aquaculture products. The consumer preference for local seafood products is a further market characteristic that can be harnessed to the benefit of aquaculture.

The survey showed that South African seafood suppliers are buying into the concept of sustainable seafood, and sustainability is becoming important in purchase decisions. Aquaculture products were regarded as potentially sustainable products, although consumers and buyers were aware of some of the negative health and environmental associations with intensively farmed products. Therefore, if the aquaculture industry establishes itself as a credible source of sustainable seafood, this should help to secure market share in the future.

Based on the consumer and seafood buyer surveys, the following recommendations are suggested:

- 10.1 Initiate a consumer Aquaculture Awareness and Education Campaign (AAEC). As part of this Campaign, AISA should further its collaboration with the WWF to include Aquaculture products on the SASSI programme .
- 10.2 Promote a greater awareness of the positive attributes of aquaculture products amongst South African consumers.
- 10.3 Increase aquaculture production to supply market demand for fresh products such as linefish and trout.
- 10.4 Promote schemes which provide evidence of the sustainability of South African aquaculture, so that consumers can choose aquaculture products knowing that they are environmentally sustainable.
- 10.5 In general, when the market survey gets repeated it should have a greater sample size of buyers section and it should include face-to-face interviews. More provinces should also be surveyed

11. Recommendations for Promoting Growth of the Aquaculture Sector

The AISA Aquaculture Benchmarking Survey of primary production and markets yielded data and opinions from producers, consumers and seafood buyers, which indicate critical interventions required to promote the growth of the aquaculture sector in South Africa. These are summarised under headings below.

11.1 A Comprehensive set of Industrial Support Measures

Since the Aquaculture Sector is not a mature sector as yet, transaction costs and risk is higher than in other sectors. In order to kick start investment and develop a competitive Aquaculture Sector, the governments in many other countries provide support measures to pioneer farmers and innovative enterprises. While there have been some support measures for aquaculture development by the South African government, they have been largely uncoordinated and *ad hoc*. A more comprehensive set of support measures and industrial incentives will be required if aquaculture is to develop to its full potential (Britz, 2007). South Africa's National Industrial Policy Framework provides principles for government to develop comprehensive sets of support measures for sectors with high growth potential. Previously, aquaculture enterprises found it very difficult to access incentive schemes such as the SMEDP. They were really aimed at medium size enterprises and specialist consultants were required to complete the applications. A customised set of incentives with a facilitated, user-friendly interface is required to deliver them to the aquaculture sector.

To this end it needs to recognise that due to the lack of an established services sector, aquaculture businesses often need to be vertically integrated - which requires an economy of scale precluding the entry of small enterprises. Transaction costs tend to be comparatively high;- reducing competitiveness. Australia and Chile have recognised this problem and provided support by means of a capital subsidy for "Joint Industry Actions". i.e. if a group of companies jointly invest in the establishment of a service that promotes industry development (e.g. a company for health management, feed manufacture, marketing etc), a 50% capital subsidy is provided.

Further support measures are outlined below and by Britz (1997).

11.2 Support for Small Aquaculture Enterprise Development

A shock finding of the survey was that the aquaculture sector is not conducive to small business development due to the strict regulatory environment which is not aligned with sector development initiatives, lack of technical support, and skills development. There is no single intervention or quick fix to address this problem and further investigation and analysis should be undertaken to better understand the issues and to develop solutions.

Suggested interventions to create less disabling environment for small enterprise development include:

11.2.1 Partnerships with Established Aquaculture Ventures.

This is a key intervention that has been successful in a number of instances. Established businesses are often seeking more product, have established market channels and technical expertise and are willing to partner with small producers. An incentive for promoting this form of partnership should be considered by the state, for example, in Australia a larger company mentoring a smaller one receives a lower tax rate on its profits from its share in the smaller company. While South African taxation policy might not favour such an intervention, other forms of incentive could be considered.

11.2.2. Aquaculture Development Nodes

Many of the barriers to entry by small business, particularly the environmental planning aspects and technical support measures, can be overcome by the establishment of aquaculture development nodes where land is re-zoned for aquaculture farming activities. There is broad consensus both in industry and government that access to land and water for concentrated development within aquaculture development nodes is essential for stimulating investment into the aquaculture sector, and for opening up sufficient land and water for growing production. Development nodes, analogous to industrial parks are economically efficient, lend themselves to efficient service provision and are environmentally desirable as they promote concentrated development and discourage *ad hoc*, geographically dispersed operations which tend to conflict with other activities.

11.2.3. Small Farmer Development Schemes

Although the concept of Community Public Private Partnership (CPPP) comes with its own set of problems, this model does provide a solution/option through which access into the Aquaculture Sector can be open to a broader audience. The case studies (Botes, *et al.*, 2006) of *Masiza* Mussel farmers and the *Hands On Cooperative* are examples from which to learn.

It is recommended that the existing schemes be provided with ongoing support to overcome weaknesses, and that new opportunities be sought in partnership with established aquaculture enterprises.

11.2.4 Recognise and Support Ornamental Fish Aquaculture

The survey revealed that ornamental fish production is a viable small business enterprise with a ready local market, but that producers were frustrated by a lack of government recognition and support as it was not recognised as a “farming” activity and a means to food security. Permitting was also an issue in terms of imports and NEMBA.

It is therefore recommended that Department of Agriculture support for aquaculture not be limited to food fish, but be extended to ornamental fish. Facilitated processes to streamline permitting by the new Department of Agriculture and Fisheries (DAFF) and Department of Water and Environmental Affairs (DWEA) are required. Ornamental fish farming is conducive to small farmer development schemes such as the Department of Trade and Industry’s Technology for Sustainable Livelihoods programme.

11.3 Facilitated Compliance with Environmental Legislation

The survey confirmed the findings of Britz (1997) who stated: “Compliance with environmental legislation is now seen as the single most significant constraint to aquaculture development by industry. Industry representatives frequently express desperation at meetings with government regarding the increasingly onerous requirements of environmental legislation. Large and medium sized companies with outstanding human resources and good corporate governance find it difficult, and very costly, to comply with environmental legislation; and for many small and medium size enterprises it is simply too onerous and costly. The former DEAT and nature conservation agencies are aware of the problem, but since they lack an industry development orientation, they do little more than listen sympathetically and insist on compliance. Many environmental managers are against aquaculture in principle, are reactive, and will do nothing pro-actively to assist industry to meet environmental requirements. Clearly, this is a major issue that needs a more systematic approach and pro-active intervention by government if aquaculture sector growth is to occur on any scale.”

To overcome the problem, Britz (1997) stated: "There is no simple solution to the problem as environmental legislation affects all stages of development of an aquaculture operation. A range of pro-active interventions by government are possible to open the way for investment into aquaculture. These include:

- Strategic environmental assessments to evaluate where best to situate aquaculture development nodes which have the lowest environmental impact and minimal conflict with other activities.
- Self-regulation through best management practise (BMP) schemes such as the Quality and Health Management Programme (QHMP) for the Western Cape.
- Guidelines on the use of exotic species, which species are acceptable, where they can be farmed and under what circumstances. Risk assessments required by the National Environmental Management: Biodiversity Act for the use of exotic species are expensive and time consuming. Consideration should thus be given to a grant from government to undertake risk assessments in areas earmarked for strategic aquaculture development.
- Traceability and certification schemes to market indigenous species on the local market. Fishery managers within the former DEAT are in principle against the sale of cultured indigenous species on the local market as they maintain they can be used as a front for the sale of wild poached product. Government should be pro-active in developing traceability schemes to open local markets for producers.
- Environmental impact assessments (EIA's). Even rudimentary EIA's can easily cost several hundred thousand rands which is a significant deterrent to small and medium size enterprise development. An EIA grant for aquaculture development in preferred areas should be considered to stimulate investment and promote SME's.
- Transport and sale permits. The movement of products governed by a need for permits. Industry frequently experiences frustration at the non-availability of officials when they require routine permits. A more efficient, service orientated permit system is required.
- Water quality and product monitoring. The SABS and government require frequent water quality and product testing. While the costs of this can be absorbed by large and medium size enterprises, the cost (typically over R100, 000 per year) is simply too high for small enterprises. Therefore, grant assistance from the state should be considered for small enterprises such as oyster, abalone and trout out growers."

11.4 Veterinary Services

The survey revealed an urgent need for veterinary services to support aquaculture sector development similar to that available to the Agricultural sector. For example, farm health management programmes are essential for effective production, and disease and drug free certification is a Hazard Alert Critical Control Point (HACCP) requirement for the export of products to the European Union (EU). The SABS expects guarantees in this regard from the state veterinary services. Therefore, developing this capacity within veterinary services is a priority. The abalone industry funds its own water quality management programme and health management programme, but smaller aquaculture SME's cannot afford this. Assistance should really be forthcoming from the state to promote industrial competitiveness in this regard. For example, in Chile if a group of companies approaches the state with a common goal such as this, grant assistance is available for setting up the required service.

11.5. Support Freshwater Aquaculture Research

The survey revealed that while marine aquaculture enterprises were relatively well provided with research to develop technology, support for freshwater aquaculture R&D was almost non-existent. Producers were seeking innovative means to improve production systems such as recirculation. A lack of capacity to undertake research in the aquatic health field was a concern.

As aquaculture is technology driven and environment specific, it is therefore recommended that a fresh water aquaculture research programme be established under the auspices of the DAFF and the Department of Science and Technology (DST). Research programmes should be supported by technology transfer initiatives. Encouragingly, the Water Research Commission is supporting research into the more efficient utilisation of freshwater resources for aquaculture.

11.6 Water Zoning, Infrastructure and Services for Marine Fish Farming

The survey confirmed that marine fish aquaculture shows the greatest potential for growth in the short to medium term and has attracted significant investor interest. The main barriers to entry are the lack of zoned waters for cage culture and suitable shore based infrastructure.

Therefore it is recommended that:

- Strategic environmental assessments be conducted to zone waters for marine aquaculture.
- Provide critical infrastructure. e.g. facilities at ports to service cages offshore.
- Provide capital subsidies for critical services which will benefit more than one company e.g. service vessels, feed manufacture, health services.
- Environmental certification and biosecurity is becoming paramount for market access. Government should facilitate certification schemes to meet European Union standards.
- A Government hatchery would create opportunities for smaller Aquaculture entrepreneurs to enter the industry.
- Government veterinary capacity is essential for product certification.

Water quality monitoring and achieving EU accreditation were seen as important government led interventions which could assist the development of the oyster industry.

11.7 Access to Finance

Access to finance was ranked highly by both marine and freshwater producers as a critical intervention promote aquaculture sector development. In particular a government supported aquaculture loan fund is required to encourage investment into the sector.

11.8 Promotion of aquaculture education, training and skills development

The shortage of aquaculture skills, particularly technical skills at the farm worker and middle management level remain a fundamental constraint to aquaculture enterprise development. A comprehensive support strategy for training, similar to the Western Cape Skills development and Training Programme (STP), is required both at national and provincial level.

11.9 Promotion of South African Aquaculture Products

The low awareness of aquaculture products by consumers in the local market, combined with the need to promote a distinct South African identity for aquaculture products in the export market, emphasises the need to promote consumer awareness South African aquaculture products generically. As previously suggested, a consumer Aquaculture Awareness and Education Campaign (AAEC) should be initiated by AISA and supported by means of a multi-stakeholder fashion.

11.10 Promote increased Aquaculture Production to supply market demand for fresh fish

The market survey showed that increasing amounts of fresh salmon were being imported into South Africa as the local demand for fresh fish could not be met from the South African fishery or aquaculture sector. Buyers confirmed there was scope for growth in cultured linefish and trout.

11.11 Promote Aquaculture Sustainability Schemes

The marketing survey revealed that the market is moving to products which are certified as sustainable. For South African aquaculture products to be competitive, evidence of the sustainability will increasingly be required. Support for initiatives which assist producers to demonstrate their environmental sustainability is thus recommended. An example of such initiatives is the Quality and Health Management Programme (QHMP) of the Western Cape where the WWF are part of the QHMP steering committee.

11.12 A National Strategy and Coordinated Government Support

The survey revealed that uncoordinated government support (including regulations and permitting which are not coordinated between departments) was a source of great frustration to producers as it inhibited investment and development. In particular, there was a “disconnect” between departments responsible for the implementation of environmental legislation and those responsible for economic development. Further issues around mandates arose around the roles and responsibilities of the new DAFF and DWEA.

It is therefore recommended that:

1. A national policy/strategy for aquaculture development be drafted which defines the roles and responsibilities of national and provincial departments in promoting aquaculture development.
2. Particular attention be paid to overcoming the constraints to development posed by legislation. It is clear that compliance with environmental regulations is often beyond the means of the individual enterprise, and requires facilitated and coordinated action by both the economic development and environmental management clusters of government.

12. References

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13. Appendices

13.1 Production Survey Questionnaire

QUESTIONNAIRE – 2009 AQUACULTURE INDUSTRY BENCHMARKING STUDY

PLEASE ANSWER ALL QUESTIONS IN THIS SURVEY.

1. RESPONDENT PROFILE

1.1 Your name:

1.2 The name of your company / project:

1.3 What is your job title (position) in the company / project?

1.4 Please could you confirm your company / project contact details:

Physical Address:
Postal Address:
Telephone number:
Cell phone number:
Fax number:
Email address:
Website address:
Gate GPS/Google Coordinates (This will help us map where aquaculture takes place)

2. COMPANY / PROJECT PROFILE

2.1 Company / project registration

Pty Ltd	Closed Corporation	Sole trader	Cooperative	Trust	Government facility
Other (please specify):					

Indicate answer with "X" or specify registration.

2.2 How many years has the company / project been in operation?

< 1	1 – 5	6 – 10	11 – 15	16 – 20	21 – 25	> 25
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Indicate answer with "X".

2.3 In what sub-sector of the aquaculture industry do you operate?

Marine	Freshwater
Other (please specify):	

Indicate answer with "X" or specify sub-sector.

2.4 What species do you farm?

Marine	Abalone		Yellowtail	
	Dusky kob		Silver kob	
	Ornamental fish		Oysters	
	Prawns		Seaweed	
	Scallop		Mussels	
	Corals			
	Other (please specify):			

Indicate answer with "X" or specify other species farmed.

Freshwater	African Catfish		Bass	
	Trout - rainbow		Marron	
	Trout - brown		Waterblommetjies	
	Ornamental fish (various)		Yellowfish	
	Koi Carp		Tilapia	
	Goldfish			
	Other (please specify):			

Indicate answer with "X" or specify other species farmed.

2.5 How would you describe the scale of your operations?

Commercial / industrial production (> R5m p.a. turnover)	Small-scale commercial / Smallholding (< R5m p.a. turnover)	Community project / cooperative
Other (please specify):		

Indicate answer with "X" or specify scale of operations.

3. ENTERPRISE VALUE CHAIN

3.1 Which business processes are included within your company's / project's operations?

Spawning	Fry rearing / Weaning	Grading
Grow Out	Processing	Packing
Distribution	Other (please specify):	

Indicate answer with "X" or specify business process.

4. VALUE AND VOLUME OF PRODUCTION

4.1 What were the total volumes (in metric tonnes or units*) and the total values (annual turnover) of production of species for the years 2000 - 2005?

Year	Species	Volume (metric tonnes)*	Value (R's)	Total (%)
2008				
2007				
2006				
2005				

*In the case of ornamental fish, oysters and fingerlings, please indicate individuals produced.

4.2 Is your company / project operating at full capacity (100%)? If no, please indicate percentage capacity utilisation for production:

>10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
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Indicate answer with "X".

5. MARKETS (DOMESTIC, EXPORT AND IMPORT)

5.1 Please indicated the percentage volume and value of production per species supplied to the domestic market:

Market	Species	% Volume (metric tonnes)*
Eastern Cape		
Free State		
Gauteng		
KwaZulu Natal		
Limpopo Province		
Mpumalanga		
Northern Cape		
North West		
Western Cape		

*In the case of ornamental fish and oysters, please indicate units produced.

5.2 If you export, when did you begin exporting?

Species	Year

5.3 Which exports markets do you supply product?

Region	Species	% Volume (metric tonnes)
Africa		
Americas (North, Latin, South)		
Asia		
Europe		
Middle East		
Oceania (Australia / New Zealand)		

5.6 Which market channels do you use?

Channel	
Direct to consumers	
Wholesalers	
Restaurants/ hotels	
Processors	
Supermarkets	
Exporter	
Other	

5.7 Do you sell your product immediately after harvest and/ or do you employ some form of processing?

Form of product	Circle answer
Live/ whole freshly killed	Yes/ no
Some form of processing and value adding	Yes/no

5.8 Is your product sold according to different grades?

Yes/ No

5.9 Do you have difficulties in meeting the required quality standard for your products?
If yes, why?

Yes/ No/ Sometimes

5.10 How is the price of your product determined?

Options:	
Producer sets price	
Auction	
Bargain and negotiate with buyer	
Other (specify)	

5.11 Do you undertake any specific marketing activities to increase sales?

Yes/ No/ Sometimes

5.10 Does government/ public sector agencies play any role in linking you, or your sub-sector, to markets?

Yes/ No/ Don't know

5.11 What are the biggest challenges in marketing your products?

6. EMPLOYMENT6.1 What are your past, current and future year-on-year *permanent* employment trends per skill level* and historical racial classification**? (A permanent employee works full-time for the company / project).

Year	Professional				Skilled				Middle Services				Semi-skilled				Unskilled				Total
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W	
2008																					
2007																					
2006																					
2005																					

Please indicate number of employees per category per year.

* Definitions: professional = upper management, scientist; Skilled = technicians, artisans; middle services = clerical, semi-skilled = secondary, some secondary education, unskilled = no formal training.

** As per Statistics South Africa categories: B = Black South Africans, C = Coloured, I = Indian, and W = White.

6.2 What are your past, current and future year-on-year *temporary* employment trends per skill level and historical racial classification? (A temporary employee works for the company / project on a part-time basis or as per seasonal requirements, e.g. harvesting).

Year	Professional				Skilled				Middle Services				Semi-skilled				Unskilled				Total
	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W	B	C	I	W	
2008																					
2007																					
2006																					
2005																					

Please indicate number of employees per category per year.

6.3 Please indicated which months of the year you use part-time (temporary) employees:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
-----	-----	-----	-----	-----	-----	-----	-----	------	-----	-----	-----

Indicate answer with "X".

7. BLACK ECONOMIC EMPOWERMENT

Circle answer

7.1 Are you aware of the new BEE scorecard system and its accompanying criteria?

Yes/ No

7.2 Have you calculated a score for your enterprise?

Yes/ No/ Don't need one – less than R5 million turnover

8. ENTERPRISE DEVELOPMENT

8.1 Please indicate your current sources of financing:

Domestic Investment and Loans	Foreign investment	Foreign aid	Government Assistance	Private Capital
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Indicate answer with "X".

8.2 Please rate the importance of the following constraints that your company / project currently faces in running an aquaculture operation:

Barriers to entry	1	2	3	4	5
Environmental regulatory requirements (e.g. EIAs)					
Site selection (zoning, leasing, discharge permits)					
Processing (SABS approval, public health issues, bans on exports)					
Tariffs for imports (protect domestic market)					
Permitting (time takes to issue, farming and capture of fish)					
Extension services					
Access to finance					
Access to skilled labour					
Access to Research and Technology Development					

Rating: 1 = not important, 2 = little importance, 3 = neutral, 4 = some importance, 5 = very important.

8.3 Please rate the importance of the following interventions for supporting your company / project:

Government support	1	2	3	4	5
Research, technology development and transfer					
Facilitate access to finance and investment					
National Policy, Strategic plan and Implementation plan for the sector					
Extension services					
Infrastructure development					
Promote South African aquaculture (nationally and internationally)					
Enhance industry-led development initiatives					
Promote best practice management guidelines (environment and social)					
Identify and zone areas for aquaculture development					
Promote trade in aquaculture products					
Capacity to monitor and guarantee the safety of aquaculture products					
Monitoring of water quality to ensure export of aquaculture product					
Promote aquaculture education, training and skills development					
Employees family support programme. For issues affecting work performance such as alcohol, drug abuse, debt.					
Other (please specify)					

Rating: 1 = not important, 2 = little importance, 3 = neutral, 4 = some importance, 5 = very important.

13.2 Consumer Questionnaire

Screening will be based on the following criteria:

LSM

Race

Gender

Did you buy any seafood produce in the last month

If yes, where – fish shop, supermarket, fast food, restaurant, fishing boat.

Introduction

We are conducting a research study on the aquaculture market in order to have a better understanding of consumers' needs and preferences. Your insight as a consumer would assist us in understanding the market for aquaculture products.

1. Respondent's Demographic info

1.1 Gender	Male / Female
1.2 Age Please circle the correct answer	16-21; 21-30; 30-40; 40-50; 50-60; older
1.3 Home language	
Afrikaans	
English	
IsiNdebele	
IsiXhosa	
IsiZulu	
Sepedi	
Sesotho	
Setswana	
SiSwati	
Tshivenda	
Xitsonga	
1.4 Highest Education qualification	Matric certificate; Tertiary qualification
1.5 In what suburb do you live? Please specify.	
1.6 Race	Black / Coloured/ Indian/ White
1.7 Household structure	
1.8 Religion	
Which religion do you practice? Please indicate your answer with an "x" next to your religion.	
Christianity	
Islam	
Hinduism	
Judaism	

Buddhism	
Other	
None	
1.8.2 Do you think that religion influence your purchasing seafood?	
1.9 Average monthly household income? Please circle your preferred answer.	Per month: R5000- R15 000; R15 000 – R25000; R25 000- R50 000; more than R50 000
1.10 Are you responsible for doing most of the grocery shopping for your household? Please circle your correct answer.	Yes / No

2. Purchasing behaviour

2.1 Please indicate what type of seafood you bought in during the past month? Please mark correct answer with an "x".	When dining in?	When eating out?
Hake		
Kingklip		
Linefish/reds		
Snoek		
Monkfish		
Gurnard		
Soles		
Angelfish		
Butterfish		
Dorado		
Mackerel		
Cape salmon/geelbek		
Shrimp/prawns		
Calamari		
Abalone		
Oysters		
Mussels		
Salmon		
Trout		
What would you like to buy		
Other, please specify.		

2.2 Rank from 1 to 3 the importance of the following three products in your diet.	1= plays biggest part; 2= plays 2 nd biggest part 3= plays 3 rd biggest part
Poultry	
Meat	
Seafood	
2.3.1 Have you heard of the word "aquaculture"? Please circle your correct answer.	Yes / No
2.3.2 If yes, what is your understanding of the word "aquaculture"? If no. Let me give you a short definition of aquaculture also referred to as aquafarming. It is the farming of freshwater and seawater organisms.	
2.4 On a scale from 1 to 10 please rate how important it is to you whether you buy wild or farmed seafood?	1= not at all important 10 = extremely important
2.5.1 Do you prefer wild, or farmed seafood, or no preference?	
2.5.1 Please explain why you gave this answer	
2.6 On a scale from 1 to 10 please rate how important it is to you to have information , on whether seafood originated from the wild or was farmed.	1= not at all important 10 = extremely important
2.7.1 On a scale from 1 to 10 please rate how important it is to you whether you buy local or imported seafood?	1= not at all important 10 = extremely important
2.7.2 On a scale from 1 to 10 please rate how important it is to you to have information on whether the seafood you buy is local or imported.	1= not at all important 10 = extremely important
2.8 If you are in a supermarket how important are the following factors to you when deciding on a seafood product? Please rate from 1 to 10 the importance of the below factors	1= not at all important; 10= extremely important
Freshness	
Nutritional value	
Appearance	
Quality	

Price	
Eco-friendliness	
Availability	
Preparation time	
low in saturated fat?	
2.9.1 When you buy trout and salmon is it important to you what shade of colour the fish is?	Yes / No
2.9.2 If yes, why do you say this?	
2.10 When buying seafood products in the supermarket do you tend to stick to products that you are familiar with? Please circle your preferred answer.	Yes / No
2.11 Please rank meat, poultry and seafood according to their affordability, from 1 to 3?	1= most affordable 3= least affordable

3. Product form, packaging and processing

The following questions only relate to consumers' purchase behaviour within the supermarket context.

3. 1 Do you buy fresh seafood?	Yes / No
3.1.1 If yes, why?	
3.1.2 If yes, how often?	Sometimes, Most of the time, Always
3.1.3 If no, why?	
3.2 Do you buy frozen seafood	Yes / No
3.2.1 If yes, why?	
3.2.2 If yes, how often?	Sometimes, Most of the time, Always
3.2.3 If no why?	
3.3 Do you buy whole fish	Yes / No
3.3.1 If yes, why?	
3.3.2 If yes, how often?	Sometimes, Most of the time, Always
3.3.3 If no, why?	
3.4 Do you buy cutlets?	Yes / No

3.4.1 If yes, why?	
3.4.2 If yes, how often?	Sometimes, Most of the time, Always
3.4.3 If no, why?	
3.5 Do you buy fillets?	Yes / No
3.5.1 If yes, why?	
3.5.2 If yes, how often?	Sometimes, Most of the time, Always
3.5.3 If no, why?	
3.6 Do you buy tinned?	Yes / No
3.6.1 If yes, why?	
3.6.2 If yes, how often?	Sometimes, Most of the time, Always
3.6.3 If no, why?	
3.7 Do you buy pre-cooked or ready to eat seafood meals?	Yes / No
3.7.1 If yes, why?	
3.7.2 If yes, how often?	Sometimes, Most of the time, Always
3.7.3 If no, why?	
3.8 Do you buy sushi?	Yes / No
3.8.1 If yes, why?	
3.8.2 If yes, how often?	Sometimes, Most of the time, Always
3.8.3 If no, why?	
3.9 Do you buy seafood sold with a sauce?	Yes / No
3.9.1 If yes, why?	
3.9.2 If yes, how often?	Sometimes, Most of the time, Always
3.9.3 If no, why?	

13.3 Restaurant Seafood Buyers Questionnaire

Introduction

We are conducting a research study on the aquaculture market in order to have a better understanding of the demand and supply of aquaculture products. Your insights would assist us in understanding the aquaculture market.

1. Respondent & Company information

1.1 Respondent's Name & Surname	
1.2 Email address	
1.3 Name of Company	
1.4 Job title	
1.4 Company physical address	
1. 5 Your company is located in which Province(s)	Western Cape, Northern Cape, Eastern Cape, Gauteng, Limpopo, KwaZulu-Natal, Mpumalanga, North West, Free State
1.6 Company contact no	
1.7 Company website address	

2. Seafood purchase-behaviour

2.1.1 Are you familiar with the term "aquaculture"? Please circle your correct answer.	Yes / No
2.1.2 If yes, briefly explain to me what your understanding of "aquaculture" is?	
2.1.3 If, no. Let me give you a short definition of aquaculture. Aquaculture is also referred to as aquafarming and is the farming of freshwater and seawater organisms.	

2.2 Answer the following questions in terms of the seafood products that you purchase for your restaurant	Aquaculture product	Originating from the wild	Fresh	Frozen	Local	Imported
Hake						
Kingklip						
Linefish/reds						
Snoek						
Monkfish						
Gurnard						
Soles						
Angelfish						
Butterfish						
Dorado						
Mackerel						
Cape salmon/geelbek						
Shrimp/prawns						
Calamari						
Abalone						
Oysters						
Mussels						
Salmon						
Trout						
Other, please specify						

2.3 Availability	
2.3.1 Do you know of any seafood types that are currently unavailable in the market that you would like to buy?	
2.3.2 If so, please give examples.	
2.3.3 As a buyer of aquaculture products: would you be encouraged to buy more aquaculture products if it was more readily available?	Yes / No
2.3.4 If so, why? If not, why?	

2.4 Please list your restaurant's top 3 best selling seafood dishes (please be as specific as possible): (For eg 1. calamari; 2. tuna; 3. sushi)	1. _____ 2. _____ 3. _____
2.5.1 Do you offer customers line fish? Please circle your preferred answer.	Yes / No
2.5.2 Should you experience a short in supply of line fish do you offer any substitute fish species? Please circle your preferred answer.	Yes / No
2.5.3 If so what substitute fish do you offer?	
2.6.1 Do you inform the customer whether the seafood product originated from the wild or whether it was farmed? Please circle your preferred answer.	Yes / No
2.6.2 If so, why? If not, why?	
2.7 How important do consider the following factors are when deciding on the seafood products you buy for you're your restaurant. Please rate from 1 to 10 the importance of the below factors	1 = not at all important; 10 = extremely important
Freshness	
Nutritional value	
Appearance	
Quality	
Price	
Eco-friendliness	
Availability	
Preparation time	
Product form (cutlets, fillets, whole fish)	
Low in saturated fat?	
2.8 Colour	
2.8.1 When you buy trout and salmon for resell purposes - is it important to you what shade of colour the fish is?	Yes / No
2.8.2 If yes, why do you say this?	
2.9 Specific trends	
2.9.1 What are the current market trends for sushi?	
2.9.2 What are the current market trends for smoked seafood?	

4. Current Seafood trends

Do you know what the latest trends in the seafood market are? Probing:	
● What current seafood trends in the South African market are you aware of?	
● What seafood trends in international markets are you aware of?	
● Do you think there is a greater tendency in South Africa towards aquaculture produce compared to seafood originating from the wild?	
● In South Africa, are there any seafood species short in supply? If so, what species are scarce and are these wild or farmed species?	

13.4 Retail and Supermarket Buyers Questionnaire

Introduction

We are conducting a research study on the aquaculture market in order to have a better understanding of the demand and supply of aquaculture products. Your insights would assist us in understanding the aquaculture market.

1. Respondent & Company information

1.1 Respondent's Name & Surname	
1.2 Email address	
1.3 Name of Company	
1.4 Job title	
1.4 Company physical address	
1. 5 Your company is located in which Province(s)	Western Cape, Northern Cape, Eastern Cape, Gauteng, Limpopo, KwaZulu-Natal, Mpumalanga, North West, Free State
1.6 Company contact no	
1.7 Company website address	

2. Seafood purchase-behaviour

2.1.1 Are you familiar with the term "aquaculture"? Please circle your correct answer.	Yes / No
2.1.2 If yes, briefly explain to me what your understanding of "aquaculture" is? If, no. Let me give you a short definition of aquaculture. Aquaculture is also referred to as aquafarming and is the farming of freshwater and seawater organisms.	

2.2 Answer the following questions in terms of the seafood products that are currently available in your supermarket:	Aquaculture product	Originating from the wild	Fresh	Frozen	Local	Imported
Hake						
Kingklip						
Linefish/reds						
Snoek						
Monkfish						
Gurnard						
Soles						
Angelfish						
Butterfish						
Dorado						
Mackerel						
Cape salmon/geelbek						
Shrimp/prawns						
Calamari						
Abalone						
Oysters						
Mussels						
Salmon						
Trout						
Other, please specify						

2.3 Availability	
Do you know of any seafood types that are currently unavailable in the market that you would like to buy?	
If so, please give examples.	

2.4 Please list your top 3 best selling seafood types.	1. _____ 2. _____ 3. _____
2.5 Do you think that the demand for fresh seafood exceeds the supply thereof?	Yes / No
2.6 Are you aware of any positive attributes associated with aquaculture products? If so, please explain why you say so.	Open-ended
2.7.1 Do you inform the customer whether the seafood product originated from the wild or whether it was farmed? Please circle your preferred answer?	Yes / No
2.7.2 If yes, why and through what channels do you inform the customer? Probe-information on packaging.	
2.7.3 If no, why?	
2.8 How important do consider the following factors are when deciding on the seafood products you buy to resell in your supermarket? Please rate from 1 to 10 the importance of the below factors	1= not at all important; 10= extremely important
Freshness	
Nutritional value	
Appearance	
Quality	
Price	
Eco-friendliness	
Availability	
Product form (cutlets, fillets, whole fish)	
Preparation time	
Low in saturated fat?	
2.9 Colour	
2.9.1 When you buy trout and salmon for resell purposes - is it important to you what shade of colour the fish is?	Yes / No
2.9.2 If yes, why do you say this?	

3. Product form, packaging and processing

3.1 Could you please give me an approximate percentage of the fresh compared to frozen seafood sold per month?	
3.2 Could you please give me an approximate percentage of seafood do you sell that is	
3.3 Specific trends	
3.3.1 What are the current market trends for tinned seafood? Probe. Is it on the increase, decrease, or stable. Ask respondent to give a few examples.	
3.3.2 What are the current market trends for pre-cooked and ready to eat meals?	
3.3.3 What are the current market trends for sushi?	
3.3.4 What are the current market trends for smoked seafood?	
3.3.5 What are the current market trends for value added products (for e.g. separate sauces sold with seafood)	

4. General Seafood trends

Do you know what the latest seafood trends are in South Africa and internationally? Probing:	
● What current seafood trends in the South African market are you aware of?	
● What seafood trends in international markets are you aware of?	
● Do you think there is a greater tendency in South Africa towards aquaculture produce compared to seafood originating from the wild?	
● In South Africa, are there any seafood species short in supply? If so, what species are scarce and are these wild or farmed species?	
● Are international trends being adopted by South Africa?	
● What countries are setting the trends?	
● Is South Africa setting any trends?	

13.5 Wholesale Seafood Buyers Questionnaire

Introduction

We are conducting a research study on the aquaculture market in order to have a better understanding of the demand and supply of aquaculture products. Your insights would assist us in understanding the aquaculture market.

1. Respondent & Company information

1.1 Respondent's Name & Surname	
1.2 Email address	
1.3 Name of Company	
1.4 Job title	
1.4 Company physical address	
1. 5 Your company is located in which Province(s)	Western Cape, Northern Cape, Eastern Cape, Gauteng, Limpopo, KwaZulu-Natal, Mpumalanga, North West, Free State
1.6 Company contact no	
1.7 Company website address	

2. Seafood purchase-behaviour

2.1.1 Are you familiar with the term "aquaculture"? Please circle your correct answer.	Yes / No
2.1.2 If yes, briefly explain to me what your understanding of "aquaculture" is? If, no. Let me give you a short definition of aquaculture. Aquaculture is also referred to as aquafarming and is the farming of freshwater and seawater organisms.	

2.2 Answer the following questions in terms of the seafood products that are currently available in your supermarket:	Aquaculture product	Originating from the wild	Fresh	Frozen	Local	Imported
Hake						
Kingklip						
Linefish/reds						
Snoek						
Monkfish						
Gurnard						
Soles						
Angelfish						
Butterfish						
Dorado						
Mackerel						
Cape salmon/geelbek						
Shrimp/prawns						
Calamari						
Abalone						
Oysters						
Mussels						
Salmon						
Trout						
Other, please specify						

2.3 Availability	
Do you know of any seafood types that are currently unavailable in the market that you would like to buy?	
If so, please give examples.	

2.4 Please list your top 3 best selling seafood types.	1. _____ 2. _____ 3. _____
2.5 Do you think that the demand for fresh seafood exceeds the supply thereof?	Yes / No
2.6 Are you aware of any positive attributes associated with aquaculture products? If so, please explain why you say so.	Open-ended
2.7.1 Do you inform the customer whether the seafood product originated from the wild or whether it was farmed? Please circle your preferred answer?	Yes / No
2.7.2 If yes, why and through what channels do you inform the customer? Probe- information on packaging.	
2.7.3 If no, why?	
2.8 How important do consider the following factors are when deciding on the seafood products you buy to resell in your supermarket? Please rate from 1 to 10 the importance of the below factors	1= not at all important; 10= extremely important
Freshness	
Nutritional value	
Appearance	
Quality	
Price	
Eco-friendliness	
Availability	
Product form (cutlets, fillets, whole fish)	
Preparation time	
Low in saturated fat?	
2.9 Colour	
2.9.1 When you buy trout and salmon for resell purposes - is it important to you what shade of colour the fish is?	Yes / No
2.9.2 If yes, why do you say this?	

3. Product form, packaging and processing

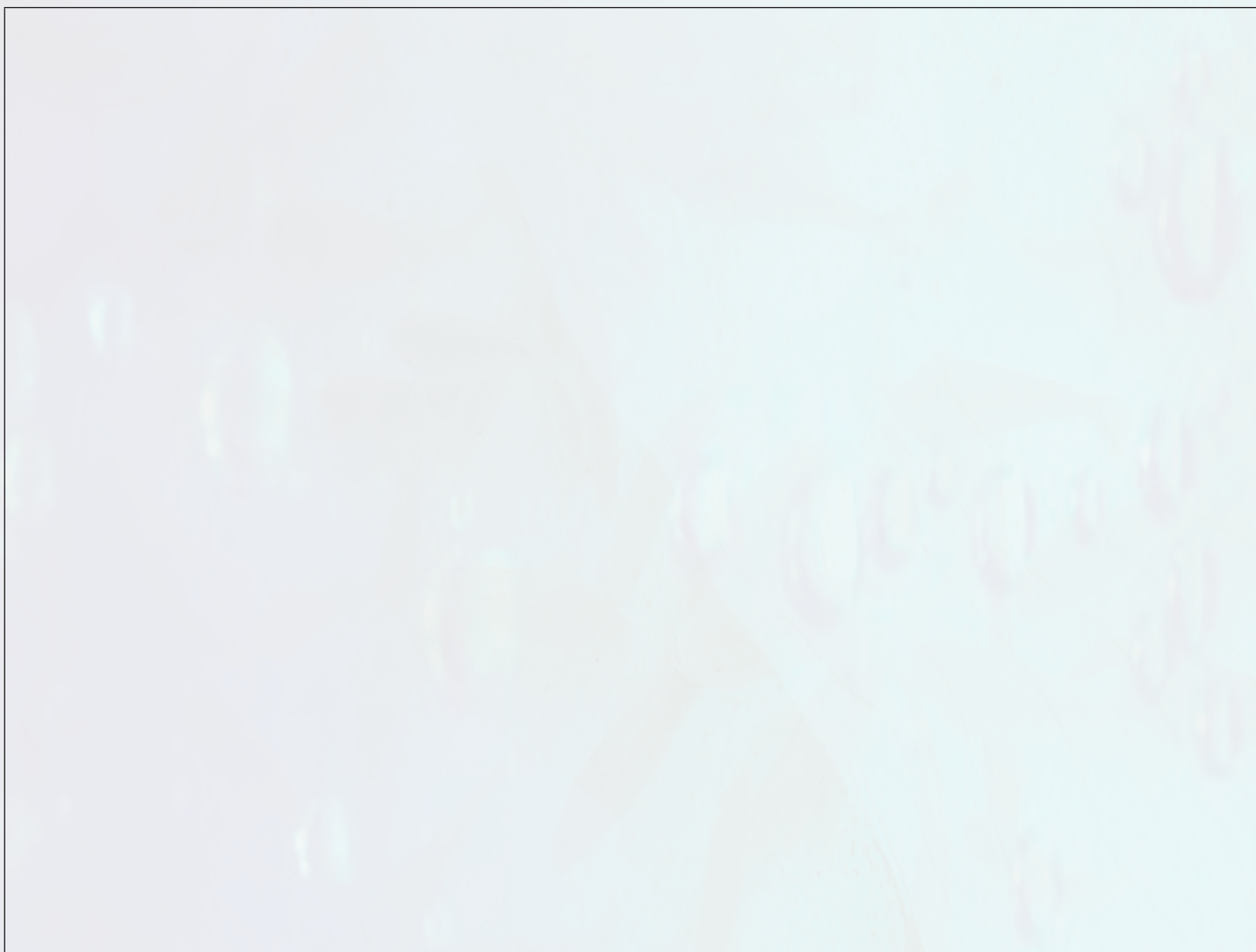
3.1 Could you please give me an approximate percentage of the fresh compared to frozen seafood sold per month?	
3.2 Could you please give me an approximate percentage of seafood do you sell that is	
3.3 Specific trends	
3.3.1 What are the current market trends for tinned seafood? Probe. Is it on the increase, decrease, or stable. Ask respondent to give a few examples.	
3.3.2 What are the current market trends for pre-cooked and ready to eat meals?	
3.3.3 What are the current market trends for sushi?	
3.3.4 What are the current market trends for smoked seafood?	
3.3.5 What are the current market trends for value added products (for e.g. separate sauces sold with seafood)	

4. General Seafood trends

Do you know what the latest seafood trends are in South Africa and internationally? Probing:	
● What current seafood trends in the South African market are you aware of?	
● What seafood trends in international markets are you aware of?	
● Do you think there is a greater tendency in South Africa towards aquaculture produce compared to seafood originating from the wild?	
● In South Africa, are there any seafood species short in supply? If so, what species are scarce and are these wild or farmed species?	
● Are international trends being adopted by South Africa?	
● What countries are setting the trends?	
● Is South Africa setting any trends?	

9 Further Comments

Additional comments on industry issues that you would like to draw to our attention:



THANK YOU FOR YOUR TIME

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Survey No.		Researcher	
Date surveyed		Approval (survey status)	*
Date captured		Approval (capture status)	

* Code

01 – Completed

02 – Pending, additional data required

03 – Incomplete

04 – Rejected as not an aquaculture operation

05 – Not completed as respondent not willing to participate in survey



Aquaculture Institute of South Africa (AISA)

Postal Address: AISA, PO Box 51743, West Beach, Cape Town, South Africa, 7449

Physical Address: AISA, The Avenues - Unit 3C1, Village Walk Rd, Parklands, Cape Town, South Africa

Tel: +27 (0)21 556 7339, Fax: +27 (0)21 556 4428, www.ai-sa.org.za

Vision:

To be a globally competitive Aquaculture sector in the Western Cape and in general in South Africa

Mission:

To promote the integrated development of a sustainable and equitable Aquaculture sector in the Western Cape and in general for all South Africans

