

## Assessing the Impacts of Stakeholders in Aquaculture Enterprise Development in the Western Cape, South Africa

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### **ABSTRACT**

*South African stakeholders, including the government, have made significant efforts to improve the enabling environment for aquaculture development. However, due to socio-economic pressures, the investment of public funding comes with expectations for job creation, transformation and empowerment. This study examined the effects of the current institutional framework, support systems and stakeholders on the development of the aquaculture sector in South Africa. The study was conducted on the west coast of the Western Cape, South Africa, focusing on the marine bivalve shellfish farming sub-sector in Saldanha Bay. A multiple-case study approach was employed. Semi-structured interviews were conducted with the owners or managers of ten aquaculture enterprises, and with nine representatives of role players who have experience in aquaculture, agriculture or enterprise development. The results indicated that over-regulation and complex application processes are still challenging, and a change in the lead department introduced uncertainty. The strong focus on socio-economic development was regarded as problematic. The study found that the enabling environment for aquaculture has greatly improved, but important challenges remain. The study recommends the establishment of an integrated aquaculture sector incubator programme to develop financially*

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*sustainable aquaculture enterprises and strengthen the role and mandate of an existing aquaculture industry organisation, such as Aquaculture South Africa.*

**Keywords:** Aquaculture, Enterprise Development, Institutional Framework, Support Systems, Western Cape, South Africa.

## 1. INTRODUCTION

South Africa is one of the most unequal societies globally, with low economic growth, high poverty and high unemployment levels. The development and support of small businesses are an important tool for addressing these challenges. This is reflected in policy instruments such as the National Small Enterprise Act No. 102 of 1996, as amended, and the establishment of a Small Enterprise Development Agency (SEDA). In 2016, there were an estimated 2.2 million small enterprises in South Africa, supporting more than 8.5 million jobs and contributing 46% to the Gross Domestic Product (Department of Small Business Development [DSBD], 2017). However, it is known that small businesses in South Africa struggle to maintain sustainability and have a high business discontinuation rate (Herrington & Kew, 2018).

Aquaculture development could also contribute to addressing socio-economic challenges, such as economic growth, wealth creation, and job opportunities. Over the last few decades, several initiatives have been implemented to improve the environment for aquaculture growth. These include, but are not limited to, the Aquaculture Benchmarking Surveys in 2006 and 2009 (Botes, Thompson & Louw, 2006a; Britz, Lee & Botes, 2009), the National Aquaculture Strategic Framework (NASF) (DAFF, 2012), the National Aquaculture Policy Framework (NAPF) (DAFF, 2013b), and an aquaculture development programme called Operation Phakisa: Aquaculture Workstream (Operation Phakisa, 2014). In 2015, there were 189 freshwater and marine aquaculture farms in South Africa, with an annual production of 5,418 tonnes (valued at USD 52.3 million), and supporting 3,826 jobs (DAFF, 2017). By 2018, this had grown to 229 farms with an annual production of 6,365.8 tonnes (valued at USD 84.2 million), supporting about 6,500 jobs across the aquaculture value chain (DEFF, 2021).

Sector development initiatives have led to increases in private and public investment, the number of farms, production, and jobs in the aquaculture sector (DAFF, 2018). Investments were made into enterprises with a commercial focus, and into enterprises and projects with a

socio-economic focus, in various sub-sectors including mussels, trout, catfish, oyster and dusky cob (Brierley, 2003; Rouhani & Britz, 2004; Botes, Thompson & Louw, 2006b; DAFF, 2017; Hara, Njokweni & Semoli, 2017). Although some of these initiatives have been hailed as success stories, many have struggled to become self-sustainable (able to sustain its own operations from income from the sale of its goods and services, without continued external financial support). The relative success of commercially oriented aquaculture projects, as opposed to the problems experienced by projects with a socio-economic focus, is well-documented in the literature (Rouhani & Britz, 2004; Hara, Njokweni,. These examples illustrate that key stakeholders, especially the government, do not operate in a vacuum; their contexts and mandates have a significant impact on sector and enterprise development in specific ways.

Although the Department of Forestry, Fisheries and the Environment (DFFE) is the lead agency for aquaculture development, numerous inter-governmental stakeholders are also involved. The different mandates and motivations of other stakeholders could have both positive and negative impacts on the development of the sector and on aquaculture enterprises.

The study needed to address the question of how South Africa's current institutional framework and support systems for agribusiness or aquaculture development impact the sector and individual enterprises. It also needed to address the question of which role players are important to aquaculture enterprises, and how they impact the sustainable development and growth of the agribusiness/aquaculture sector. Through this investigation, the study aimed to provide insights that could guide future policies and strategies in the development of financially self-sustainable aquaculture enterprises.

## **2. CONCEPTUAL FRAMEWORK**

An enabling environment for the sustainable growth of the aquaculture sector should comprise economic, legal, social and physical components to ensure 'fair access to resources, mechanisms for conflict resolution and access to information, credit and markets' (Shehadeh, 1999). Stakeholders are individuals or groups that hold an interest or stake in a resource, either directly (through exploitation of the resource) or indirectly (through managing or generating wealth or business from the resource) (Townesley, 1998). The Food and Agriculture Organisation of the United Nations (FAO) definition of an institutional framework for fishery

governance is “the set of principles, rules, conditions, agreements, processes, mechanisms and organisations used for the development and management of fisheries. Its functioning and outcome are influenced by the set of ideas, values, beliefs and assumptions under which the people concerned operate” (Manning, 2016). Commercial aquaculture is described as “the rearing of aquatic organisms with a profit motive, is done mainly by the private sector and does not need direct assistance from donor or government sources” (Percy & Hishamunda, 2001). In contrast, community-based aquaculture (CBA) is described as “situations whereby communities are empowered through skills, financial investment and the legal authority to practice aquaculture”. The rationale for CBA is to “increase fish production for local consumption” (Hara, Njokweni & Semoli, 2017). The study distinguishes between commercial aquaculture ventures driven by profit motives and community-based or collective ventures with social objectives. The mussel farming industry provided a good case study, as it included examples of both commercial and community-based or collective aquaculture ventures.

### **3. RESEARCH METHODOLOGY**

#### **3.1. Study Area and Research Design**

The study focused on the marine mussel aquaculture industry in South Africa. The study area was Saldanha Bay, on the west coast of South Africa, and included three bivalve shellfish (mussel and oyster) farming areas in Small Bay, Big Bay and Outer Bay (North), totalling 460 ha. The survey population included 27 aquaculture enterprises identified by the Bivalve Shellfish Farmers Association of South Africa (BSASA) and the Western Cape Provincial Department of Agriculture. The survey population also included role players in South Africa with responsibility or experience in aquaculture, agriculture or enterprise development. The role player categories included government departments responsible for aquaculture, aquaculture associations, universities and individuals with expertise in aquaculture farming and enterprise development.

A multiple-case study research design, as described by Yin (2009), was employed to develop a framework for collecting evidence. A case study approach was selected as it is a scientific research method in its own right and can generate context-dependent knowledge (Flyvbjerg, 2006; Yin, 2009; Remenyi *et al.*, 2010). The case study approach was selected as the most suitable for this study, as the research questions were mostly how/why questions, the study did not require control of behavioural events, and it focused on contemporary events. It also

provided the researcher with the opportunity to make comparisons, build a theory and propose generalisations about aquaculture agribusiness projects.

As described by Remenyi *et al.* (2010), the case study approach, in-depth surveys and focus groups were deemed suitable tactics for this study. In-depth surveys, including semi-structured interviews and focus groups, were selected as appropriate study tools to conduct interviews with farmers and other stakeholders, and to validate research conclusions. A qualitative approach was followed to conduct the research. The mussel farming industry provided a good case study, as it is the largest contributor to aquaculture production in South Africa (DAFF, 2017). Semi-structured interviews using survey questionnaires were conducted in 2020 with the owners or managers of ten bivalve shellfish farming enterprises, as well as with representatives of nine key stakeholders.

### **3.2. Sampling Procedure**

Multiple case studies could be compared to multiple experiments. However, replication logic is used instead of sampling logic. Each case must be selected so that each case study either predicts similar results (a literal replication) or contrasting results for anticipatable reasons (a theoretical replication). If all individual case study findings align with predictions, the studies in aggregate would have provided sufficient support for the initial propositions related to the overall multiple-case study. However, if the individual case study results contradict the initial predictions, the propositions must be revised (Yin, 2009).

The study population for case studies included aquaculture agribusiness enterprises in the bivalve shellfish farming sub-sector in South Africa. All existing and new bivalve shellfish farming enterprises (27 in total) were approached through the Bivalve Shellfish Farmers Association of South Africa (BSASA), which is the relevant industry association, and the Western Cape Provincial Department of Agriculture. The sample included nine enterprises still in operation at the time, and one that had ceased operations. Selection was primarily based on the participants' willingness to participate in the study. Enterprises included a mix of commercial and community-based or cooperative initiatives.

A non-random, judgment sampling approach, as described in Willemse and Nyelisani (2015), was used to draw a sample from subsets of the role player population (government departments, implementing agents, and research institutions). This led to semi-structured interviews with

nine role player representatives. The role player sample selection was based on willingness to participate in the study and availability.

### **3.3. Data Analysis**

In case study research, data analysis typically consists of examining, categorising, tabulating, testing, or recombining evidence to draw empirically based conclusions. For this study, relying on theoretical propositions was the preferred analytic strategy applied. A Thematic Data Analysis was used because the study followed a qualitative approach. Multiple-case study analysis consisted of two stages. Firstly, within-case analysis was conducted, where the qualitative data were analysed by identifying and copying responses from each transcription that were relevant to each of the questions asked during the interview. These responses were further analysed to create themes and sub-themes (or codes). MS Excel was used for the second stage of analysis (cross-case analysis), where grouping of themes and sub-themes, as well as summarising of codes, was completed. Results were used to generate radar charts.

## **4. RESULTS AND DISCUSSION**

### **4.1. Key Stakeholders**

Respondents identified ten key stakeholder groups (Table 1). For enterprise respondents, the three most important stakeholder groups were the government (100%), financial institutions (70%), and government-owned entities (60%). Role-player respondents listed the government (67%), industry support (44%), and financial institutions (44%) as the three most important stakeholder groups. Therefore, the government was recognised as the most important stakeholder group. The importance of government in creating an enabling environment for aquaculture development is recognised and described in the literature (Hishamunda, Ridler & Martone, 2014; Satia, 2017).

These stakeholder groups correspond with most of the groups identified in a legal guide for the development of the aquaculture sector in South Africa (DAFF, 2013a). Stakeholders with specific mandates for enterprise development, such as the Department of Small Business Development (DSBD), the Small Enterprise Development Agency (SEDA) and the Small Enterprise Finance Agency (SEFA), were not identified in the guide or by study respondents as key stakeholders. This indicated an insufficient focus on the development of aquaculture entrepreneurs and enterprises in South Africa.

**TABLE 1: Key Stakeholder Groups and Associated Percentages**

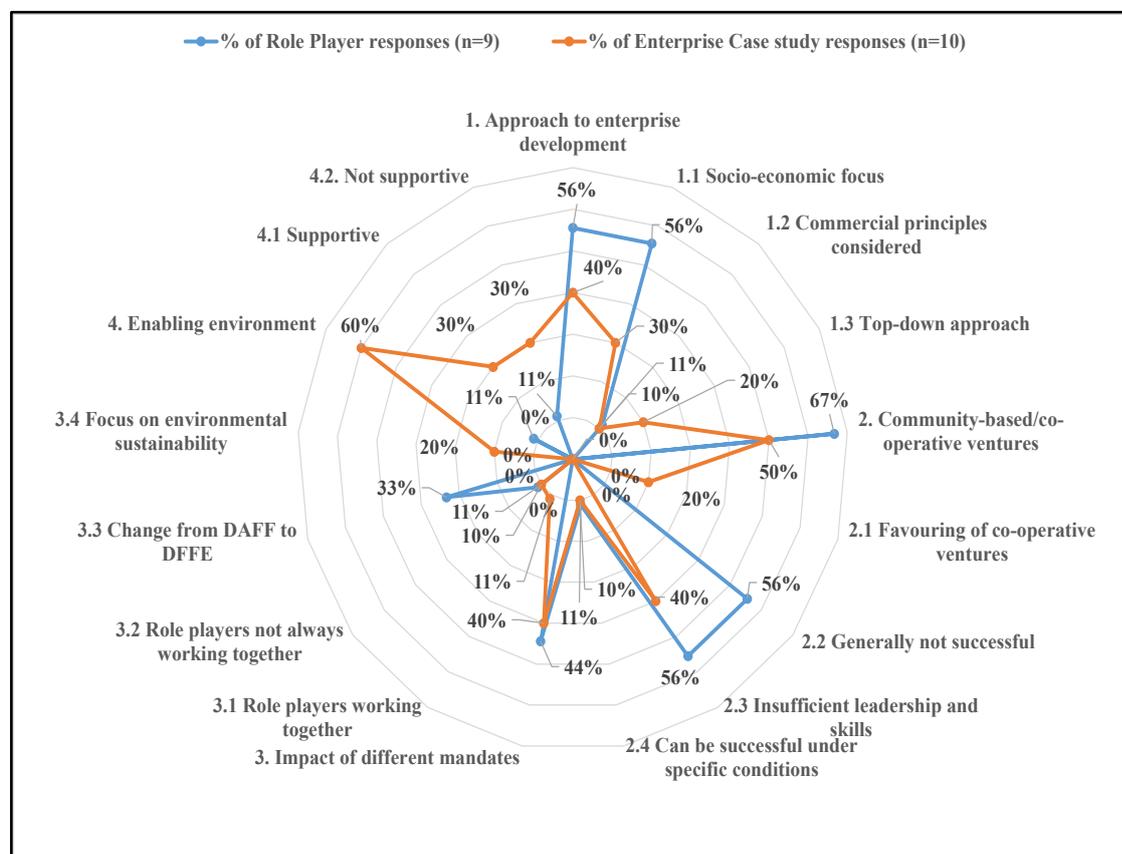
Key stakeholder groups	Number of respondents (n=10 Enterprises)	% Of enterprise responses	Number of respondents (n=9 Role players)	% Of role player responses
1. Government	10	100%	6	67%
2. Government-owned entities	6	60%	3	33%
3. Non-governmental organisations (NGOs)	1	10%	2	22%
4. Industry support and associations	5	50%	4	44%
5. Private public partnerships (PPPs)	4	40%	1	11%
6. Research institutions	2	20%	3	33%
7. Learning/ Training institutions	0	0%	2	22%
8. Funding/ Financial institutions	7	70%	4	44%
9. Industry sector	4	40%	3	33%
10. Markets	5	50%	1	11%

#### 4.2. Impacts of Key Stakeholders

The main areas of impact of key stakeholders were categorised as the approach to enterprise development, community-based/cooperative ventures, different stakeholder mandates, and the enabling environment (Figure 1). Thirty percent (30%) of enterprise respondents and 56% of role-player respondents indicated that enterprise development is driven by the need to achieve socio-economic benefits rather than by market forces or commercial principles. The

importance of a commercial rather than socio-economic focus in aquaculture development projects is supported in the literature (Rouhani & Britz, 2004; Hara, Njokweni & Semoli, 2017). Fifty-six percent (56%) of role player respondents indicated that community-based or cooperative aquaculture venture projects do not work and are not self-sustainable. However, some indicated that these projects could be successful if they are managed correctly and have commercial rather than socio-economic motives.

There were mixed opinions about the change in lead agency for aquaculture from the Department of Agriculture, Forestry and Fisheries (DAFF) to the DFFE in 2019. This meant that aquaculture is now managed as a fishery instead of an agricultural activity, and it introduced uncertainty about governance and future development. The five-year review of Operation Phakisa recognised these concerns (DEFF, n.d.). Some enterprise respondents indicated that frameworks such as EIAs contributed to a supportive environment by allowing aquaculture activities to go ahead in an environmentally responsible manner. However, others felt that the environment was not supportive due to over-regulation, red tape, increased costs, and an excessive number of approved but unsustainable projects.



**FIGURE 1: Role player and Enterprise Responses about Impacts of Key Stakeholders**

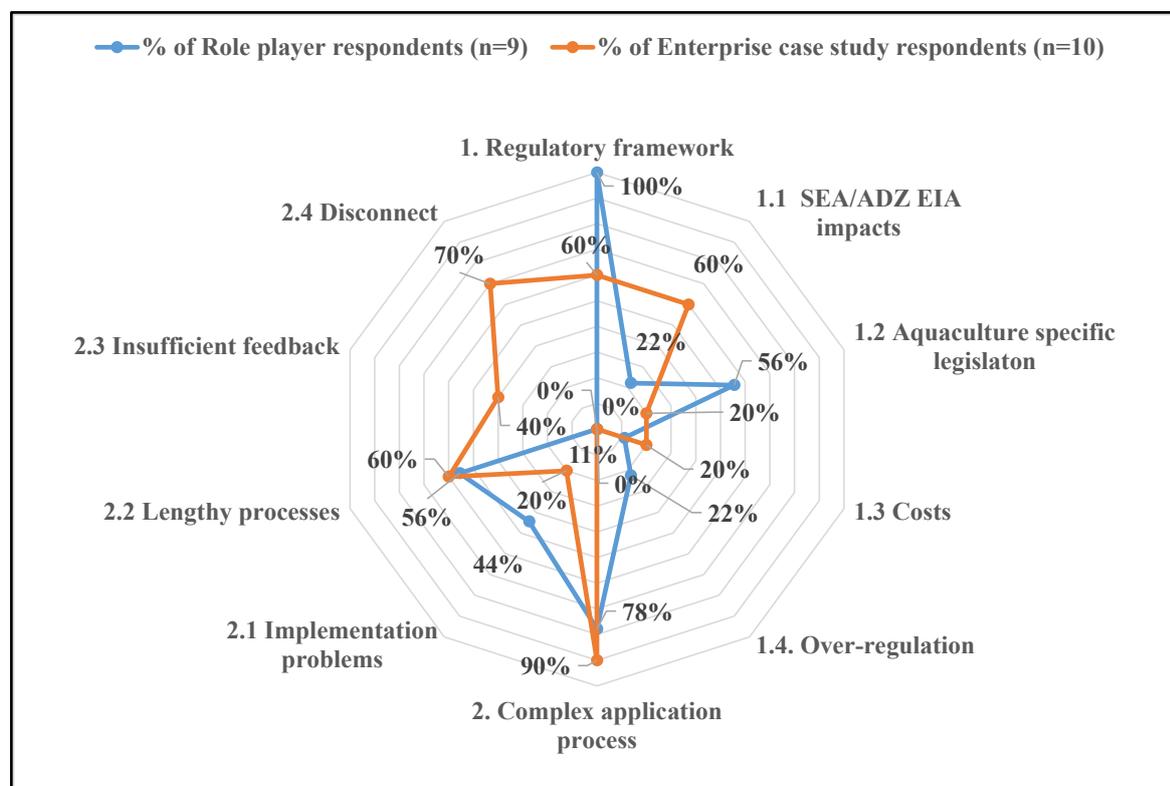
### **4.3. Impacts of the Institutional Framework**

Responses about the impacts of the institutional framework were categorised into the regulatory framework and complex application processes (Figure 2). Enterprise respondents felt most strongly about the impacts of environmental processes (60%), while role-player respondents were most concerned with aquaculture-specific legislation (56%). Enterprise concerns mainly were related to the Environmental Impact Assessment (EIA) recommendations for the Saldanha Bay Aquaculture Development Zone (ADZ), which limited total bivalve shellfish production to 10,000 tonnes per annum (TPA) for the first two years, and annual incremental increases by 5,000 TPA thereafter to a maximum of 27,600 TPA (DAFF, 2017). This limited farmers' ability to operate at full capacity. The problem of finding a balance between responsible regulation and optimal production levels is also experienced elsewhere, such as Norway's salmon aquaculture industry (Osmundsen, Almklov & Tveterås, 2017).

Most role-player respondents agreed on the need for aquaculture-specific legislation to guide the development of aquaculture. As part of Operation Phakisa, an Aquaculture Development Bill was drafted to promote the development of marine and freshwater aquaculture as a key agricultural activity. The Bill was withdrawn for rework in 2020 (DEFF, n.d.) and republished for comment in 2023. The responses support the literature that finds that aquaculture requires a specific legislative framework as a basis for long-term and sustainable growth (Young *et al.*, 2019). Over-regulation was a concern due to the high administrative burden and costs associated with seawater leases, compliance with permit applications and renewals, environmental monitoring and data collection, as well as food safety monitoring. This negatively impacted smaller companies.

For both respondent groups, complex and lengthy application processes (for rights, permits, leases and financial support) remain one of the most important constraints. This is despite the establishment of an Inter-departmental Authorisations Committee (IAC) aimed at simplifying application processes and reducing processing time (DEFF, n.d.; Operation Phakisa, 2014; DAFF, 2018). Enterprise respondents commented about insufficient communication regarding applications (40%) and insufficient communication between stakeholders (70%). This included the perceived inability of officials to understand the impacts of their decisions on industry, as well as confusion among applicants about what is required. Similar issues were experienced

elsewhere, for example, in Ireland, where dysfunctional licensing arrangements were a challenge to the development of the Irish oyster industry (Renwick, 2018).

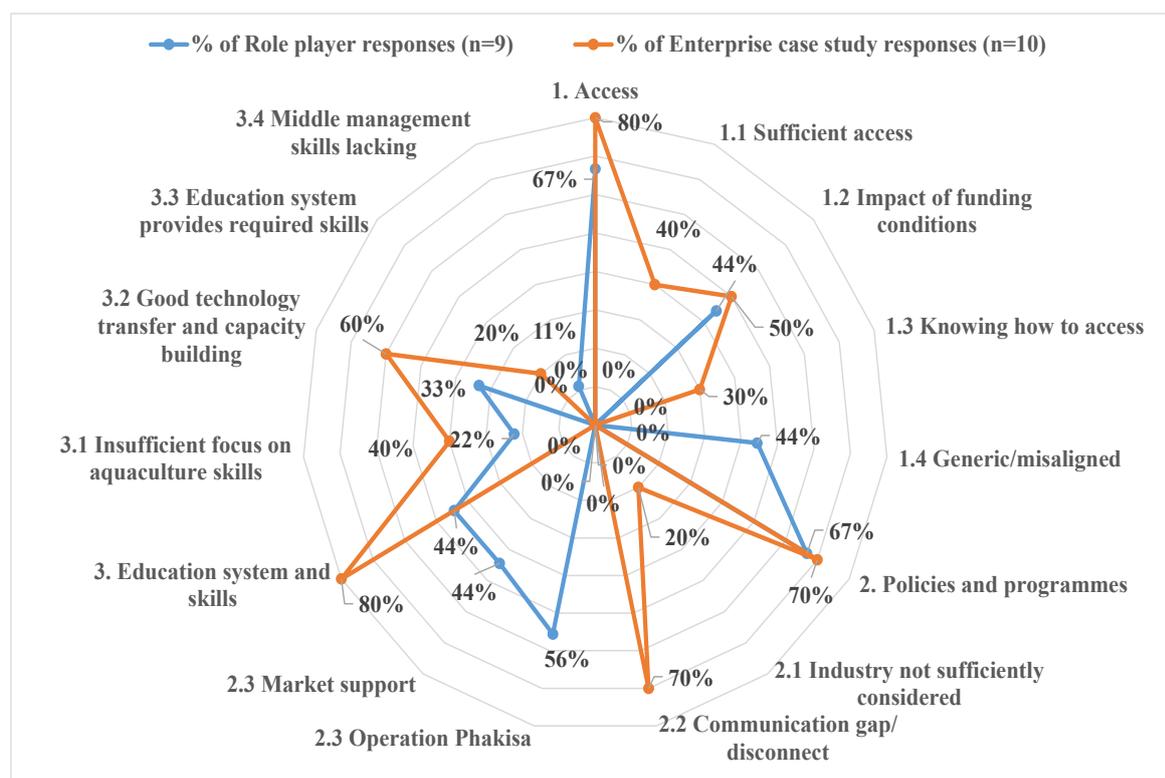


**FIGURE 2: Role player and Enterprise Responses about the Institutional Framework**

#### 4.4. Impacts of Support Systems

Responses about the impacts of support systems for aquaculture enterprises were categorised into access, policies and programmes, and the education system and skills (Figure 2). Although 40% of enterprise respondents indicated that they had sufficient access to funding, water space, and technology, 30% mentioned that new aquaculture farmers were unaware of how to access the available support. Funding for aquaculture enterprises is available; however, funding conditions are challenging, especially for new entrants. These findings are supported by the literature, which highlights the importance of overcoming regulatory and financial constraints for the development of an aquaculture sector, as seen in the case of the oyster industry in Ireland (Renwick, 2018). Support systems were also perceived as being misaligned with different parts of the country or with the available environments, or as being too generic to support established enterprises. Responses about policies and programmes were categorised into insufficient consideration of industry, a communication gap between stakeholders, Operation Phakisa and market support. Enterprise respondents (70%) perceived that policymakers do not adequately

account for the realities of aquaculture limitations. Most role-player respondents (56%) were positive about the impacts of the Operation Phakisa (Aquaculture Programme); however, there was a concern that the goals related to job creation and economic development were overly ambitious. The local market demand for mussels is about 3,500 TPA. Therefore, the potential increase in bivalve shellfish production to more than 27,000 TPA would require additional market support. Operation Phakisa included the development of a Public Awareness and Marketing Strategy as well as an Aquaculture Development Bill. However, remaining challenges include the slow rollout of planned production and development of export markets (DAFF, 2019a, 2019b, 2020). During 2019, DFFE began developing an Oceans Economy Master Plan, which would build on and incorporate the lessons learnt from Operation Phakisa. Due to the COVID-19 pandemic, work on this Plan was halted and re-commenced in 2021.



**FIGURE 3: Role player and Enterprise Responses about Support Systems**

While concerns were raised about aquaculture education and skills, 60% of enterprise respondents indicated that the required skills can be obtained through technology transfer, mentoring, online learning, and on-the-job training. Although “Aquaculture farmer” and “Aquaculture farm assistant” qualifications were developed and approved through Operation Phakisa (DAFF, 2018). Concerns about insufficient middle management are supported in the literature (Botes, Thompson & Louw, 2006a; Chrysalis, 2017).

The study found that key stakeholders have both positive and negative impacts on the aquaculture sector. The enabling environment for the sector has improved, but several key constraints and concerns remain. Positive impacts include efforts to improve the regulatory environment for aquaculture, a focus on environmental sustainability, the Operation Phakisa Programme, the market support programme, and skills improvement programmes. Remaining challenges include over-regulation, complex application processes, a strong focus on socio-economic need rather than commercial principles, the negative impacts of funding conditions, and a change in the lead department for aquaculture.

Industry associations do not receive support from government or other institutions and are dependent on membership fees. If fully funded, these associations could address many of the challenges and improve the sustainability of aquaculture enterprises and the industry. For example, the Bivalve Shellfish Farmers Association of South Africa (BSASA) received funding from the Foreign, Commonwealth and Development Office of the Government of the United Kingdom (FCDO) to investigate the potential of commercial kelp farming on the west coast of South Africa (BSASA, 2022). This led to further funding for a kelp farming feasibility study and kelp market and value chain analysis (BSASA, 2023). This highlights the potential of industry associations to fast-track the development of the aquaculture sector.

## **5. CONCLUSIONS AND RECOMMENDATIONS**

The results of the study showed that the enabling environment for aquaculture sector development in South Africa has significantly improved over the last decade, particularly through interventions such as Operation Phakisa. However, challenges remain. While sector development initiatives led to increased investment, production expansion, and job creation, the development of aquaculture enterprises did not receive sufficient attention. Recommendations for interventions are therefore aimed at developing financially self-sustainable enterprises.

Aquaculture industry associations should be strengthened and resourced. If fully funded and supported, an industry organisation such as Aquaculture South Africa could launch an integrated project to pilot the recommendations from this study. This could include assistance with the development of a focused aquaculture Enterprise and Supplier Development (ESD)

strategy and an aquaculture sector incubator programme. It should include mentoring, coaching and capacity building through relationships with established commercial partners, the research community, financial partners, and other stakeholders. It should focus on a development path for new and established enterprises that would enable them to become financially self-sustainable, with the support of institutions such as DSBD and SEDA, in collaboration with private sector business incubators and accelerators.

Industry bodies could also assist with streamlining application processes through mechanisms such as an online application portal and a help desk to assist new entrants and guide applicants through the process. Additionally, they could facilitate improved coordination and communication between relevant stakeholders and enterprises. Lastly, the finalisation and implementation of the Oceans Economy Master Plan should serve as a platform for DFFE to enhance its visibility and increase confidence in its ability to address the aquaculture sector's challenges.

Addressing the challenges identified through this study could expand the positive impacts of the initiatives implemented to date, further improve the enabling environment for the sector and assist aquaculture enterprises in becoming financially self-sustainable.

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## **7. DISCLOSURE STATEMENT**

The authors declare that they have no conflict of interest.

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