

OPERATION PHAKISA

Unlocking the Oceans Economy through Aquaculture

OCTOBER
2014-2019

Aquaculture Workstream
Year Five Review



environment, forestry
& fisheries

Department:
Environment, Forestry and Fisheries
REPUBLIC OF SOUTH AFRICA





Abalone farm in Haga Haga



Abalone farming



Catfish feeding Karoo Catch



Salmon-trout Franschhoek



Trout offloaded for processing



Boat transporting harvested oysters

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1. ANNUAL REVIEW: OPERATION PHAKISA OCEANS ECONOMY: AQUACULTURE

1.1 ABBREVIATIONS

AASA	Aquaculture Association of Southern Africa	IDC	Industrial Development Corporation
ADEP	Aquaculture Development and Enhancement Programme	MAFISA	Micro Agricultural Financial Institutions of South Africa
ADF	Aquaculture Development Fund	MOU	Memorandum of Understanding
ADZ	Aquaculture Development Zone	NC	Northern Cape
BBBEE	Broad Based Black Economic Empowerment	NEPAD	New Partnership for African's Development
BEE	Black Economic Empowerment	NRCS	National Regulator for Compulsory Standards
CASP	Comprehensive Agricultural Support Programme	NRF	National Research Foundation
DALRRD	Department of Agriculture, Land Reform and Rural Development	SA	South Africa
DEFF	Department of Environmental, Forestry and Fisheries	SADC	Southern African Development Community
DFI	Development Funding Institutions	SAIMI	South African International Maritime Institute
DHET	Department of High Education and Training	SARS	South African Revenue Service
DPME	Department of Planning, Monitoring and Evaluation	SEA	Strategic Environmental Assessment
DSI	Department of Science and Innovation	SEDA	Small Enterprise Development Agency
DTIC	Department of Trade, Industry and Competition	SMMEs	Small, Medium and Micro-size Enterprises
EC	Eastern Cape	TETA	Transport Education Training Authority
ECDC	Eastern Cape Development Corporation	TIA	Technology Innovation Agency
ECRDA	Eastern Cape Rural Development Agency	TNPA	Transnet National Ports Authority
EIA	Environmental Impact Assessment	WAS	World Aquaculture Society
EU	European Union	WC	Western Cape
FAO	Food and Agriculture Organisation		
GDA	General Discharge Authorisation		
GDP	Gross Domestic Product		
GP	Gauteng Province		
GTAC	Government Technical Advisory Centre		
HACCP	Hazard Analysis and Critical Control Points		
HDI	Historically Disadvantaged Individuals		
IAC	Inter-departmental Authorisations Committee		

1.2 FOREWORD BY THE ACTING DIRECTOR-GENERAL: ENVIRONMENT, FORESTRY AND FISHERIES



Foreword by the acting director-general: environment, forestry and fisheries.

It is our pleasure to present the 2018/2019 Aquaculture Year Five Review publication. We have reached the five year mark since the inception of the Operation Phakisa: Oceans Economy programme. As we reflect on the highlights and challenges experienced, there is no doubt that Operation Phakisa has accelerated the trajectory of the aquaculture sector in South Africa. Over the last five years, the ground work was set firmly in place as we continue to aspire towards the 2030 milestones set by the National Development Plan.

During the reporting period, the Department of Agriculture, Forestry and Fisheries (DAFF) particularly the fisheries and aquaculture functions, transitioned into the now Department of Environment, Forestry and Fisheries (DEFF). DEFF is now the lead on aquaculture development alongside key partners including industry, academia, fellow public entities and government stakeholders. Collaboration was critical to achieving the progress on the nine aquaculture initiatives during the 2018/19 reporting period.

The number of registered Operation Phakisa projects grew from 35 in 2017/18 to 45 in 2018/19. In essence these projects have committed to meet the aquaculture aspirations which seeks to grow sector revenue to R3 billion; production by 20 000 tons; jobs from 2 227 to 15 000 and to increase participation to realise sector transformation. Towards the latter end of 2019, new targets were set for the next five years and are noted in the 'Year Five Snapshot' section of this review. The development of enabling legislation is critical

for the sustainable development of the sector. In this regard the Aquaculture Development Bill was developed and introduced in Parliament in 2018. It is anticipated that the Bill will be revived and undergo parliamentary processes with the newly appointed sixth administration of government.

It is notable that the final certification framework under initiative four was completed and will assist the country with meeting local and international standards around certification for aquaculture. This will assist with access to local and international markets. A South African National Standard has been drafted for the exportation of live, raw chilled and processed aquaculture sea urchins, adding to the range of aquaculture products available to export markets.

The Aquaculture Development Fund Working Group under initiative five hosted its inaugural 'Aquaculture Finance and Investment Seminar' in Durban during March 2019. This networking platform saw various projects presented to a full house of over 200 delegates of potential investors and Development Funding Institutions (DFIs). Revised guidelines for the Aquaculture Development and Enhancement Programme (ADEP) were published in order to further support aquaculture businesses financially.

Aquaculture is a knowledge and technology-driven sector that requires a diversity of skills. In this respect, the department's Memorandum of Agreement with Stirling University to train and address local scarce skills in fish health is still ongoing. The 'Skills and Needs Analysis' assessment of the sector was presented at various platforms and skills requirements were modelled and projected over the next five years.

The China – South Africa Aquaculture Technology Demonstration Centre (ATDC) located near Gariep

Dam in the Free State trained 415 potential farmers and government officials to date. The aim is to broaden this training to SADC countries. During this period, the 'Aquaculture Skills Programme Booklet' for short skills was developed and serves as a published directory for short skills programmes available in South Africa.

In an effort to increase our national consumption of fish products locally, the department and industry have developed the 'Public Awareness and Marketing Strategy for Aquaculture Products and the Sector in South Africa'. In addition to the strategy, a videography marketing campaign was launched to showcase the farming and recipe preparation of five species.

Along with the notable progress made, there are still critical challenges to be addressed to see the sector meet the initial aspirations set out in 2014. We would like to extend our utmost appreciation to sister departments, the aquaculture industry, sub-sector associations, project owners, academic colleagues, the management team and staff for the unwavering hard work in pursuit of developing a sustainable aquaculture sector.

Let us continue to press forward and use our collective efforts towards building an aquaculture sector that positively contributes towards enhancing food and nutrition security; job opportunities; transformation; economic growth and rural development.

Mr Ishaam Abader
Acting Director-General: Environment, Forestry and Fisheries

1.3 INTRODUCTION

Operation Phakisa is a fast results delivery programme launched in July 2014 to help implement the National Development Plan, with the ultimate goal of boosting economic growth and to create jobs. The National Development Plan (NDP) is South Africa's socio-economic development blueprint which enjoins us to create a better life for all citizens in an inclusive society. The NDP guides every sector's plans and policies; programmes; projects and operations – including how budgets, skills and other resources are allocated to move South Africa forward.

Operation Phakisa is a results-driven approach to development, setting clear plans and targets with on-going monitoring of progress; and making these results public in order to address the triple challenges of poverty, unemployment and inequality. It focusses on bringing key stakeholders from the public and private sectors, academia as well as civil society organisations together to collaborate in detailed problem analysis; priority setting; intervention planning and delivery. The Department of Planning, Monitoring and Evaluation leads Operation Phakisa. The Department of Environment, Forestry and Fisheries (DEFF) established the Oceans Economy Secretariat to lead the 'Oceans Economy'.

The Operation Phakisa: Ocean Economy programme focuses on:

- Marine Transport and Manufacturing, led by the Department of Transport;
- Offshore Oil and Gas, led by the Department of Mineral Resources and Energy;
- Aquaculture, led by the Department of Environment, Forestry and Fisheries;
- Marine Protection Services and Ocean Governance, led by the Department of Environment, Forestry and Fisheries;

- Small Harbours Development, led by Department of Public Works and Infrastructure; and
- Coastal and Marine Tourism, led by the Department of Tourism.

Each of the focus areas noted above are enabled by skills development and capacity building; as well as research, technology and innovation initiatives, led by the Department of Higher Education and Training and the Department of Science and Innovation.

DEFF is the lead department for the Oceans Economy Aquaculture focus area and its deliverables. The Lab concluded that South Africa's aquaculture sector has a high growth potential due to an increasing demand of fish products due to the increasing global population; increasing income by the middle class in developing countries and more awareness on the dietary benefits offered by fish products. Moreover the capture fisheries yield has been plateauing over the past decade while aquaculture continues to grow over 7% per annum. This growth is expected to continue at a higher rate in the future.

The goal is to grow the aquaculture sector in South Africa to play a major role in supplying fish products; an enhanced role in job creation; increased contribution to national income and rural livelihoods. The targets over five years (2014-2019), seeks to grow sector revenue from R0, 67 billion to R3 billion; production by 20 000 tons; jobs from 2 227 to 15 000 and to ensure increased participation to support transformation in the sector.

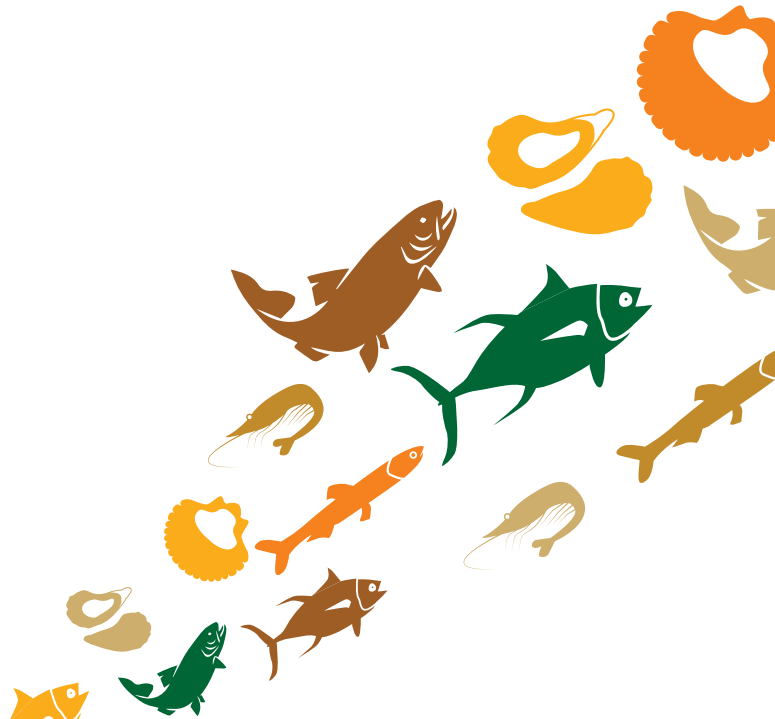
The Aquaculture Lab comprised of stakeholders from industry, government and academia who identified nine (9) key initiatives. One initiative addresses the selection and implementation of catalyst projects, improving both the number and productivity of the new farms. Three initiatives relate to the creation of an enabling regulatory environment and others focus on funding support, increasing the skills pool and awareness; and improving access to markets. Initiative nine "Develop and Implement Aquaculture Development Zones (ADZ's)"

seeks to promote investment into the sector and create an enabling environment.

To deliver these initiatives, the Aquaculture Lab created detailed implementation plans and accompanying budgets, a proposed governance system to take responsibility for initiatives and key performance indicators to help monitor delivery. The highlights outlined are consequences of the progress achieved on the 3 feet plans across the three horizons defined by the Lab participants in 2014.

The previous Year One – Year Four Annual Review publications are available on the DEFF website:

<https://www.environment.gov.za/projectsprogrammes/operationphakisa/oceanseconomy>





1.4 PROGRESS ON AQUACULTURE KEY PERFORMANCE INDICATORS (2018)

It has been five years since the introduction of Operation Phakisa: Oceans Economy and considerable milestones were achieved to grow the aquaculture sector.

2019 LAB PROJECTIONS

During 2019 in the 3 feet plans targets, a total investment of R2.8 billion (Government and Private) since 2014 was required to unlock an additional 2 618 direct jobs, 20 970 tons production capacity and increase turnover across the 36 projects to over R1.6 billion per annum.

INVESTMENT 2018 ACTUAL

By end of 2018, total actual investment committed to Operation Phakisa aquaculture projects was over R1.78 billion, of which over R280 million was from government. This is 93.7% of the projected additional investment of R1.9 billion target for 2018/2019.

The additional actual investment (private and government) in 2018 was R557 million. Committed government investment in 2018 was over R155 million, which will be utilised from 2019 onwards.



2018 PROJECTED

During 2018 as per the 3 feet plans an additional investment of R1.9 billion - (government and private) was projected

PRODUCTION 2018 ACTUAL



Operation Phakisa projects contributed a total of 3 547.79 tons production in 2018, which is 37.71 tons less than 2017. This equates to an 8.69% decrease from 2017.

The total production for marine and freshwater for the sector is 6 365.8 tons.

The production target set in the Phakisa Lab report for 2018 was 16 853 tons, therefore in terms of the sector as a whole the production is 37.7% on target.

2018 PROJECTED

13 347 tons additional production

JOBS 2018 ACTUAL

The total number of jobs contributed by Operation Phakisa projects was 2 367, these included:

- 2 030, previous total jobs on 35 farms in 2017;
- 337, new direct jobs created in 2018;

Disaggregated jobs (of total jobs on farm):

- **Gender:** Females (984) 42% Males (1 383) 58%
- **Ages:** Youth (1 175) 50%
- **Race:** African black (1 411) 60%; Coloured (760) 32%; White (194) 8%; Asian (2) 0.1%
- **Disabilities:** (14) 1%
- **Veterans:** (2) 0.1 %

The total jobs for the sector were 6 500 (including the crocodile subsector and value chain jobs i.e. processing).



2018 PROJECTED

An additional 568 direct jobs

TRANSFORMATION



Operation Phakisa projects transformation statistics in 2018:

SMMEs = 16
Cooperatives = 1
Average BBBE Level = < Level 4

GDP 2018 ACTUAL

Total estimated turnover (based on tonnage) across 36 projects amounted to over R584 million per annum in 2018.

The total value of the aquaculture sector in 2018, was estimated at over R 1.01 billion. This represents an increase of 3% in the value of the sector.



2018 PROJECTED

The projected increased turnover from the baseline of R770 million is R1.1 billion per annum across the 36 projects.

1.5 HIGHLIGHT PER INITIATIVE

★ Quick wins

Priority initiatives identified by the Aquaculture Lab to support the implementation of catalyst projects

1★ Selection and Implementation of Catalyst Projects

Since the Lab in 2014, twenty-eight (28) new projects have been assessed and incorporated as part of Operation Phakisa Oceans Economy. In total there are forty-five (45) projects. Twenty eight (28) of the 45 projects are producing farmed aquaculture animals. Feasibility studies for hatcheries were completed in the Northern Cape and Eastern Cape.

2	Legislative reform Aquaculture Development Bill: approved by Cabinet on 9 May 2018 and was introduced to Parliament on 15 June 2018. It is expected to be taken up by the newly appointed 6th administration. Strategic Environmental Assessment: The study was completed and the next step is implementation.	
3★	Inter-departmental authorisations committee Environmental Authorisations completed since October 2014: • Nine (9) Environmental Impact Assessments (EIA) were completed and authorised, two appeals completed. • Four (4) coastal discharge permits were issued. • Nine (9) biodiversity risk assessments. • Seven (7) land leases have been issued and nineteen (19) new water leases were allocated and approved. • Fourteen (14) marine aquaculture permits/Rights were issued.	
4	Globally recognised monitoring and certification system • Certification Framework: The final certification framework for aquaculture products in South Africa was completed and will assist the country with meeting local and international standards around certification for aquaculture. • Sea urchin export: A South African National Standard has been drafted for the exportation of live, raw chilled and processed aquaculture urchins (SANS 2091) and technologies for commercial grow-out of sea urchin have been further refined.	

5★ Aquaculture development fund

- **Aquaculture Development and Enhancement Programme:** New guidelines were published by the DTIC as from April 2019
- **Investment Promotions:** The first Aquaculture Finance and Investment Seminar was held in Durban in March 2019. Various private projects and government agencies presented to the full house of over 200 delegates.



6 Capacity building and skills development for support services

- **The skills and needs analysis assessment** of the sector was presented at various platforms. In order to inform interventions, skills needs were modelled and projected over the next five years.
- **DEFF and Stirling University Agreement:** Two vets attended short courses during 2019.
- **China-South Africa Aquaculture Technology Demonstration Centre (ATDC):** 415 potential farmers and government officials were trained and the aim is to broaden it to SADC countries.
- **Aquaculture Skills Programme (short skills) Booklet** was developed and published in October 2019. The booklet is a directory and guideline for short skills programmes available for aquaculture in South Africa.



7★ Coordinated industry-wide marketing efforts

- **The Public Awareness and Marketing Strategy for Aquaculture Products and the Sector in SA** was completed
- **Videography** content of local aquaculture species was developed to promote how farming is done and how to prepare recipes for five species (mussels, oysters, catfish, trout and tilapia).
- **The African Chapter of the World Aquaculture Society (WAS)** elected and appointed its permanent board; key guiding and operational documents were drafted as well as conceptualisation of a joint project and work programme to serve the SA aquaculture sector.



8 Preferential Procurement

In order to access public sector markets and designate local fish products, baseline market information is required. Research on the current fish consumption of state owned entities and departments are currently underway. Collaboration with the **Department of Correctional Services** nutritional guidelines for the procurement of fish products was set in motion.



9 (NEW) Develop and Implement Aquaculture Development Zones (ADZs)

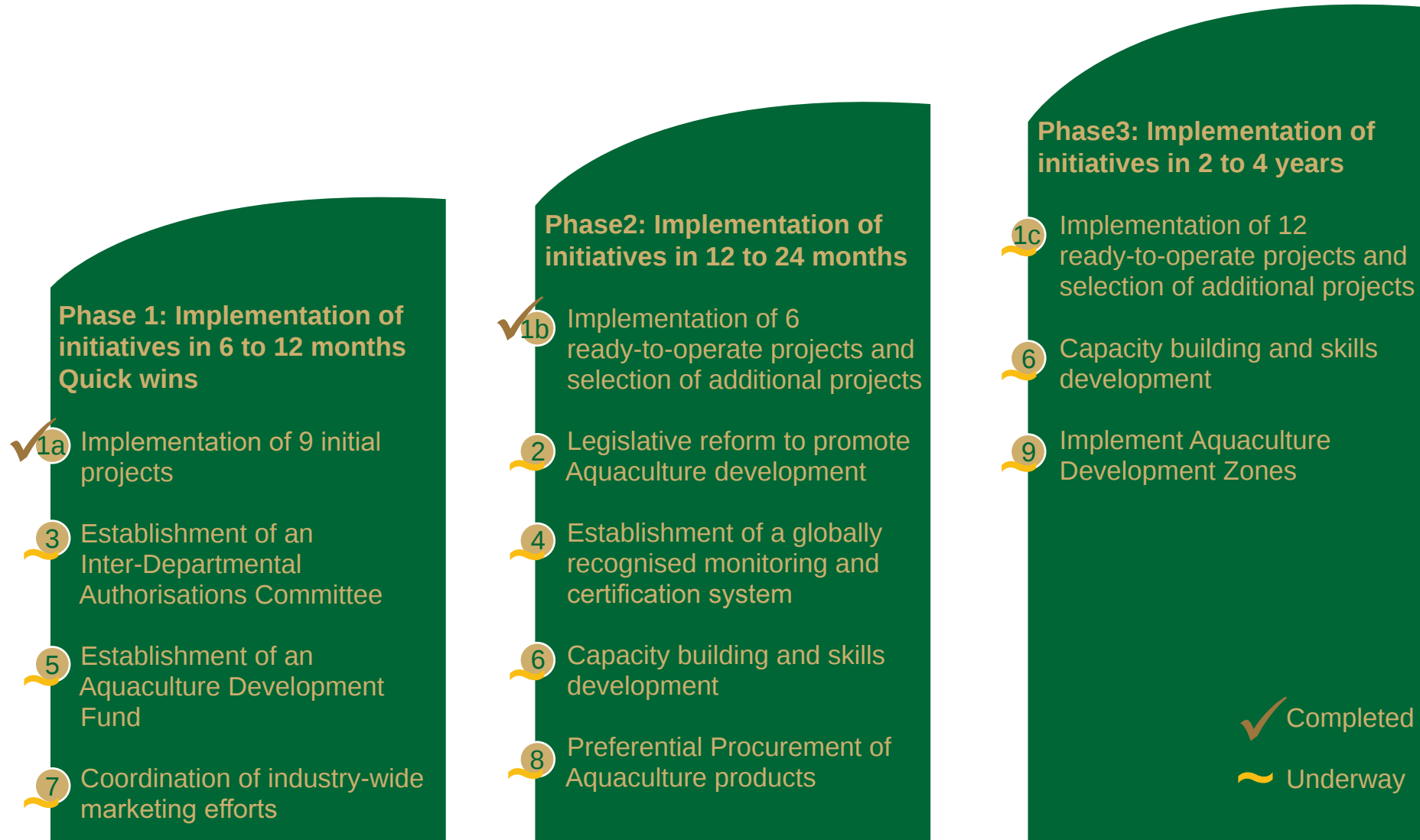
To promote investment into the sector and create an enabling environment, the DEFF has embarked on a process to establish ADZs. An ADZ is an area or site either on land or sea set aside exclusively for aquaculture use or development and may have bulk infrastructure (reservoir, water pump) to attract investors. There are currently eight (8) ADZs registered and monitored under this initiative.



1.6 YEAR FIVE REVIEW

OVERVIEW OF INITIATIVES

The nine aquaculture initiatives are divided into three phases in order to increase the scale of the aquaculture sector and identification of quick wins. This reporting period is based on phase three of implementation.



PROGRESS: INITIATIVE 1 - SELECTION AND IMPLEMENTATION OF CATALYST PROJECTS

Since the Lab in 2014, twenty eight (28) new projects have been assessed and incorporated as part of Operation Phakisa Oceans Economy. In total there are forty-five (45) projects. Six (6) of the original 24 projects conceptualised during the Lab have been removed and placed on business opportunities and one (1) project, Amatikulu Kob, was incorporated in the new Aquaculture Development Zone initiative nine. Twenty-four (24) of these projects are considered Small, Medium and Micro-sized Enterprises (SMMEs). Twenty eight (28) of the 45 projects are producing farmed aquaculture animals.

In summary, the delays and challenges experienced by some projects include funding, road repair, poaching, coastal water quality, water leases, land leases and authorisations.

Hatcheries

In order to supply demand and promote new entrants into the sector, the DEFF completed feasibility studies for hatcheries (research and demonstration) in the Northern Cape and Eastern Cape. The feasibility study completed for the Northern Cape Abalone Hatchery shows significant potential to foster the growth of aquaculture in the province. The DEFF is now engaging the Public Private Partnership unit for National Treasury at the Government Technical Advisory Centre (GTAC) on suitable procurement models to explore.

Policy for aquaculture

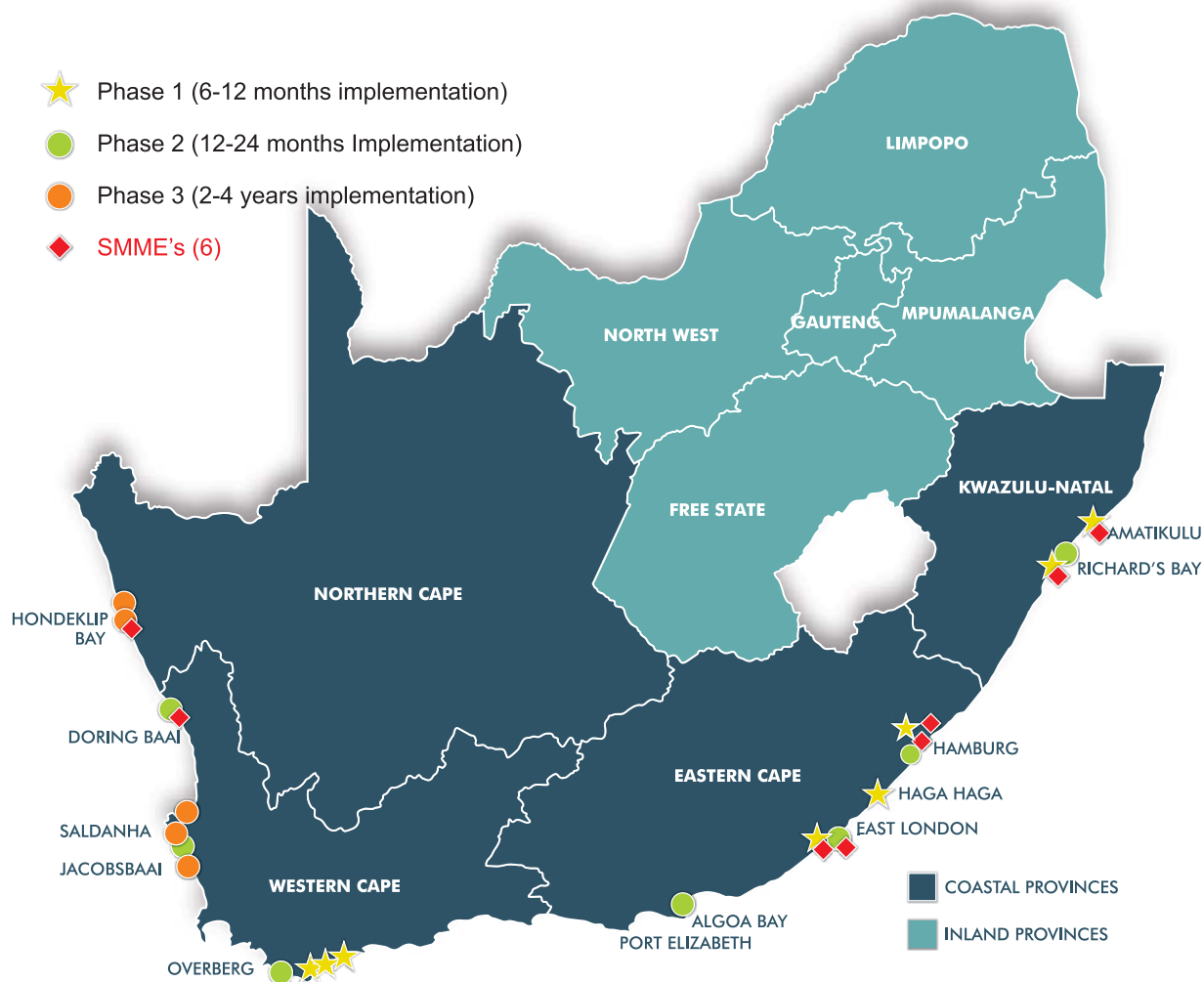
The department commissioned the development of a transformation strategy and small scale policy in order to support small scale aquaculture and ensure efficient transformation of the sector. Workshops were held on the draft 'Transformation Strategy for the Aquaculture Sector'.

Comprehensive Aquaculture Small Scale Framework was completed as a first step towards development of the small scale policy. The small scale feasibility studies were published for the following species; catfish, marron, crayfish, Nile and Mozambique tilapia, oysters and mussels and rainbow trout.

This will assist new entrants with assessing the minimum viability for establishing a small-scale aquaculture operation in South Africa. The small scale aquaculture implementation plan will be drafted and used as a technical guide for the small scale aquaculture framework. The plan aims to guide how the participation of small scale fish farmers can be improved and become part of the mainstream aquaculture activities.



24 ORIGINAL AQUACULTURE PROJECTS



HONDEKLIP BAY

- New farm: DCA Ranching (abalone)
- ◆ Expansion of DST Abalone Hatchery

DORING BAAI

- ◆ Expansion of Doring Bay Abalone

JACOBSBAAI

- Expansion: Jacobsbaai Sea Products (abalone)

SALDANHA BAY

- New farm: Molapong Cages (salmon trout)
- Expansion of Blue Ocean Mussels
- Expansion of Saldanha Bay Oysters

OVERBERG

- ★ Expansion of Roman Bay (abalone)
- ★ Expansion of Abagold (abalone)
- Expansion of Marine Growers (abalone)
- ★ Expansion of HIK Abalone

PORT ELIZABETH

- New: Wild Coast Abalone Ranching

HAMBURG

- ◆ Expansion of Hamburg Oyster farm
- ◆ New farm: Hamburg Kob

HAGA

- ★ Expansion: Wild Coast Abalone Farm

AMATIKULU

- ◆ Expansion of Amatikulu ornamentals

RICHARDSBAY

- ◆ New farm: Richards Bay Sea Cage Farming

7 projects removed, placed onto business opportunities

Ventersdorp Catfish, ADZ Ventersdorp, Algoa Bay Yellowtail, Oceanwise ELIDZ and Southern Atlantic, Paternoster Oyster, Amatikulu ADZ removed to Initiative 9 (ADZ)

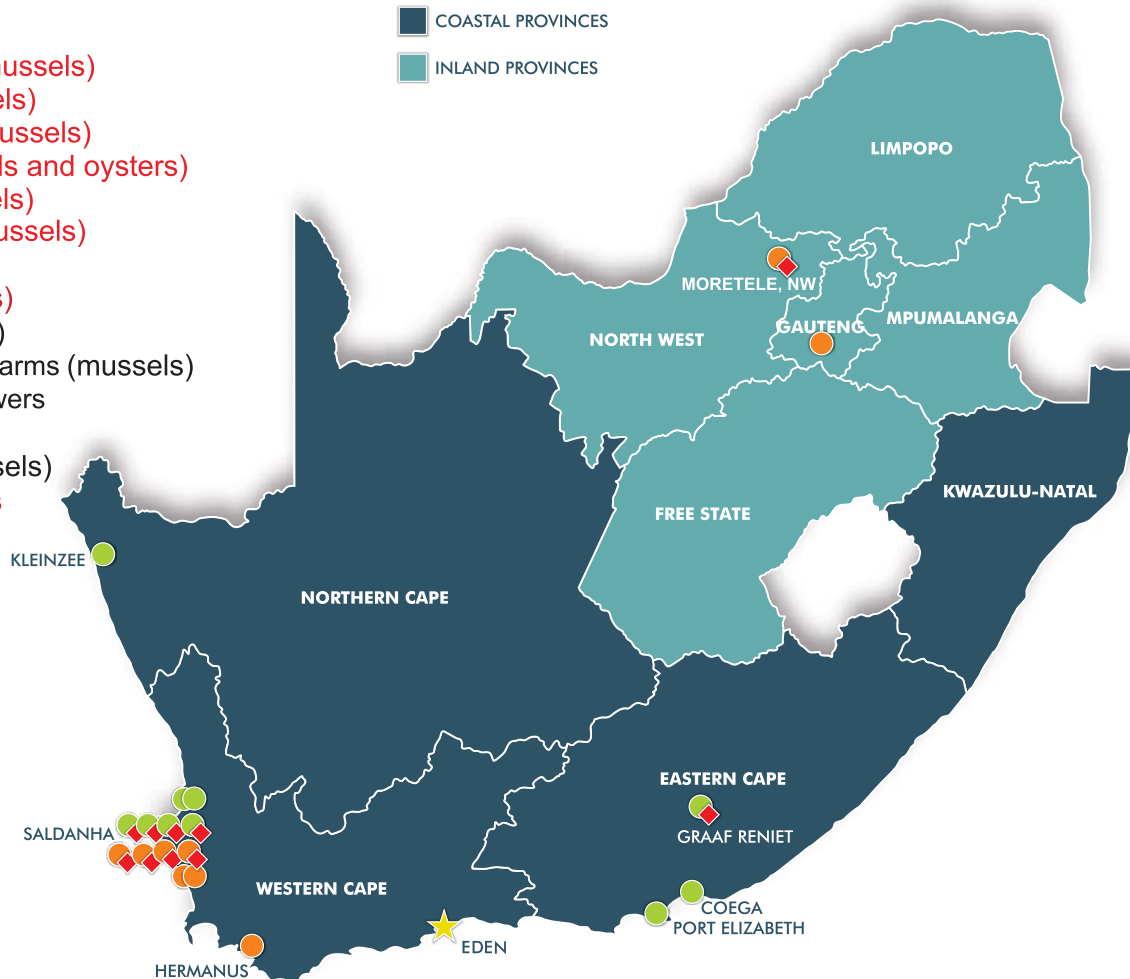
28 NEW AQUACULTURE PROJECTS SINCE 2014

KLEINZEE

- Exp: Diamond Coast Aquaculture

SALDANHA

- Exp: Blue Sapphire Pearls (mussels)
- Exp: Imbaza Mussels (mussels)
- Exp: African Olive Trading (mussels)
- Exp: Aqua Foods SA (mussels and oysters)
- New: Requa Mussels (mussels)
- New: Chapmans Mussels (mussels)
- New: Xesibe (mussels)
- Exp: Salmar Trading (oysters)
- New: Oystercatcher (oysters)
- New: Southern Atlantic Sea farms (mussels)
- Exp: West Coast Oyster Growers (mussels and oysters)
- Exp: West Coast Aqua (mussels)
- New: Blue Lagoon Products
- New: Lagoon Aqua
- New: MMM Agri Consult
- New: Madima Trading
- New: Simunye Mussels
- New: Ulwazi Kukutya
- New: Mika Growers
- New: Pluto Mussels



★ Phase 1

● Phase 2

● Phase 3

◆ SMME's (18)

HERMANUS

- New: Hermanus Salmon (salmon)

EDEN

- ★ New: Abalone Farm Aquinion (abalone)

PORT ELIZABETH

- Exp: Zwembesi (oyster)

COEGA

- RMS Abalone Farm (abalone)

GRAAF RENIET

- ◆ Exp: Karoo Catch (catfish)

GAUTENG

- New: Northdene (tilapia)

MORETELE, NW

- ◆ New: Blue Green (tilapia)

TABLE 1: POTENTIAL PRODUCTION AND JOB CREATION BY 2023/2024 OF NINE NEW PROJECTS REGISTERED DURING 2019.

PROJECT NAME	LOCATION	SPECIES	POTENTIAL PRODUCTION BY 2023/2024	POTENTIAL JOBS BY 2023/2024
Blue-Green Aquaculture (Pty) Ltd	Bosplaas, NW	Tilapia	200 tons	50 jobs on farm
Pluto Mussel and Trading (Pty) Ltd	Saldanha Bay, WC	Mussels	1000 tons	13 jobs on farm
MMM Agriconsult (Pty) Ltd	Saldanha Bay, WC	Mussels	1000 tons	13 jobs on farm
Simunye Mussels (Pty) Ltd	Saldanha Bay, WC	Mussels	1000 tons	13 jobs on farm
Ulwazi Kukutya (Pty) Ltd	Saldanha Bay, WC	Mussels	1000 tons	13 jobs on farm
Madima General Agricultural Trading (Pty) Ltd	Saldanha Bay, WC	Mussels	1000 tons	13 jobs on farm
Lagoon Aquafarm (Pty) Ltd	Saldanha Bay, WC	Mussels	1000 tons	13 jobs on farm
Blue Lagoon (Pty) Ltd	Saldanha Bay, WC	Oysters	100 tons	22 jobs on farm
Mika Growers (Pty) Ltd	Saldanha Bay, WC	Mussels	1000 tons	13 jobs on farm
TOTAL			7 300 tons	163 jobs

PROGRESS: INITIATIVE 2 - LEGISLATIVE REFORM TO PROMOTE AQUACULTURE DEVELOPMENT

Currently, the legislative framework governing aquaculture activities is fragmented and regulated by various departments as aquaculture occurs across sea, land and fresh water. Initiative 2 looks at `Legislative Reform` which aims to amend legislation to streamline the assortment of existing regulations and creates an enabling environment to promote aquaculture sector growth. Several steps have been taken towards the legislative reform to promote aquaculture development.

The Aquaculture Development Bill was approved by Cabinet on 9 May 2018 and introduced to Parliament on 15 June 2018. During the 2019 reporting period, it is expected to be taken up by the newly appointed 6th administration.

Aquaculture Strategic Environmental Assessment (SEA)

The purpose of the SEA is to identify suitable areas where environmentally sustainable aquaculture development can be prioritised and incentivised. Secondly, it will provide a streamlined and integrated management and regulatory framework to reduce compliance complexities and improve decision-making processes. The study was completed and the next step is implementation.

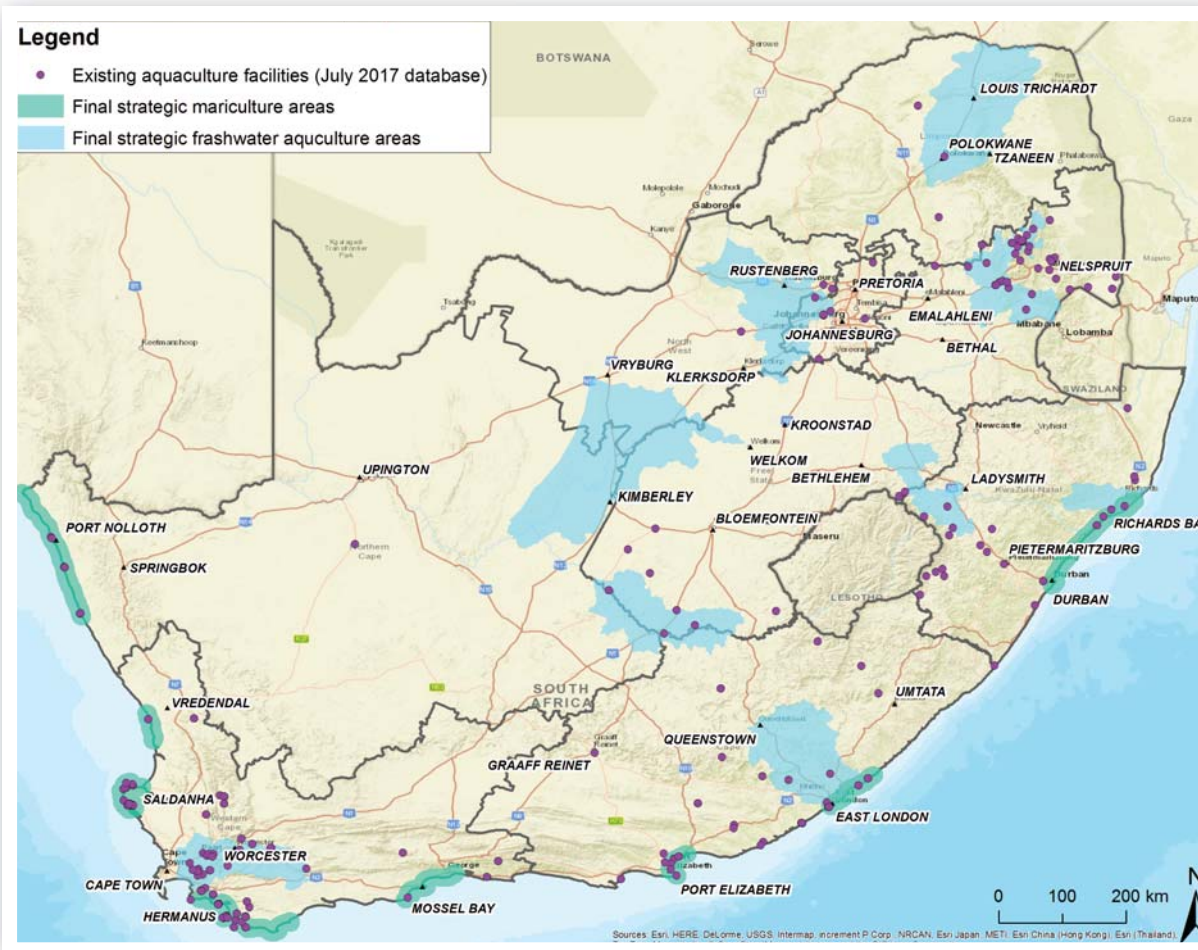


Figure 1: Freshwater and marine areas screened for aquaculture through the SEA.

Norms and standards

Norms and standards for abalone were gazetted for comment in February 2016 and will most likely be incorporated into the SEA process.

Coastal Discharge Permits:

The General Discharge Authorisation (GDA) for coastal discharges, which includes aquaculture, is aimed at reducing the need for aquaculture operations to apply for a full Coastal Water Discharge Permit which required various specialist studies. The project is delayed due to significant amendments completed to the draft GDA. The internal approval process had to be redone entirely, prior to gazetting for comment. The revised General Discharge Authorisation conditions were published for comment in 2019.

Mapping and regulations of alien species:

In terms of Nile tilapia, a task team has been set up between industry, national government and the provinces. Nile tilapia and hybrids have to be sampled to determine risk areas for farming the species. The trout mapping has not been finalised to date but the presence and absence of trout has been mapped per province. DEFF has communicated regulatory implications of a state legal opinion that was sent to industry stakeholders. The revised regulations were published on the 16 February 2018 however since the matter has been taken to court, these regulations have not been implemented. Ground truth mapping of Nile tilapia is underway.

PROGRESS: INITIATIVE 3 - ESTABLISHMENT OF AN INTER-DEPARTMENTAL AUTHORISATION COMMITTEE

Initiative 3 covers the establishment of an 'Inter-Departmental Authorisations Committee' (IAC) which will streamline and coordinate applications and approvals in the aquaculture sector. The IAC is made up of the following key member departments: Environment, Forestry and Fisheries; Public Works and Infrastructure; Agriculture; Land Reform and Rural Development, Water and Sanitation; Public Enterprises (Transnet National Ports Authority) and Mineral Resources and Energy.

Environmental Authorisations issued for Operation Phakisa projects since October 2014:

- ▶ Nine (9) Environmental Impact Assessments (EIA) were completed and authorised, two appeals completed.
- ▶ Four (4) coastal discharge permits were issued.
- ▶ Nine (9) biodiversity risk assessments (Barramundi, Coho, King Salmon, Siberian Sturgeon, Rainbow Trout, Catfish, Nile Tilapia, Mozambique Tilapia and Common Carp).
- ▶ Saldanha Bay Aquaculture Development Zone Environmental Impact Authorisation:
 - The Minister of DEFF approved the ADZ authorisation on 8 January 2018 and the appeal decision took place on 7 June 2018.
 - Saldanha Bay ADZ could potentially create between 780-2500 jobs, bring in additional investment of R400 million, unlock R800 million revenue per annum and contribute towards rural livelihoods and food security (import substitution).
 - Requirements to commence were met such as appointment of Environmental Control Officer, establishment of the Aquaculture Management Committee (AMC) and Consultative Forum (CF).
 - DEFF and TNPA have engaged regularly around the allocation of new water space in Saldanha Bay in line with the revised area authorised in the EIA.
 - The year one external audit was conducted for February 2020.

Algoa Bay Aquaculture Development Zone:

- Alternative sites are being assessed and considered. There are three precincts with a different combination of species and area combinations. There is only one precinct being considered for finfish i.e. the Algoa 7 Coega site, other precincts propose the farming of bivalves. The new Basic Assessment process has been completed and the appeals process is underway. The appeal decision is expected in December 2020.
- #### COEGA Aquaculture Development Zone: 6
- On 7 February 2018 DEFF granted an integrated environmental authorisation for the development and operation of the Coega Land-Based ADZ in the Coega Industrial Development Zone.
 - Seven (7) land leases have been issued.
 - Nineteen (19) new water leases were allocated and approved in total. One for an Operation Phakisa aquaculture project in Port Elizabeth and eighteen (18) projects received lease options in Saldanha Bay (ADZ) new water leases were approved for projects in Saldanha Bay.
 - The water use license notice for the Vanderkloof dam was received.
 - Coastal lease and water use license was issued for Qolora ADZ.
 - Fourteen (14) marine aquaculture permits/Rights were issued.

PROGRESS: INITIATIVE 4 - ESTABLISHMENT OF A GLOBALLY RECOGNIZED MONITORING AND CERTIFICATION SYSTEM

Importing nations require assurances that the products they receive are safe for consumption; however, in South Africa there are currently only a few trained technicians and specialists. To address this, Initiative 4 is an enabler to establish a 'Globally Recognised Monitoring and Certification System' to boost exports of South African aquaculture products.

Certification framework

Stakeholder workshops were held in Cape Town and Pretoria with various bodies, government entities and industry. The final certification framework for aquaculture products in South African was completed in October 2019 and will assist the country with meeting local and international standards around certification for aquaculture.

European Union (EU) export approval:

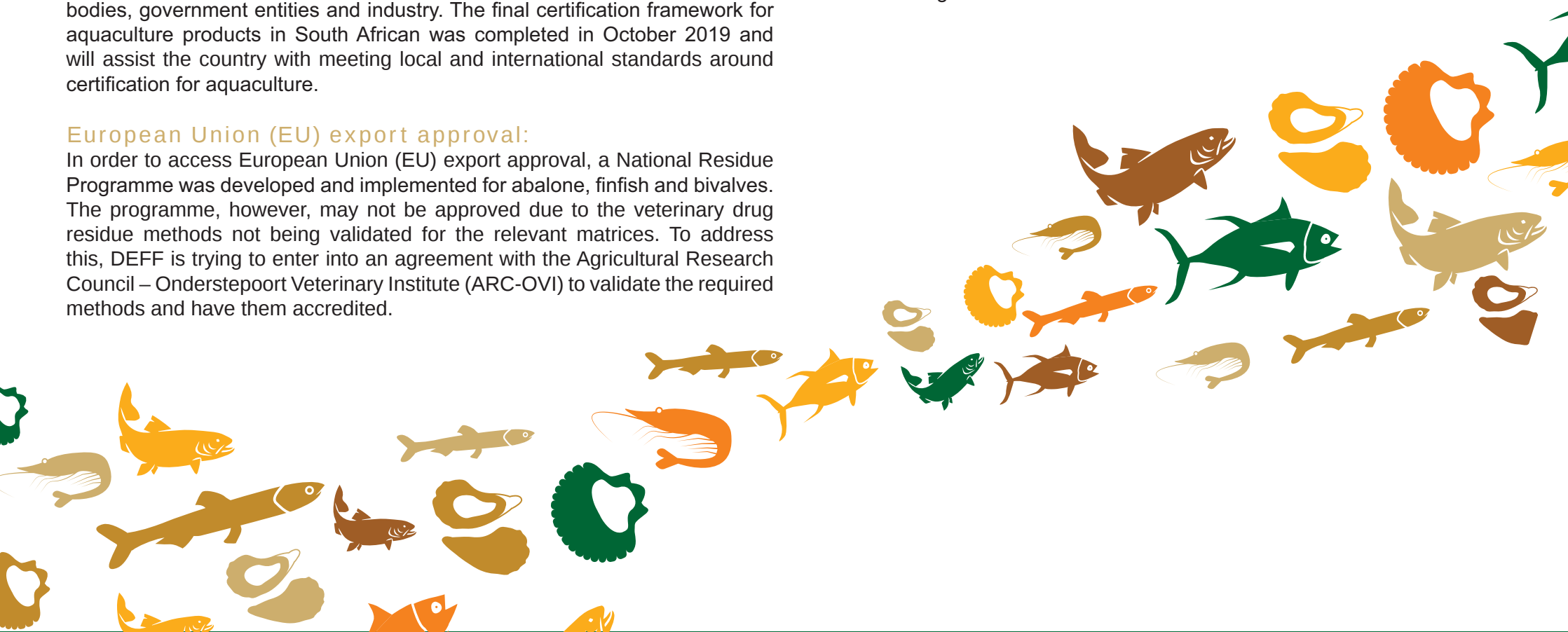
In order to access European Union (EU) export approval, a National Residue Programme was developed and implemented for abalone, finfish and bivalves. The programme, however, may not be approved due to the veterinary drug residue methods not being validated for the relevant matrices. To address this, DEFF is trying to enter into an agreement with the Agricultural Research Council – Onderstepoort Veterinary Institute (ARC-OVI) to validate the required methods and have them accredited.

Standards:

DEFF and National Regulator for Compulsory Standards (NRCS) are working on the Dried Abalone Standard.

Sea Urchin Production:

A South African National Standard has been drafted for the exportation of live, raw chilled and processed aquaculture urchins (SANS 2091) and technologies for commercial grow-out of sea urchin have been further refined.



Standards and Compulsory Specifications to date:

LIST OF COMPULSORY SPECIFICATIONS

Standard no:	Name of the standard	Date published	Entity
No. R. 934	Compulsory specification for live lobsters	19 August 2016	Department of Trade, Industry and Competition
No. R. 1329	Amendment of the compulsory specification for canned fish, canned marine molluscs and canned crustaceans and products derived therefrom	1 December 2017	Department of Trade, Industry and Competition
No. R. 870	Compulsory specification for aquacultured live and chilled raw bivalve molluscs	10 August 2018	Department of Trade, Industry and Competition
No. R. 628	Amendment of the compulsory specification for canned fish, canned marine molluscs and canned crustaceans and products derived therefrom	22 June 2018	Department of Trade, Industry and Competition

LIST OF PUBLISHED STANDARDS

SANS Number	Title	Date Approved
SANS 585:2018	The production of frozen fish, marine molluscs, and products derived therefrom	2018-03-16
SANS 587:2020	Canned fish, canned marine molluscs and canned	2020-03-30
SANS 729:2018	Live aquaculture abalone	2018-11-02
SANS 1680:2014	Live lobsters	2014-11-14
SANS 2074:2019	Frozen lobster, frozen lobster products and products derived therefrom	2019-03-28
SANS 2329:2019	Dried abalone	2019-03-28
SANS 2879:2016	Live and chilled raw bivalve molluscs	2016-04-08

PROGRESS: INITIATIVE 5 - ESTABLISHMENT OF AN AQUACULTURE DEVELOPMENT FUND

Initiative 5, looks at the 'Aquaculture Development Fund' (ADF) which aims to establish an integrated pool of existing funds in order to finance all phases of aquaculture projects (including pre-production) and encourage new entrants to participate in the aquaculture sector.

The ADF Working Group is made up of the following key Development Funding Institutions (DFI's) and departments:

The ADF Working Group is made up of the following key Development Funding Institutions (DFIs) and departments: Environment, Forestry and Fisheries; Comprehensive Agriculture Support Programme and Mafisa Fund; Industrial Development Corporation (IDC); Land Bank; Eastern Cape Development Corporation (ECDC); Eastern Cape Rural Development Agency (ECRDA); Science, Technology and Innovation; Jobs Fund; National Empowerment Fund; Trade, Industry and Competition; Small Business Development; National Treasury Government Technical Advisory Centre (GTAC); Small Enterprise Development Agency (SEDA); Wesgro (Tourism, Trade and Investment Promotion Agency for Cape Town and the Western Cape); Trade and Investment KZN (TIKZN).

Aquaculture Species Feasibility Studies:

The financial feasibility studies were conducted on key aquaculture species and are guidelines to inform new entrants, government authorities and funders to assist with policy and investment decisions. Feasibility studies were completed for marine finfish, oyster and mussels, tilapia, trout, abalone, catfish, freshwater ornamentals, marron

crayfish and aquaponic systems to inform new entrants, funding agencies, policy and investors. The feasibility studies include general economic models based on various production systems per species. The studies indicate market assessments, minimum scale and financial analysis based on inputs from technical experts, industry stakeholders and peer-review workshops.

The feasibility studies and funding directory can be obtained from the links below:

Feasibility Studies: <https://www.environment.gov.za/documents/research/feasibilitystudies>

Funding Directory: https://www.nda.agric.za/doaDev/sideMenu/fisheries/03_areasofwork/Aquaculture/economics/Funding%20Guide%202019%20Final.pdf

Engagements with Land-Bank

DEFF had a bilateral meeting with Land Bank on 27 February 2019 to reinforce the Land Bank's participation in the ADF Working Group and funding of aquaculture projects. Thereafter an information sharing session was held with the Land Bank and the DTIC's Product and Incentive Development unit on the 23 May 2019. The session aimed to educate regarding the aquaculture sector and to outline the Aquaculture Development and Enhancement Programme (ADEP) as a dedicated aquaculture grant fund. This led to the Land Bank's participation on the ADF Working Group and their presence during all ADEP application site visits.

Aquaculture – Call for Proposal

The call for aquaculture funding was made by the Technology Innovation Agency (TIA) in March 2019.

The call was made through the Agriculture Business Unit under Bio-Innovation Aquaculture Programme. The call targeted start-up companies, SMMEs, private individuals, science councils and higher education institutions. It focused primarily on:

- Fresh water and marine production systems (particularly on increasing production output/yield).
- Aquatic animal feed, health and disease management technologies.
- Aquaculture value addition and post-harvest technologies for food security and nutrition.

Aquaculture Development and Enhancement Programme

New ADEP guidelines were published by the dtic and effective from the 1st of April 2019 and extended this programme until further notice. An overview is included in the snapshot section of this year five review publication.

Aquaculture Finance and Investment Seminar

On the 27 March 2019, the DEFF held the first Aquaculture Finance and Investment Seminar in Durban. Various private projects and government agencies presented to the full house of over 200 delegates. The seminar included live panel discussions and exhibition stands.

PROGRESS: INITIATIVE 6 - CAPACITY AND SKILLS DEVELOPMENT

There is currently a lack of certified vocational training for basic aquaculture farming skills. In addition, aquaculture as an emerging sector has almost no dedicated and specialised extension officers; state vets specialised in aquaculture and research officers at a provincial level and at the national level within DEFF. Initiative 6 covers 'Capacity Building and Skills Development for Support Services.'

The skills and needs analysis assessment of the sector has been completed to inform further interventions and skills requirements. This was funded by AGRISETA and the National Skills Fund (DHET). The analysis of the sector was presented at various platforms including the South African International Maritime Institute (SAIMI) Conference held in Durban during October 2019. In order to help inform interventions by various role players responsible for aquaculture, the skills needs were modelled and projected over the next five years in terms of quantifiable numbers.

In order to address the scarce aquatic veterinarian skills and services available in South Africa, DEFF and Stirling University signed an agreement for training of aquatic vets and aquaculture specialists. Five (5) provincial veterinarians have completed one year Masters training programme. Two DEFF staff members completed three months of training on fish health management. Three new vets were sent for another year of training in September 2018. Two vets attended short courses (3 months) during 2019.

Aquaculture qualifications (through AGRISETA):

The aquaculture qualifications for 'Aquaculture Farmer' and 'Aquaculture Farm Assistant' was completed and approved by QCTO (Quality Council for Trades and Occupations) in March 2018. It was approved by SAQA (South African Qualifications Authority). The development and approval of the aquaculture farmer qualifications framework was completed in partnership with AgriSETA.

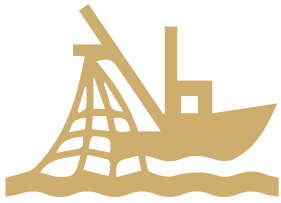
The China-South Africa Aquaculture Technology Demonstration Centre (ATDC)

is located near Gariep Dam in the Free State. Since this aquaculture training centre was officially handed over to South Africa in June 2017, 415 potential farmers and government officials were trained and the aim is to broaden it to SADC countries. The species currently farmed at the demonstration centre includes common carp, African sharptooth catfish, koi carp, Mozambique tilapia and goldfish. The centre's service offering comprises of extension advisory services; supply of catfish fingerlings to small scale projects in surrounding areas; conducts ongoing research; provides various training courses and public awareness through school day visits and exhibitions at events.

Aquaculture Skills Programme (short skills) Booklet

The Aquaculture Skills Programme (Short Skills) available in SA booklet was developed and published in October 2019. One of the key challenges is information sharing and knowledge around the aquaculture sector in general, including the availability of local training opportunities. The Department of Agriculture, Rural Development and Land Reform publishes career booklets annually which includes various diploma and degrees available related to aquaculture. However, this does not include short skills and programmes. Therefore, the booklet provides a guideline in terms of short skills programmes currently provided for aquaculture.





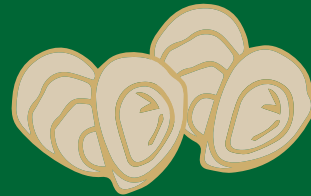
KEY MILESTONES OVER LAST FIVE YEARS



- * Operation Phakisa Lab process bringing together of industry, government, civil society, academia etc. (July 2014)
- * EIA production thresholds amended to only Basic Assessment required for aquaculture, unless another listed activity is triggered (December 2014)

YEAR 2015

- * Eight new land leases approved by Department of Public Works and Infrastructure. Leases for 85 hectares of water space were granted or extended in line with the 15 year Marine Right by TNPA
- * NRCS and DEFF signed MOU for NRCS to undertake independent sampling
- * Inaugural Interdepartmental Authorisation Committee (IAC) meeting held
- * 140 hectares of water space approved for ten projects in Saldanha Bay for 15 years by TNPA
- * Aquaculture Development Fund working group established
- * Taiwan market opened for oysters
- * Skills Working Group established for aquaculture
- * Aquatic animal health and welfare implementation plan developed and approved



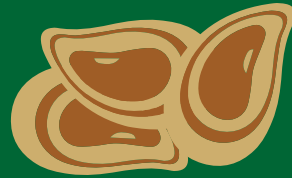
YEAR 2016

- Alien and Invasive Species (AIS) regulations amended for marine species (oyster and mussels). Applicable to farms with a Marine Right and in existing areas, it did not require a risk assessment
- Aquaculture Development Bill introduced to NEDLAC
- Council for Scientific and Industrial Research (CSIR) started the Strategic Environment Assessment
- European Union (EU) conducts fact finding mission on abalone
- DEFF procures additional microscopes for shellfish monitoring programme



YEAR 2017

- * National feasibility studies for marine finfish, oysters and mussels completed
- * EU Residues and Public Health team came to South Africa to audit the agricultural and aquaculture sectors
- * National Residue Programme was developed and implemented
- * Aquaculture Development Bill signed off by NEDLAC
- * First World Aquaculture Society Conference held in Africa, South Africa
- * DAFF signs MOU with Stirling University, first five local vets are sent for Master's degree in Aquatic Medicine
- * Aquaculture Development Fund model and mechanism were completed
- * Aquaculture Skills Inventory and Skills Analysis completed
- * All remaining permits and Power of Attorney received for Qolora ADZ
- * Compulsory specification for live and chilled raw bivalve molluscs was gazetted
- * The Gariep Dam Aquaculture Training Centre officially handed over to South Africa
- * Value – stream mapping undertaken with recommendations to improve streamlining of authorisation
- * DEFF scoops award for best exhibition in China International Fishery & Seafood Expo (FISHEX) in Guangzhou China



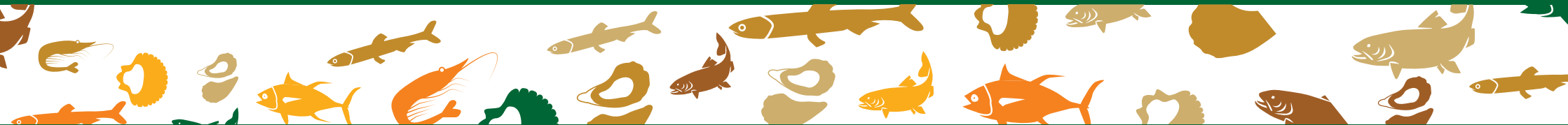
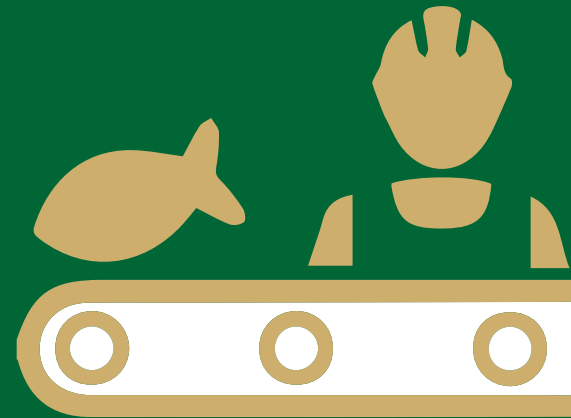
YEAR 2018

- * Saldanha Bay ADZ authorisation received and Minister of Environment upheld the decision
- * Aquaculture Farmer and Aquaculture Farm Assistant have been completed, approved by the Quality Council for Trades & Occupations (QCTO) and South African Qualifications Authority
- * Aquaculture Development Bill was approved by Cabinet
- * Aquaculture Development Bill introduced to Parliament
- * COEGA Aquaculture Development Zone EIA granted
- * National feasibility studies for trout, abalone, catfish, freshwater, ornamentals, marron crayfish and aquaponics systems completed to inform new entrants, funding agencies, policy and investors
- * Two DEFF staff members completed three months training and three vets completed one year of training at Stirling University
- * Establishment of the African Chapter of the World Aquaculture Society
- * Aquaculture Development Zones added as the ninth Operation Phakisa aquaculture initiative



YEAR 2019

- * First Aquaculture Finance and Investment Seminar held in Durban
- * A National Residue Programme was developed and implemented for abalone, finfish and bivalve as per the EU findings
- * DEFF commissioned the development of a transformation strategy and a small scale aquaculture policy
- * Feasibility studies for hatcheries (research and demonstration) in the Northern Cape and Eastern Cape completed
- * Coastal Waters Discharge Permit Regulation (CWDPR) 2019 were published for implementation
- * Algoa Bay ADZ: Pre-public consultation for the new Basic Assessment completed
- * DEFF completed a certification framework for aquaculture products in SA
- * Sea urchin export: risk assessment completed on cultured sea urchins for export purposes
- * Public Awareness and Marketing Strategy for aquaculture products and the sector in RSA completed
- * New Aquaculture Development and Enhancement Programme (ADEP) guidelines were published by the DTIC
- * Videography campaign launched showcasing local aquaculture species content on local airline



PROGRESS: INITIATIVE 7 - COORDINATION FOR INDUSTRY WIDE MARKETING EFFORTS

Initiative 7 seeks to launch 'Coordinated Industry-Wide Marketing Efforts' to increase local consumption of aquaculture products, currently at 8kg per person per annum and encourage the growth of small-scale farmers and new entrants. The coordination of industry wide marketing efforts is under way in order to reduce duplicative efforts and resources.

Marketing and Awareness:

During 2019 the Public Awareness and Marketing Strategy for Aquaculture Products and the Sector in SA was completed. The public awareness strategy report consists of two parts: the first provides a general global overview of studies on perceptions of aquaculture and the second provides specific recommendations for addressing public concerns, and the roles that key stakeholders can play in promoting the public understanding of aquaculture (PUA). In addition, strategies for promoting aquaculture as a career and business opportunity were identified. Key target groups for improving the PUA who were interviewed included a few South African consumers, restaurateurs and chefs, supermarket retailers, small seafood retailers/ fish shops/ fishmongers and seafood wholesalers. Strategies and recommendations for improving the public understanding of aquaculture include:

- Communicate effectively on environmental issues and publicise aquaculture production methods – e.g. locally produced, sustainably farmed, ethically sourced to improve the sector's reputation and build trust.

- Encourage and build collaboration and partnerships between various government departments, non-government organisations (NGOs), industry stakeholders and the public.
- Create greater social acceptance – for example, awareness of jobs and self-employment opportunities, benefits for local communities, positive relationships and dissemination of success stories.
- Promote aquaculture's contribution to food security and nutrition.
- Communicate the health benefits of farmed seafood.
- Inform the public around food-safety, farming methods, innovation and technology.
- Promote and publicise aquaculture products and its characteristics throughout the value chain and market key areas such as quality, healthy benefits, versatility, nutritional value, sustainable and ethical choices.
- Link aquaculture to the generic promotion of other sectors (e.g. tourism, other regional food and drink products, a fishing and maritime industries).
- Invest in aquaculture education.
- Media and radio campaigns.

The marketing recommendations include:

- 1) Market development and generic promotion of local aquaculture products.
- 2) Market Access - Marketing is as important as actual production.
- 3) Regulatory Constraints- government needs to develop coordinated, consistent and efficient regulatory processes for the aquaculture sector.

- 4) Advocacy and key partnerships.
- 5) Promotion and Branding of South Africa's rich, natural and high-energy coastlines
- 6) Local fishmongers and deli's will be instrumental in promoting awareness and consumption of aquaculture products.
- 7) Third party certification is becoming increasingly important especially around exports.
- 8) Consumer Survey - It is further recommended that an updated consumer survey (similar to the 2009 Benchmarking Survey) is commissioned in order to get a more accurate and realistic result in terms of consumer preferences and buying patterns relating to seafood and aquaculture products.
- 9) Market Intelligence
- 10) Establishment of an active aquaculture industry body - A more cohesive and well represented overarching aquaculture sector association with a strong "leader / captain" needs to be created and managed similar to what Aquaculture New Zealand achieved.

Advertising Campaign

Videography content of local aquaculture species was developed to promote how farming is done and how to prepare recipes on each of the five species- mussels, oysters, catfish, trout and tilapia. These short videos were aired on local Mango airlines during various flights. The link to the videos can be found on the Youtube link here: <https://www.environment.gov.za/media/audioandvisual#2019videos>

Investment Promotions

The Value Proposition for the Aquaculture Sector was completed with the Department of Trade, Industry and Competition (DTIC). The value proposition provides an overview of why and how to invest into the sector which is a valuable tool for targeting new investors.

Establishment of African Chapter of the World Aquaculture Society (WAS)

South Africa (through DEFF) has facilitated and supported the establishment of an African Chapter of the WAS.

The Chapter aims to provide support towards aquaculture development on the African continent by:

- ▶ Creating a forum to increase exposure, share information and facilitate collaboration.
- ▶ Collaborate with the continent and between continents around research, technology and education.
- ▶ Co-ordinate conferences and other platforms.

The DEFF/WAS AC project began in June 2018 and ended 31 May 2019, after which the Secretariat was handed over to the WAS and the hosting party, NEPAD. Achievements during 2019 include:

- Undertaking the process of electing WAS AC's permanent Board that replaced the Steering Committee. The Board was officially appointed in August 2019 and has been functioning well since, in accordance to WAS standards.
- Drafting of some of the key guiding and operational documents for DEFF/WAS AC. These include: Chapter's financial plan, Operational Plan, Communication Plan and the Membership Recruitment Drive Plan. These were presented to Chapter Board at the 1st WAS AC annual board meeting at

Stellenbosch in September 2019.

- Conceptualisation of a joint project and work programme in South Africa to serve the aquaculture sector in the country, including WAS AC membership within South Africa. This joint project will be co-ordinated through DEFF, WAS AC Secretariat, AUDA-NEPAD, AASA and Stellenbosch University. Project was expected to be launched during the AASA2020 Conference, which has now been rescheduled to 2021.
- Preparatory work for the launch/organising of the 1st Aquaculture Africa Conference (annual) which was initially scheduled for November 2020 in Egypt, now rescheduled to December 2021 due to Covid-19. Such efforts began in mid-2019.

PROGRESS: INITIATIVE 8 - PREFERENTIAL PROCUREMENT OF AQUACULTURE PRODUCT

Preferential procurement can create local markets while contributing towards transformation and food security in South Africa. Initiative 8 is 'Preferential Procurement' which seeks to partner with government institutions to procure aquaculture products, thereby increasing local consumption and improving nutritional levels. The importance of investigating preferential procurement further was again highlighted in the financial feasibility studies conducted for various species. Research on the current fish consumption of state owned entities and departments are currently underway. Information has been received from Department of Correctional Services and South African Airways (Airchefs).

PROGRESS: INITIATIVE 9 (NEW): DEVELOP AND IMPLEMENT AQUACULTURE DEVELOPMENT ZONES (ADZs) AQUACULTURE DEVELOPMENT ZONES

In order to promote investment into the sector and create an enabling environment, the DEFF has embarked on a process to establish ADZs. An ADZ is an area or site either on land or sea set aside exclusively for aquaculture use or development and may have bulk infrastructure (reservoir, water pump) to attract investors. Such zones are supported by key government policies such as Industrial Policy Action Plan; Agricultural Policy Action Plan; Special Economic Zones (SEZs) and the National Aquaculture Policy Framework. The Department of Environment, Forestry and Fisheries identifies suitable Aquaculture Development Zones based on:

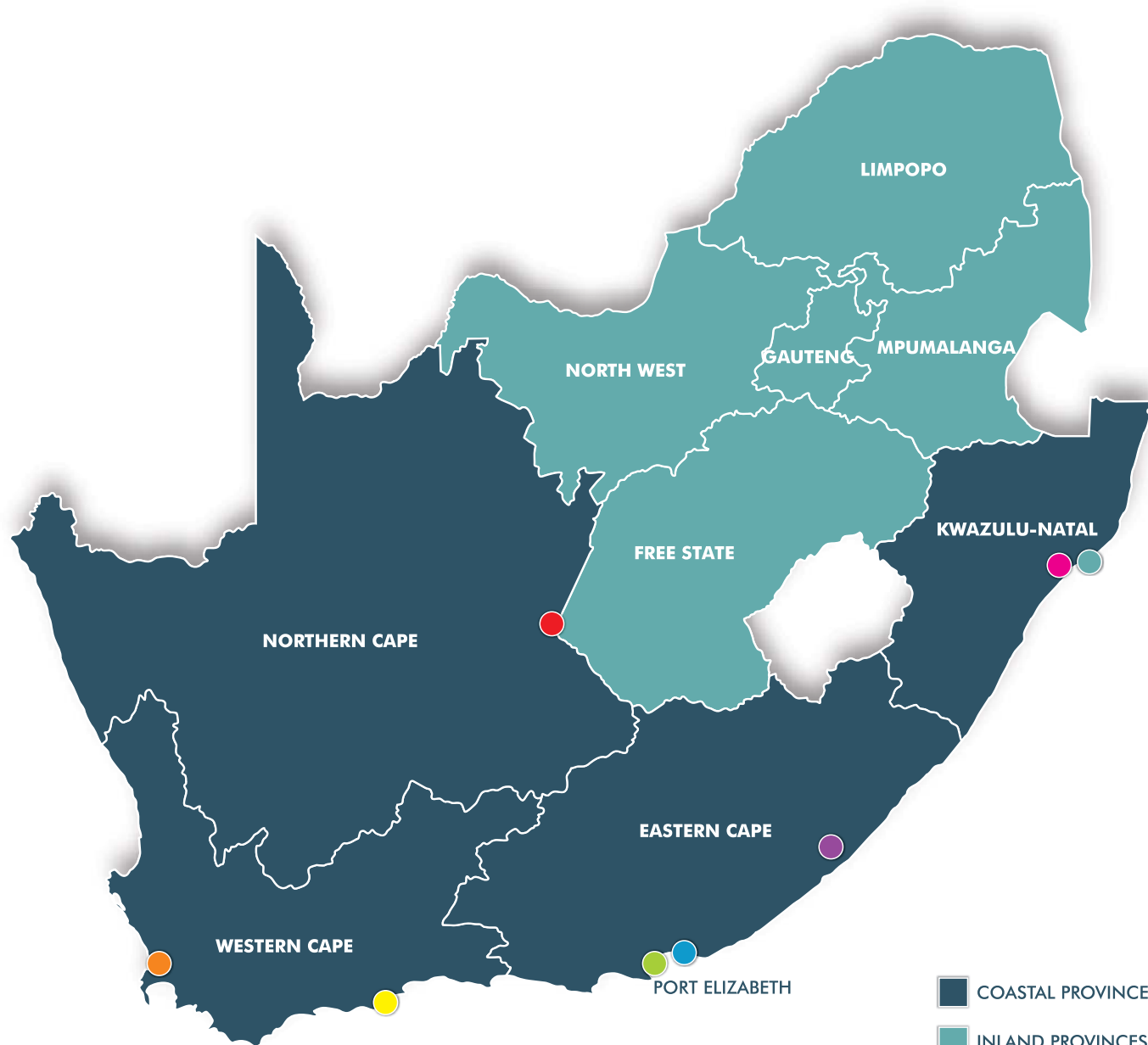
- Locational advantages of the site
- Availability of quality water (freshwater or seawater)
- Carrying capacity of the ecosystem
- Accessibility to markets (infrastructure and logistical)
- Potential socio-economic impacts (job creation, rural development, etc.)

The benefits of an ADZ include:

- Minimising the cost of obtaining Environmental Impact Assessments authorisation due to the economies of scale
- Minimising the costs of infrastructure development (e.g. access roads, electricity, water intake and discharge)
- Easily coordinated support systems such as extension services, veterinary services, hatcheries, etc.
- Coordinated marketing
- Associated benefits of agricultural zoning of the sites
- Investment attraction
- Job creation



MAP: AQUACULTURE DEVELOPMENT ZONES (ADZ's)



VAN DER KLOOF ADZ.(DAM BASED)



SALDANHA BAY ADZ.(SEA BASED)



MOSSSEL BAY ADZ.(SEA BASED)



ALGOA BAY ADZ.(SEA BASED)



COEGA ADZ.(LAND BASED)



QOLORA ADZ.(LAND BASED)



AMATIKULU ADZ.(LAND BASED)



RICHARDS BAY ADZ.(SEA BASED)



There are currently eight ADZs registered and monitored under initiative nine:

1. Amatikulu Aquaculture Development Zone:

The Amatikulu ADZ is located in KwaZulu Natal approximately 130km from Durban and 7km from Amatikulu River. This land based zone has a targeted area of 108 hectares. The Environmental Impact Assessment (EIA) commenced in June 2017 and the scoping report was completed. The targeted species for the zone includes ornamentals, prawns; and marine and freshwater finfish. Currently only two hectares are utilised for ornamental fish farming.

Progress: The Amatikulu ADZ application for Environmental Authorisation has been declined. The department has submitted an appeal.

2. Richards Bay Aquaculture Development Zone:

Richards Bay was identified as a site that may be suitable for marine aquaculture, specifically finfish cage culture due to sheltered nature and warm water temperatures. In 2014 during the Operation Phakisa lab, Richards Bay dusky kob cage culture was identified for establishment in Richards Bay Harbour. The project, known as the DST KZN Aquaculture Development Project is a collaborative undertaking between the Department of Science and Innovation (DSI), the DEFF and Stellenbosch University to determine the technical, environmental and financial feasibility of farming dusky kob (*Argyrosomus japonicus*) in sea cages in Richards Bay in KwaZulu-Natal. The dusky kob life cycle has been closed and the species appears to be well suited to marine aquaculture, as it grows fast, has a good yield, and are tolerant of a wide range of temperature and salinity conditions. The pilot project involved the grow-out of a single batch of fish to a targeted weight of 1.5 kg. The project harvested over 20 tons of dusky kob at the end of June 2017. The DSI KZN Aquaculture Development Project has since been concluded and the ADZ feasibility study has commenced.

Progress: Richards Bay feasibility study is completed and engagements are underway with TNPA to discuss the way forward.

3. Qolora Aquaculture Development Zone:

Qolora in the Eastern Cape had been earmarked for the development of an Aquaculture Development Zone. It is situated within the Wild Coast in the Eastern Cape Province, located approximately 2.6km northeast of the Great Kei River mouth and ±80km northeast of East London. The site has an area of 26.4 hectares of land. An abalone farm is proposed for community participation and beneficiation. Other targeted species include marine finfish and seaweed. The ADZ requires funding for basic infrastructure as all authorisations were received.

4. Van der Kloof Aquaculture Development Zone:

The Vanderkloof dam is situated in the Northern Cape approximately 130km upstream from Gariep dam and is fed by the Orange River, which is South Africa's largest river. The aim is to negotiate and obtain consent from the land owners, custodians or government departments, undertake EIA processes where necessary and declare an ADZ. Vanderkloof dam has been identified as an ideal site for the declaration of an ADZ. The majority of permits have been received and the pilot has yet to commence.

5. Saldanha Bay Aquaculture Development Zone:

Refer to initiative three Inter-departmental Authorisations Committee for details. The ADZ has the potential to meet the Operation Phakisa production target, increase local employment in the area by unlocking up to 2 500 permanent direct jobs which can contribute up to 25% towards current local unemployment figures. It has the potential to increase investment into the area by over R400 million and the estimated direct revenue at full production could result to over R800 million per annum.

6. COEGA Aquaculture Development Zone:

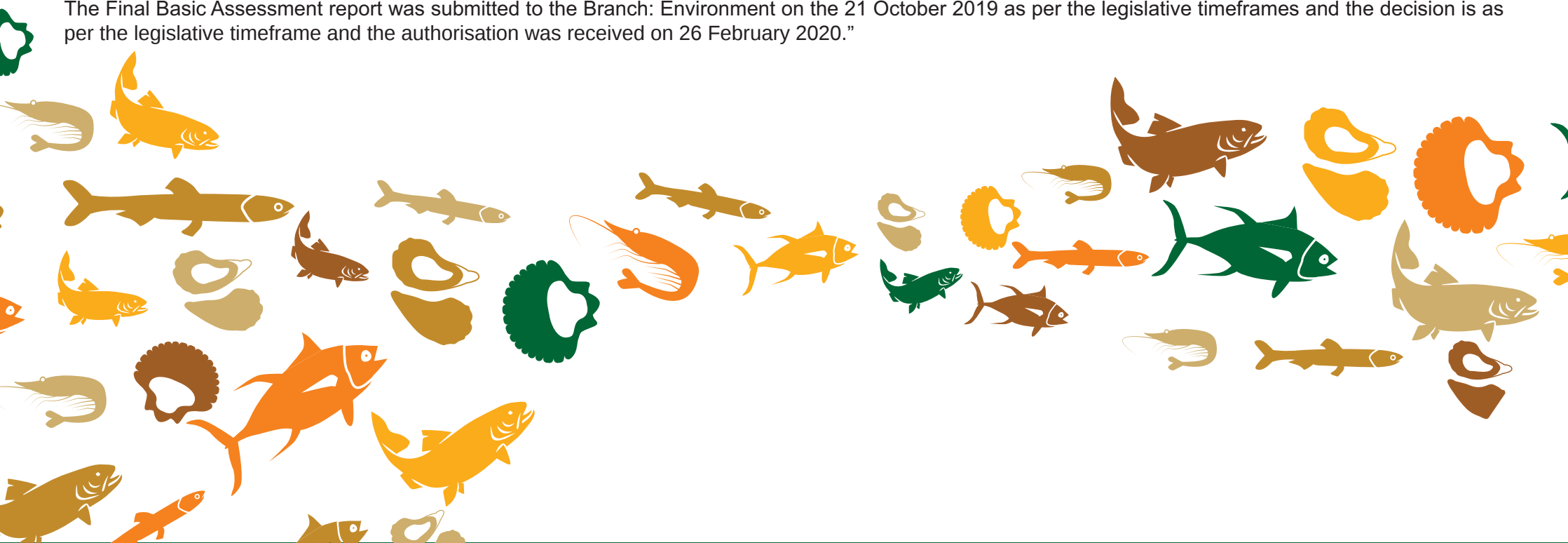
The Coega Development Corporation (CDC) is proposing the development of a land-based aquaculture development zone in Zone 10 of the Coega Special Economic Zone (SEZ), Port Elizabeth in the Eastern Cape. The intention of the Coega Aquaculture Development Zone will enable the Coega Development Corporation to provide an 'investment ready' platform for companies planning to set up commercial aquaculture operations in the Coega IDZ. An EIA was approved in February 2018 for the ADZ for Zone 10. Targeted species include marine and freshwater finfish and abalone. Based on the feedback received and technological development to reduce water exchange and consumptive water use, the CDC is also including intensive freshwater and brackish water aquaculture in the ADZ.

7. Mosselbay Aquaculture Development Zone:

Located in the Western Cape, this is a sea based ADZ. The target species are bivalves (mussels and oysters) and finfish however an EIA is planned for the zone and will determine the size, location and species best. An Environmental Assessment Practitioner needs to be appointed in order to undertake the EIA.

8. Algoa Bay Aquaculture Development Zone:

DEFF intends to establish and manage a sea-based ADZ in Algoa Bay in the Eastern Cape. The ADZ would accommodate finfish as well as bivalve culture (oysters/mussels) within a combination of precincts. The location of the ADZ is ideal as the zone would be able to support potential processing facilities established in the Port or in the Coega Industrial Development Zone. Potential aquaculture farms may be developed in the Coega Industrial Development Zone subsequent to the development of the sea based Algoa Bay ADZ. Public participation meetings were held in Port Elizabeth on the 31 July and 1 August 2019. The Final Basic Assessment report was submitted to the Branch: Environment on the 21 October 2019 as per the legislative timeframes and the decision is as per the legislative timeframe and the authorisation was received on 26 February 2020."



2. YEAR FIVE SNAPSHOT

Highlights from Operation Phakisa aquaculture projects and initiatives during the reporting period:

2.1. FEATURE 1: ASSESSING THE PERFORMANCE OF THE OPERATION PHAKISA STRATEGY IMPLEMENTATION FROM A STAKEHOLDER PERSPECTIVE

The year 2019 marks the end of the first five years of implementation of the Operation Phakisa methodology. The Operation Phakisa: Unlocking the Economic Potential of South Africa's Oceans programme was adopted to strengthen the aquaculture sector and prioritise it to reach its full potential.

During this period, an aquaculture advisor within the Operation Phakisa Aquaculture Delivery Unit, Keagan Halley, conducted his thesis on assessing the performance of the Aquaculture Operation Phakisa Strategy (AOPS) implementation. This was completed in fulfilment to acquire his Master's in Business Administration (MBA) degree with Rhodes University. The assessment focuses on the perceptions of key internal stakeholders, namely the Department of Environment, Forestry and Fisheries (DEFF) staff responsible for implementing the AOPS and external stakeholders, mainly aquaculture farmers registered on the Aquaculture Operation Phakisa programme.

The objectives of the research were to:

- Identify the gaps of the AOPS implementation;
- Analyse the strategy implementation from the stakeholder's point of view to develop an understanding of future success factors for strategy execution of the AOPS;
- Make recommendations on how the implementation

of the AOPS can be improved to assist with implementation success.

Semi-structured interviews were conducted with nine aquaculture farm managers with the objective of getting their perception on implementation of the AOPS and to reflect on how the Operation Phakisa methodology has affected their businesses. Furthermore, the semi-structured interviews were used to review the implementation of the AOPS.

From the results it was evident that prior to the implementation of the AOPS, farm managers were unclear of DEFF's, Branch Fisheries Management, overall strategic direction of the aquaculture sector. This indicates that the AOPS provided a clearer pathway on how government and industry could grow the sector.

With regards to the organisational culture, organisational structure and leadership driving the strategy implementation internally, the farm managers perceived that these were in place within DEFF. Farm managers distinguished that there is effective leadership within the Chief Directorate: Aquaculture and Economic Development (CD:AED) driving the implementation of the AOPS, however the leadership within other support functions were perceived to be lacking in terms of driving the implementation of the AOPS i.e. supply chain

management; customer services; supply chain management; marine compliance and surveillance; and communication.

The allocation of resources (financial, time and personnel) was an important factor in the strategy implementation phase. In this regard, farm managers perceived that there were inadequate financial resources allocated to the implementation of the AOPS. The farm manager's perceptions made it evident that the lack of the financial support has affected the implementation of the AOPS according to plan. However, farm managers perceived the development of the Operation Phakisa Aquaculture Delivery Unit (OPADU) to be of positive value towards the implementation of the AOPS and that through the development of the OPADU, time (as a resource) had been allocated to the implementation of the AOPS. It was noted by farm managers that the OPADU relies on other support functions within the DEFF Branch Fisheries Management for effective implementation of the AOPS. The inadequate personnel in other Chief Directorates/Directorates will ultimately affect the efficiency of the OPADU.

Effective communication is vital during strategy implementation to effectively engage stakeholders and create understanding. The development of the OPADU was aimed at communicating plans and engaging stakeholders. The farm managers saw the development of the OPADU as a positive value towards implementing the AOPS. They indicated that there was sufficient communication from the OPADU with regards to implementation.

The last crucial factor that affected the implementation phase of the AOPS was the outcomes. The farm managers perceived that the outcomes of the AOPS implementation had affected their stakeholder group in a positive manner through issuing of authorisations (permits and marine aquaculture rights); increasing longer term sea space leases; access to sea space; access to finance; training; internship programmes and assisting new entrants.

Furthermore, under outcome, stakeholder satisfaction was outlined as a factor that needed to be considered regarding implementation and determining a way forward. Stakeholders all agreed that there is room for improvement of the AOPS implementation, especially where the allocation of resources (financial) is concerned. However, farm managers in general were satisfied with the strategy implementation as many had received technical resources (Rights/permits, sea space and finance) through the AOPS implementation.

In summary, the gaps identified in the AOPS implementation focused around factors including; strategy development, organisation structure, organisational culture, leadership, resource allocation, people, communication and outcomes. Furthermore, negative perception by the farm managers, was experienced towards the DEFF, Branch Fisheries Management as a whole, rather than within the Chief

Directorate (CD: AED), responsible for implementing the strategy.

Based on the gaps identified, recommendations were made to improve the AOPS implementation success:

• **Change management within the DEFF, Branch Fisheries Management** - From the results it has been identified that the majority of factors affecting the implementation are due to the lack of buy in from the DEFF, Branch Fisheries Management, as a whole. Factors related to alignment of DEFF strategies; DEFFs organisational structures in place, leadership within other Chief directorates/directorates, resource allocation, people, communication and outcomes, all related to the DEFF, Branch Fisheries Management as a whole. The recommendation would be to workshop the strategy within all Chief directorates/directorates, highlighting the importance of each Chief directorate/directorate in implementing the strategy, thus identifying the deficiencies within the organisation, and rectifying those deficiencies.

• **Identify responsible structures and personnel in the DEFF, Branch Fisheries Management** – There is need for a strategic management office that drives strategy implementation and monitoring thereof. While the CD: AED has established the OPADU, which is effective according to the stakeholders perception, there are a number of support functions within the DEFF, Branch Fisheries Management requiring dedicated personnel to assist the OPADU. Identifying dedicated employees from all support functions, who are commissioned from top management to implement the strategy, will assist with the strategy implementation performance.

• **Developing communication platforms within DEFF, Branch Fisheries Management** –

Communication mechanisms; such as yearly reviews; aquaculture yearly reports; website links and brochures, should be implemented and accessible to the internal DEFF, Branch Fisheries Management staff on a daily basis. Successful communication of strategy implementation progress to internal stakeholders (staff) is as important as communication to external stakeholders.

• **Review of outcomes of the AOPS** – Import issues to consider during this process, namely; whether the strategy implemented according to plan; objectives achieved; satisfaction of stakeholders; and what has been learnt from the implementation. Identifying shortcomings in the strategy will assist with reallocation of resources or help the organisation build a business case for accessing resources.

• **Ensure commitment from all at the DEFF, Branch Fisheries Management** – Lastly, with the organisational culture change, identified structural change, developed communication channels; and identified resources required; the leadership roles of managers will need to be established within all directorates in the DEFF, Branch Fisheries Management. It is imperative that top management's understands the significance of their role in implementing strategies to ensure that the organisation creates a sense of shared values and an organisational culture. It is essential that the AOPS is not a strategy that belongs to the CD: AED, but rather a strategy that is owned by every employee within DEFF, Branch Fisheries Management.

The findings of the research can suggest that although the perception of the farm managers indicates that the strategy is being implemented accordingly, this is only viewed towards the CD: AED implementing the strategy, and not DEFF, Branch Fisheries Management, as a whole. The perception on the AOPS implementation has indicated that DEFF, Branch Fisheries Management, as a whole, is negatively affecting the strategy implementation as the leadership, culture and structures are in place in the CD:AED but not in the support functions of DEFF, Branch Fisheries Management.

The research has identified gaps within the AOPS affecting strategy implementation from the farm manager's perspective, based on theory of strategy implementation. The findings have allowed for the development of recommendations that will aid in the execution of the AOPS. The conclusions are encouraging and will provide guidance on ensuring efficient strategy implementation. Going forward, newly revised targets will be set through the masterplan currently underway for the sector.



2.2. FEATURE 2: THE FIRST FIVE YEARS AND BEYOND (2019 REVIEW OF OCEANS ECONOMY)

Background and Purpose

This year marked five years of implementation of the Operation Phakisa methodology for the oceans economy, hence the need to review progress made, identify gaps and propose ways to address those. The oceans economy remains a priority sectors for growth and job drivers, as such, the Department of Trade, Industry and Competition (dtic) has embarked on a Masterplan development process for these sectors. The DEFF therefore, hosted workshops for Aquaculture in December 2019, to review progress to date and initiate the development of a Masterplan for the Oceans Economy. Aquaculture Stakeholder Engagement Workshops were held in Cape Town on 10 - 11 December 2019 and in Johannesburg 12 and 13 of December 2019. The aim of the Masterplan development process workshops was not to re-invent the wheel, but to look at an approach and solutions to take delivery to the next level. The purpose of the workshops, therefore, was to reflect and review progress made and determine what had been realized, identify the gaps and what needed to be done to take delivery to the next level. Stakeholders were invited from industry, labour, academia and various key government departments and agencies.

Plenary discussions

The proceedings began with plenary presentations starting with an overview of the Oceans Economy programme and highlighted on progress achieved to date. It followed with overview from the Aquaculture Delivery Unit on the progress to date as well as the outstanding challenges that needed to be addressed. An industry representative then gave a presentation on the current challenges faced by the sector in 2019 and key interventions required. A presentation on the economic overview and the Masterplan process was made by the dtic. The broader discussion with delegates afterwards is summarized below:

- There was a need to develop funding models that cater for the needs of start-ups aquaculture farms. New entrants struggled to access ADEP funding and experienced delays with the process.
- Clear mentorship and skills development programmes are required for the aquaculture sector.

- Trade Union fee structures needed to be reviewed to accommodate the needy coastal communities.
- Clear synergy and value chain analysis required for aquaculture and fisheries.
- Adequate research was required for the Masterplan process to inform evidence-based approach.

Detailed Review

Detailed discussions were then held in breakaway groups to unpack the following:

Session 1 - Gap analysis

- What initiatives (private/ government) have had a positive impact over the past 5 years?
- What initiatives (private/ government) have not had the desired impact over the past 5 years?
- What are some of the challenges that have changed over the last 5 years?
- Prioritize these key challenges

Sessions 2: Solutions

- For each of the key challenges identified, what are the proposed solutions?
- What can be improved on the existing initiatives?
- What additional/new interventions will be required?

In general, the progress and achievements to date were acknowledged especially around the implementation of Saldanha Bay ADZ, the allocation of new lease space, training of aquatic veterinarians and various studies that had been undertaken including the Strategic Environmental Assessment however the following challenges raised are summarised below:

Initiative 1: Implementation of Catalyst Project

- There was a need to look at a co-operative model for new projects.
- Lack of transformation/diversity.

Initiative 2: Legislative reform

- Representatives from the aquaculture sector were of the opinion that the Aquaculture Development Bill, in its current form, did not address their current challenges.
- The Marine Living Resource Act (Act No. 18 of 1998) was likewise not an enabling environment for the aquaculture industry.
- Water-use rights are a challenge with turnaround time of 300 working days.

Initiative 3: Inter-Departmental Authorisations Committee (IAC)

- Barriers and delays to issuance of land leases by the Department of Public Works and Infrastructure are a challenge.
- The focus of the IAC should include improving operational processing and permit procedures in order to create a more enabling business environment.

Initiative 4: Globally recognised monitoring and certification system

- Key priority is passing EU audit in order to diversify and access new international markets, especially for abalone, oysters and mussels. This included ensuring laboratory capacity required for EU requirements.

Initiative 5: Aquaculture Development Fund

- Aquaculture Development Fund was not meeting expectations, with slow implementation. The Aquaculture Development and Enhancement Programme (ADEP) has tedious and stringent requirements.
- High interest rates of commercial banks remained a challenge in respect of access to funding.

Initiative 6: Capacity building and skills development

- The industry struggled to source interns to work on the farm, whereas government stakeholders indicated the opposite problem receiving hundreds of applications for limited internship posts.
- There is a need for further skills development and bursaries in the aquaculture sector.
- There was a lack of awareness on the work of the SETAs and support provided for skills development i.e. AgriSETA and TETA (Transport Education Training Authority).

Initiative 7: Coordinated industry-wide marketing efforts

- Limited market access and trade barriers are a concern.
- Abalone market was under severe strain due to political unrest in key markets, lack of diversity in the market and high trade tariffs to China.

Initiative 8: Government Preferential Procurement

- Not enough progress had been made in terms of this initiative.

Initiative 9: Aquaculture Development Zone (New)

- There were a lack of adequate areas identified for aquaculture growth and concerns were raised regarding some of the current identified Aquaculture Development Zones (ADZs).

Other

- There was a need to identify research needs as stand-alone initiatives and funding thereof.

Proposed priorities/solutions going forward

The following interventions were proposed to strengthen initiatives going forward:

Initiative 1:

- Increase awareness about the sector in all official languages and accessibility to rural communities.
- Look at possible partnerships with small-scale fishers for economic viability in terms of resource sharing.
- Data collection should be enhanced. The use social media platforms to share existing information and resources should be considered.
- Freshwater aquaculture should be promoted.
- Explore pilot and experimental projects for new species.
- Investigate high cost of feed and feed quality (local and international feed).
- Consider a focused support programme for emerging farmers to assist with seed/feed and training.
- Promote an integrated approach and inclusivity.

Initiative 2:

- Further deliberations and engagement with industry on the Aquaculture Development Bill for industry and government to find common ground.
- There is a need to look at disjuncture in respect of environmental permitting units between national and provincial to make it easier and quicker to apply for permits.

Initiative 3:

- Communication and awareness about the IAC needs to be improved.
- IAC needs to be strengthened and should focus on the operational aspects and how innovation can improve efficiency.
- Focus on implementation of the Strategic Environmental Assessment for Aquaculture.
- Investigate reduced tariffs for water space by TNPA – a comprehensive comparison between SA water space rates and international rental rates as should be done.

Initiative 4:

- Key priority was opening access to the EU market and therefore building laboratory capacity and third party verification (Reference Laboratory). Status of readiness of industry to undertake the audits needs to be assessed

(availability of EU audits for the industry), including the economic assessment of laboratory testing and equipment (comparison with international testing practices).

Initiative 5:

- Support for SMME should be increased. There is a need to consider providing templates for business plans. Training should also include the use of excel models/business plans for feasibility studies to help projects apply for funding.
- Commercial banks should be encouraged to fund aquaculture initiatives.
- Funding model should be revised to fast track access to funds, particularly for start-ups. A model that will de-risk aquaculture by DFIs should be considered.
- Investigate incentives for the sector such as tax as well as address the issue of increased legislative requirements.
- Further engagement with Department of Small Business Development to assist people with incubation and readiness to apply for funding.

Initiative 6:

- Skills development and training should be expanded to rural communities. Aquaculture courses should be included as elective in existing tertiary programmes such as engineering. Introduction of short courses to meet the skills requirements for the sector. There needs to be an assessment of current infrastructure and universities that offer aquaculture qualifications; and there needs be training of extension officers as practical experience for aquatic vets.
- Need for increased industry participation in terms of skills development.

Initiative 7:

- There is a need to capitalize on the Africa Free Trade Zone.
- There is a need to conduct a value chain analysis (retailers/WWF/fishing industry/ seafood distributors) to get a better understanding and facilitate the development of interventions.
- Further research and development of value added products.

Initiative 8:

- For freshwater aquaculture it is a priority to access markets with Department of Defense, Correctional Services and Health.

Projected targets over the next five to 10 years.

Initiative 9:

- Pilot projects need to be undertaken on large dams to prove potential of aquaculture.

NEW: Research and Development (R&D) – potentially under Initiative 6.

- Research and Development (R&D) needs to be a new standalone initiative as it requires focused effort by various entities.
- Need to improve technology being used, to make it as simple to use (such as poultry sector).
- Research and Development (focused research on influence and impact) based on a Research and Development Strategy which includes different stakeholders such as NRF, DSI, TIA as well as international stakeholders and industry. Communications of research outcomes is also key.
- Research into value-adding of products (fish skins, etc.) and reducing feed costs. Research on use of crocodile meat as protein replacement in feed should be up-scaled.

Species	Current production	5 year projection	10 year projection	Potential challenges	Estimated Jobs projection 5 and 10 year
Abalone	1 350	Land Based: 4000 (3 300) Ranching: 200	Land Based: 7000 (5 500) tons Ranching: 1000	Increase security Market	5: 3 000 10: 5 000
Mussels	2 200	1 2000 (9000)	35 000 (15 000)	International market access	5:1 200 10:3 500 (2 400)
Trout (freshwater)	1 350	2 000 (1 500) (Vanderkoof)	5 000 (2 000)	New projects Market access	5:180 (250) 10: 450 (300)
Oysters	400	1 500	3 000	Market Access	5: 450 10:900
Trout (seawater)		5 000 (4 000)	10 000 (8 000)	Environmental restrictions	5:1 500 (1 200) 10: 3 000 (2 400)
Catfish	140	1 500 (180)	2 000 (500)	• Industry has not taken off • Not seen an increase in production • Niche market	5: 150 (120) 10: 200 (150)
Tilapia	180	500 (1 500)	2 000 (2900)	400 tons from RAS operations 1600 tons from pond culture operations	5: 50 (200) 10: 200 (290)
Kob (cage culture)	0	100	600	EIA for Richards bay will refine this estimate	5: 30 10: 180
Yellowtail	0	200	3 000	Based on the economic model	5: 60 10: 900
Sea Urchin	0	20	50	Species in research and requesting research to advise on Projections	

2.3. FEATURE 3: AQUACULTURE DEVELOPMENT AND ENHANCEMENT PROGRAMME (ADEP) GUIDELINES

ADEP was formally launched by the Minister of Department of Trade, Industry and Competition (DTIC) on the 28 March 2013. The objective of Aquaculture Development and Enhancement Programme (ADEP) is to stimulate investment by commercially viable enterprise within the aquaculture sector. The programme is available to South African registered entities involved in primary, secondary and ancillary aquaculture activities in both marine and freshwater aquaculture. The ADEP offers a reimbursable grant of up to a maximum of R20 million towards qualifying costs. The grant is provided to approved applications for new, upgrading or expanding entities.

The programme has been actively investing in the sector, with a total of 89 projects being approved with an estimated investment amount of R2.197 billion. This led to 2 377 estimated jobs being created and sustained to date.

The guidelines were last amended in August 2016 and the new guidelines were in effect from the 1 April 2019. The ADEP programme has been extended until further notice. According to the DTIC the purpose of the new guidelines is to ensure that small, black entrepreneurs benefit from the programme, fostering broader participation and ensuring transformation in the sector.

Amendments to the new ADEP guidelines:

- The incentive has been reduced from R30 million to R20 million.
- Crocodile farming has been included.
- Support for small black businesses has been enhanced and the percentage depends on the amount of investment by the particular entity.
- Maximum rental costs for small black enterprises have increased from R10 000 to R20 000 per month.

- Feed costs capped at 20%.
- Compliance with BBBEE has been introduced at a level of 4.
- Mentorship costs are only for small enterprise (cap has increased from R50 000 to R 20 000 per approval).
- Owned land is only applicable to small black enterprises (100% black owned, exercises control over the business and has investment below R5 million (issue of ownership has been challenging because of fronting hence the amendment).



2.4. FEATURE 4: THE DEVELOPMENT OF ABALONE RANCHING IN SOUTH AFRICA

The abalone sector in South Africa has been flagged as an industry that has the potential to boost the aquaculture sector immensely. South Africa's production is mainly destined for export markets, this industry has already shown great potential to assist the aquaculture sector achieve its goals of generating investments, creating job opportunities, boost local GDP and increase overall production of aquaculture produce. The abalone sector has been supported and backed by the Department of Environment, Forestry and Fisheries (DEFF).

The local indigenous abalone specie that is farmed is *Haliotis midae*. It is the preferred species due to its large size growing to approximately 20cm. Approximately 1 600 tons are produced annually and exported as live; canned; dried; frozen or minced to Asian countries where it is seen as a high value top quality product originating from the three pristine oceans surrounding the tip of Africa. The farming practice is intensive and directly employs around 1 person per ton produced. Although this sector has seen rapid growth over the years and is now considered the most important and valuable species in the South African aquaculture sector, it has faced a number of challenges. At the moment the main market for this specie is the Asian market, with most of the product being exported to Hong Kong. The recent unrest in Hong Kong coupled with the outbreak of COVID-19 shutting down trade routes is a challenge for export of our local product. The DEFF has been working cohesively with abalone farmers to break into other markets. The sector also suffered a decrease in value by around R180 million in 2016, due to the harmful Algal bloom that occurred.

Ranching is a process where abalone is stocked in the ocean for the duration of the grow-out period until it reaches the desired market size. The development of abalone ranching has been introduced to diversify this industry and create more opportunities for growth. Abalone ranching has been piloted in South Africa. It involves the stocking of coastal kelp beds with the hatchery-produced seed in areas where natural abalone stock are depleted or in areas where abalone did not naturally occur.

The traditional abalone cultivation process that is conducted on land-based facilities is highly intensive and requires systems such as the Recirculating

Aquaculture System (RAS) and Flow-Through systems. These land-based facilities cost approximately R120-R150 million, to produce 150 tons of abalone. Ranching is by far the cheaper alternative with minimal cost required after successfully attaining a site to conduct the ranching. The successful cultivation of abalone is highly dependent on feed, which is very expensive. In the ranching system abalone feed naturally which means there is no need for feed. The stocked abalone will spawn naturally in the wild contributing to increasing wild stock. Currently, active pilot projects have harvested abalone that far exceed the 100g sized abalone commonly produced on South African land-based facilities; these larger abalone are expected to fetch much higher market prices (in the region of R500 per kilogram) due to their size, quality and "wild" caught status. The Rights to conduct abalone ranching can be applied for through the DEFF.



Advantages of using the ranching system

- Develop the “wild” abalone production in South Africa.
- Lower production and infrastructure costs.
- Permits/licenses are valid for a long time period.
- Ranched abalone will contribute to the natural populations by spawning in the natural environment contributing to the population increase.
- Higher prices are received for “wild caught” abalone.
- Selected regions along the coast lines of the Western Cape, Eastern Cape and Northern Cape provide optimal ocean temperatures and conditions for abalone ranching.

Disadvantages of using the ranching system

- Considered as a pilot initiative in South Africa, limited data on viability and success as yet.
- Identification of a suitable ranching site may be challenging.
- Required to meet stringent criteria and comply with DEFF regulations.
- Licensing and permit process is lengthy.
- High security costs as permanent, well trained security is required.
- High mortality rates and low harvest rates.
- Harvesting and seeding times are limited to optimal sea conditions to ensure diver and boat safety.
- Highly skilled divers are required for seeding and harvesting which can increase costs and project related risks.
- Potential loss of abalone into natural environment and stock theft.
- Difficult to maintain or control production conditions (temperature etc).

The practice of abalone ranching can serve as an alternative for recovering depleted natural abalone resources in our country. These resources were depleted significantly, up until a decision to ban all abalone activities was made, until recently. The recent revival of the local fishery industry and newly established abalone ranching operations could open up opportunities for previously disadvantaged communities and coastal communities whose livelihoods are dependent on fishing. The introduction of such operations could gain huge support from the fishing communities. The farmed abalone industry in South Africa still faces a major crisis of illegally cultivated supply.

To access available sites for abalone ranching:

https://www.gov.za/sites/default/files/gcis_document/201409/33470729.pdf



2.5. FEATURE FIVE: AGRICULTURAL TECHNOLOGY DEMONSTRATION CENTRE (ATDC)

The Aquaculture Technology Demonstration Centre (ATDC) is located in Gariep Dam Town in Xhariep District of the Free State Province. The centre was initiated and funded by the Chinese Ministry of Agriculture (MoA) and Ministry of Commerce (MOFCOM), respectively. The official handover of the project from the Chinese government to the South African government was done in June 2017. Following the official handover of the project, the centre is currently under the management and operation of the DEFF and the Free State Department of Agriculture and Rural Development (FSDARD). DEFF provides financial support towards the implementation of planned activities. The major responsibilities of the ATDC include:

Training and promotion

The training programme offers a comprehensive educational and performance experience for most fish production techniques such as breeding, feeding, rearing methodologies and technologies using various rearing systems; disease diagnostic and treatment as well as water quality analysis. Various culture and breeding techniques are demonstrated through a practical hands-on experience. This is done with utilisation of the hatchery and ponds at the centre.

Research and development.

Research and development (R&D) activities are conducted as per the 'operational plan' and R&D needs are identified by the 'Research and Development' subcommittee. Any aquatic animal health issues are addressed within this function.

The main functions of the centre include:

- Transferring the most recent fish farming technologies developed from the research institutes to the local farmers,
- Presenting a package of practical technologies in farm management,
- Showing the traditional farming practice in low external input and high output,
- Helping local farmers apply the technologies with their own hands,
- Performing a leading role income generation and supply of protein-rich food and
- Establishment of rural employment.

Project status on technical activities

The centre demonstrates various technologies including aquaponics; aquaculture; agriculture integrated systems and cage and pond culture systems. The demonstration is done in both indoor and outdoor ponds and tanks, respectively. I.e. aquaponics system is tested in a nursery using strawberry seedlings to test for their growth performance. A rice-fish integrated system is also demonstrated on one of the outside ponds.

Breeding and Technology Demonstration

The centre is currently conducting breeding techniques on the following species: African catfish (*Clarias gariepinus*), common carp (*Cyprinus carpio*) and ornamental fish, Koi carp (*Cyprinus carpio*) and gold fish (*Carassius auratus*). Breeding of some of these species is done during the summer season, January to March and October to December. However breeding can still be demonstrated during the other seasons complemented by the use of a

boiler during the winter periods. The ATDC employs three (3) types of breeding methods which include: the natural breeding of gold fish, the semi-artificial breeding of Common carp, Koi carp and African catfish, as well as artificial breeding of African catfish. During the breeding season, the demonstration of the semi-artificial breeding is facilitated by injecting both the male and female with hormones to induce the spawning activities. The fish are then left in the tank for further natural breeding. The egg collectors are placed in tanks for the collection of fertilized eggs which will be transferred to the outside ponds. The demonstration of the artificial breeding of catfish is facilitated by injecting both the male and female with hormone to induce the spawning activities. The eggs are then stripped out from the female while the male is being sacrificed to collect the gonads. The malt from the gonads is sprayed and mixed with the eggs to induce fertilization. The fertilized eggs are kept in the tanks for hatching into fry. When the fry become fingerlings, they are transferred from the hatchery to the external ponds for further growth and improvement.

Table 1: Production capacity and category of fish

Category	Species	Volume
Shooters	Catfish	50 fish
Fingerlings	Catfish	12 000 fish
Juveniles	Mossambique tilapia	10 fish
Broodstock	Catfish	20 fish
Juveniles	Catfish	100 fish
Total		12 180 fish

Training and promotion

One of the functions of the centre is to conduct training and promotion. The training is targeted to all relevant aquaculture stakeholders, including prospective and new farmers, existing farmers, officials, unemployed graduates, as well as in-service training students. The ATDC offers different training activities include:

- The ATDC offers different training activities which are distinguished by their duration. This includes:
- One (1) week training which offers lectures, practical and tours. The training is conducted for farm workers/farmers, potential farmers, Higher education students, in-service training students and government officials.
- Four (4) months experiential training which offers lectures, practical and hands on duties. This training is offered for agricultural college students under the field of agriculture.
- One (1) year training internship programme which offers lectures, practical and hands on duties. This training is offered for individuals who have completed their post graduate degree in aquaculture at university.

Training completed at ATDC during 2019/20

The ATDC training is organised by both FSDARD and DEFF. The centre trained about 63 candidates during 2019. This is a decrease in number of candidates trained during the financial year 2018/19 which was approximately 150 candidates. This excludes the number of tours by the students and private farmers from various schools and entities interested in aquaculture.



3. ADVERTISEMENT: A CALL FOR NEW PROJECTS

The Department of Environment, Forestry and Fisheries hereby invite potential and new aquaculture project owners to register their projects to become part of Operation Phakisa: Unlocking the Economic Potential of South Africa's Oceans. Projects may be submitted any time however evaluations for inclusion will be conducted on a quarterly basis. Evaluation criteria are listed below or please refer to the Aquaculture Lab report and the link below.

The benefits of including your aquaculture project onto the Operation Phakisa programme:

- Contributing towards the Operation Phakisa aspirations in growing the sector, job creation, transformation and GDP contribution
- Phakisa projects are prioritised and assistance is available with unblocking bottlenecks
- Projects will be exposed to potential investors if funding is required
- Projects will be profiled and presented at local and international events
- Progress is monitored and reporting is publicly available to ensure transparency and accountability

BBBEE REQUIREMENTS ON APPLICATION:

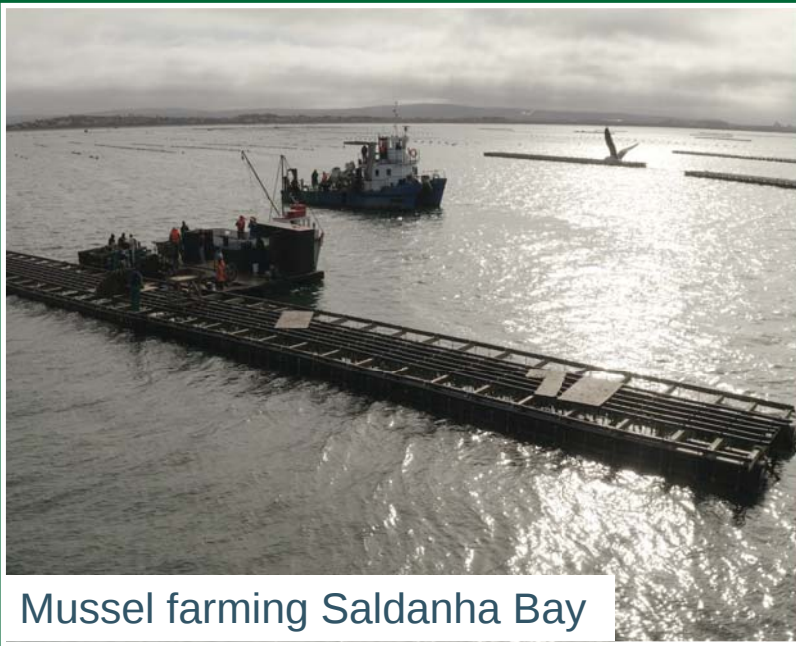
- The minimum BBBEE required is level 4
- 25% BBBEE ownership for existing projects
- 50% BBBEE ownership for new projects (greenfields)

No.	Criteria	Weight
1	Marketing	30%
2	Funding	15%
3	Readiness for production	15%
4	Scale	15%
5	Technical Expertise	25%



For more information on the criteria and application requirements, interested parties must refer to the New Projects folder available on the Operation Phakisa website: www.operationphakisa.gov.za/operations/oel/aquaculture/

All applications and enquiries can be forwarded to: Aquaculturephakisa@environment.gov.za or call Ms Bongiwe Gxilishe on 021 402 3322.



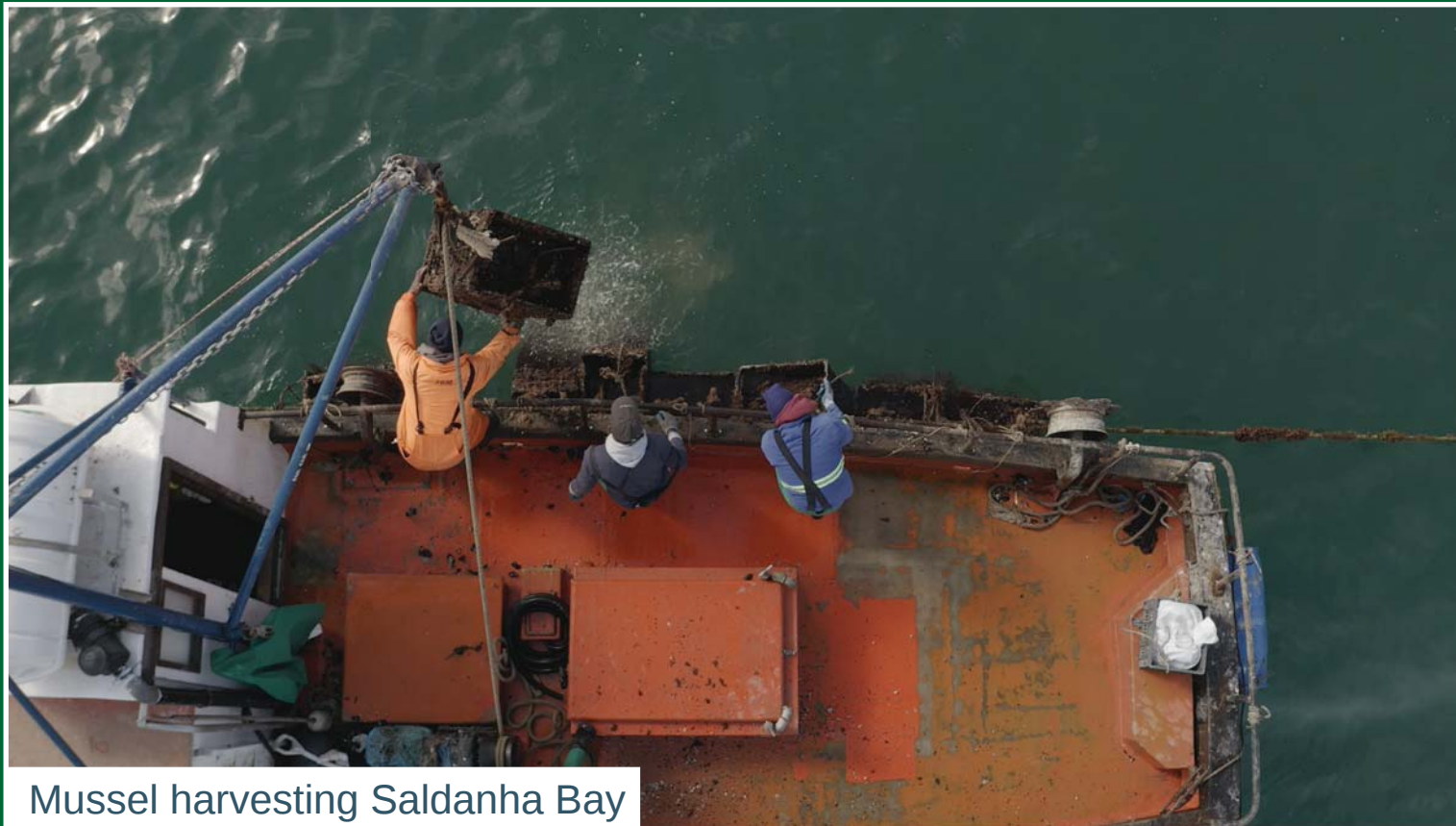
Mussel farming Saldanha Bay



Catfish farming Graaff Reinet



Trout farming in Franschhoek



Mussel harvesting Saldanha Bay



Trout roe-Three Streams Trout Farm



Abalone sizing Doringbaai

AQUACULTURE OPERATION PHAKISA DELIVERY UNIT

Chief Director: Aquaculture Economic Development

Mr Belemane Semoli

Email: Bsemoli@environment.gov.za

Tel: 021 402 3534

Operations Manager:

Ms Andrea Bernatzeder

Email: Abernatzeder@environment.gov.za

Tel: 021 402 3331

Secretariat:

Ms Bongiwe Gxilishe

Email: Bgxilishe@environment.gov.za

Tel: 021 402 3322

Investment Promotions:

Ms Lisa Mazaleni

Email: Lmazaleni@environment.gov.za

Tel: 021 402 3067

Aquaculture Advisors:

Mr Keagan Halley

Email: Khalley@environment.gov.za

Tel: 021 402 3326

Mr Kishan Sankar

Email: Ksankar@environment.gov.za

Tel: 021 402 3631

Aquaculture Economist:

Ms Gugu Njokweni

Email: Gnjokweni@environment.gov.za

Tel: 021 402 3493

