

# Operation Phakisa

Unlocking the Oceans  
Economy through  
Aquaculture

Department of  
Forestry, Fisheries  
and the Environment

Aquaculture  
Year Eight Review  
October 2014 – 2022



forestry, fisheries  
& the environment

Department:  
Forestry, Fisheries and the Environment  
REPUBLIC OF SOUTH AFRICA





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# 1. Annual Review: Operation Phakisa Oceans Economy: Aquaculture

## 1.1 Abbreviations

AASA	Aquaculture Association of Southern Africa
ADEP	Aquaculture Development and Enhancement Programme
ADF	Aquaculture Development Fund
ADZ	Aquaculture Development Zone
AMC	Aquaculture Management Committee
ARTDP	Aquaculture Research and Technology Development Programme
ATDC	Aquaculture Technology and Demonstration Centre
BBBEE	Broad Based Black Economic Empowerment
BEE	Black Economic Empowerment
CASP	Comprehensive Agricultural Support Programme
CF	Consultative Forum
DALRRD	Department of Agriculture, Land Reform and Rural Development
DFFE	Department of Forestry, Fisheries and the Environment
DFI	Development Funding Institutions
DHET	Department of Higher Education and Training
DPME	Department of Planning, Monitoring and Evaluation
DTIC	Department of Trade, Industry and Competition
EC	Eastern Cape
ECDC	Eastern Cape Development Corporation
ECRDA	Eastern Cape Rural Development Agency
EIA	Environmental Impact Assessment
EU	European Union
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
IDC	Industrial Development Corporation
MAFISA	Micro Agricultural Financial Institutions of South Africa
MOU	Memorandum of Understanding
NAQUARF	National Aquaculture Research Forum
NC	Northern Cape
NDP	National Development Plan
NEPAD	New Partnership for African's Development
NRCS	National Regulator for Compulsory Standards
NRF	National Research Foundation
RIS	Reimagined Industrial Strategy
SA	South Africa
SADC	Southern African Development Community
SAIMI	South African International Maritime Institute
SARS	South African Revenue Service
SEA	Strategic Environmental Assessment
SEDA	Small Enterprise Development Agency
SMMEs	Small, Medium and Micro-size Enterprises
TETA	Transport Education Training Authority
TIA	Technology Innovation Agency
TNPA	Transnet National Ports Authority
WAS	World Aquaculture Society
WC	Western Cape



## 1.2 Foreword

### Foreword by the Director – General: Forestry, Fisheries and the Environment



It is a pleasure to present the 2022, Eighth Aquaculture Annual Review publication. This edition of the annual review marks eight years of the Operation Phakisa: Oceans Economy Aquaculture programme and allows all stakeholders to take stock of the positive milestones and resilience shown during more challenging times.

As we work towards the 2030 milestones set by the National Development Plan, the Department of Forestry, Fisheries and the Environment (DFFE) has been working closely with industry, academia, civil society and other government entities, to embark on the development of the Oceans Economy Masterplan. This is to help accelerate the trajectory of the aquaculture sector, building on the foundation set by the Operation Phakisa: Oceans Economy programme. The objectives of the Master Plan include, encouraging sector growth, attracting investment, job creation and industry competitiveness.

In every crisis, lies opportunity and while the vision remains to grow the aquaculture sector, the COVID-19 pandemic and energy shortage had varied adverse effects on the sector. This was seen across the board from species farmed for export, those supplying the hospitality industry, as well as, the informal market. A joint vision was critical to achieving the progress on the nine aquaculture initiatives during the 2022 reporting period.

The progress on the aquaculture key performance indicators is well captured in section one of the annual review. As of December 2022, the number of registered Operation Phakisa projects are 43, with 35 farms operational and active. The total production from registered projects equalled 4 990.62 tons. This equates to a 65% contribution of the total sector production of 7677.71 for the 2022 reporting period.

To ensure sustainable development of the sector, enabling legislation is critical, and in this regard the Aquaculture Development Bill underwent further engagement with stakeholders. Cabinet approved the National Freshwater (inland) Wild Capture Fisheries Policy in August 2021 and the policy was gazetted in February 2022. The department

intends to finalise the drafting of the National Freshwater (inland) Wild Capture Fisheries Implementation Plan. The plan is undergoing consultation with stakeholders. Broadly, the policy seeks to align inland fisheries governance with constitutional requirements for a sustainable developmental approach to natural resource utilisation for the benefit of all citizens. The policy further promotes inclusive development of the sector, recognising all known resource user categories and thus, creating a mechanism for equitable access to freshwater bodies for fishing purposes.

The aquaculture sector is governed by numerous authorisations, therefore streamlining, and ensuring efficiency is a priority in securing growth and investment into the sector. Since October 2014, twelve (12) Environmental Impact Assessments (EIA) were authorised, and two appeals were completed.

Significant efforts have gone into accessing international markets. Importing countries of aquaculture products require assurance that the products received are safe for human consumption. To access the European market, the sector is undergoing the European Union (EU) food safety audit. The National Regulator for Compulsory Standards (NRCS), the department and industry completed the EU pre-audit questionnaire, the next steps are a virtual and physical audit.

During the reporting period, the Aquaculture Association of Southern Africa (AASA) Conference was held at Stellenbosch University in July 2022. Information exchange, networking and farm tours were all inclusive of the AASA conference week activities. The attendees were represented by 43 students, 63 participants from academia and research, 27 from industry, 63 from government, 30 from aquaculture support and one NGO.

As part of initiative nine, that is the establishment of aquaculture development zones, implementation continues at the Saldanha Bay Aquaculture Development Zone (ADZ). To increase preparedness in the Saldanha Bay ADZ, an entanglement workshop was successfully held to train the industry stakeholders on how to assist the South African Whale Disentanglement Network (SAWDN) in the event of a whale entanglement. Another achievement within the Saldanha Bay ADZ include secured investment and the



acquisition of mussel farms and processing facilities during the reporting period, this was vetted by the Competition Commission.

The DFFE 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. The call for interest in the zone was published in February 2022. The Aquaculture Management Committee (AMC) co-chair nominations were completed in 2022 and an inaugural AMC meeting was held in September 2022.

Along with the notable progress made, there are still critical challenges to be addressed in order for the sector to 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 pursue 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.



**Ms Nomfundo Tshabalala**  
**Director-General: Forestry, Fisheries and the Environment**



## 1.3 Introduction

Operation Phakisa is a fast results delivery programme launched in July 2014 to help implement the National Development Plan (NDP), with the ultimate goal of boosting economic growth and to create jobs. The 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 all sector 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. These targets are also aligned with the Food and Agricultural Organisations (FAO) Sustainability Development Goals, a collection of 17 interlinked objectives designed to serve as a shared blueprint for peace and prosperity for people and the planet, now and into the future. Phakisa 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 (DPME) leads Operation Phakisa implementation and reporting while the Department of Forestry, Fisheries and the Environment (DFFE) established the Oceans Economy Secretariat to lead the 'Oceans Economy'.

The Operation Phakisa: Oceans 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 Forestry, Fisheries and the Environment.
- Marine Protection Services and Ocean Governance, led by the Department of Forestry, Fisheries and the Environment
- 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. This is led by the Department of Higher Education and Training and the Department of Science and Innovation respectively.

DFFE 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 7.5% per annum. This growth is expected to continue at a higher rate in the future.

The goal was 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 (2019 – 2024), seeks to grow sector revenue from R0, 67 billion to R3 billion; production by 27 020 additional tons; jobs by 6 560 direct jobs 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 (1) initiative addresses the selection and implementation of catalyst projects, improving both the number and productivity of the new farms. Three (3) 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. The initiative nine (9) "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 (3ft) plans across the three horizons defined by the lab participants in 2014.

The previous Annual Review publications are available on the DFFE website:

<https://www.dffe.gov.za/index.php/OperationPhakisaOceansEconomy>

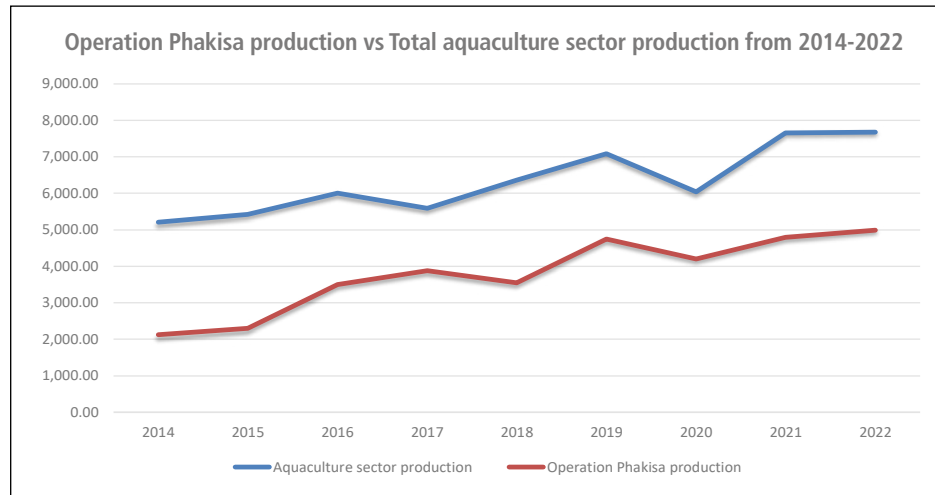


## 1.4 Progress on Aquaculture Key Performance

It has been eight (8) years since the introduction of Operation Phakisa: Oceans Economy and while the vision remains to grow the aquaculture sector, the COVID-19 pandemic and electricity crisis had varied adverse effects on the sector. This was seen across the board from species farmed for export, those supplying the hospitality industry as well as the informal market.

### Production

Operation Phakisa aquaculture farms production has progressively increased since the inception of the programme however fluctuations are noted over this period. Significant fluctuations occurred in 2018 and 2020 respectively due to fall-off in activity in the agriculture, transport, trade, government, and manufacturing industries in 2018 and COVID-19 in 2020. In 2022 a slight increase of 4.09% occurred as production increased from 4 794.16 to 4 990.62 tons. The Operation Phakisa percentage contribution is well noted from the total sector production over the years. In 2022 Operation Phakisa farms contributed 65% towards the total aquaculture sector production (see previous contribution in Table 1 below).



**Figure 1: Operation Phakisa production from 2014 to 2022**

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022
Operation Phakisa production	2 125	2 300	3 500	3 885.50	3 547.79	4 749.50	4 204	4 794.16	4 990.62
Aquaculture sector production	5 209.53	5 418.12	6 007.22	5 588.50	6 365.78	7 085.64	6 045.97	7 661.05	7 677.71
Percentage contribution	40.8	42.5	58.3	69.5	55.7	67.0	69.5	62.6	65.0

**Table 1: Percentage contribution of Operation Phakisa projects to the total aquaculture sector production from 2014-2022**

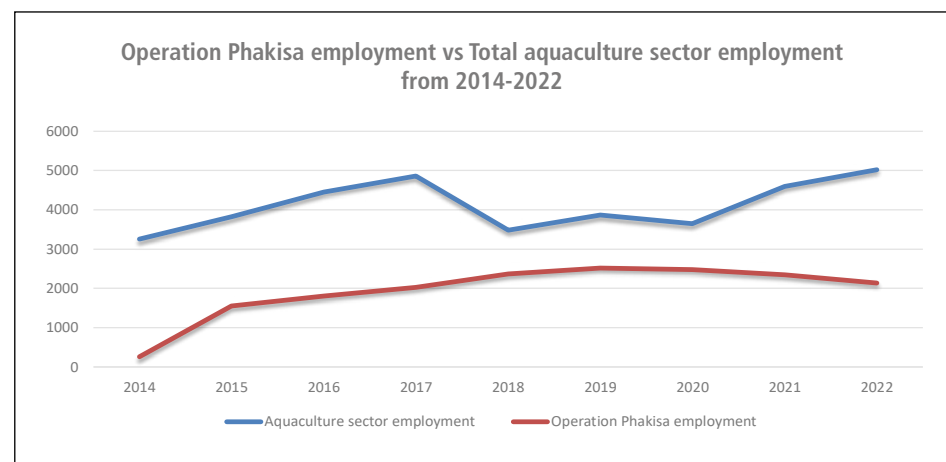


### Employment

In 2020 an estimated 58.5 million people were engaged in the primary production sector as full-time or part-time workers in fisheries and aquaculture globally and around 35% were employed in aquaculture (FAO, 2023). Worldwide, COVID-19 entailed lockdowns and closures of markets, ports and borders this resulted in significant slowdown of trade, causing disruption in aquatic food production and distribution and loss of employment and livelihoods (FAO, 2023). Fishing was disrupted and aquaculture struggled to maintain its planned production cycles (FAO, 2023). Supply chains dominated by small and

medium enterprises were particularly vulnerable to COVID-19 restrictions. Vulnerable and marginalised people were disproportionately affected, with women enduring greater employment declines and loss of household livelihoods (FAO, 2023).

Employment data from Operation Phakisa aquaculture farms steadily increased over the years however a decrease resulted in 2020 due to the closure of some aquaculture farms and the COVID-19 pandemic. In 2022, the total employment from Operation Phakisa farms was about 2 141 which was a 43% employment contribution from the 5 021 total aquaculture sector employment.



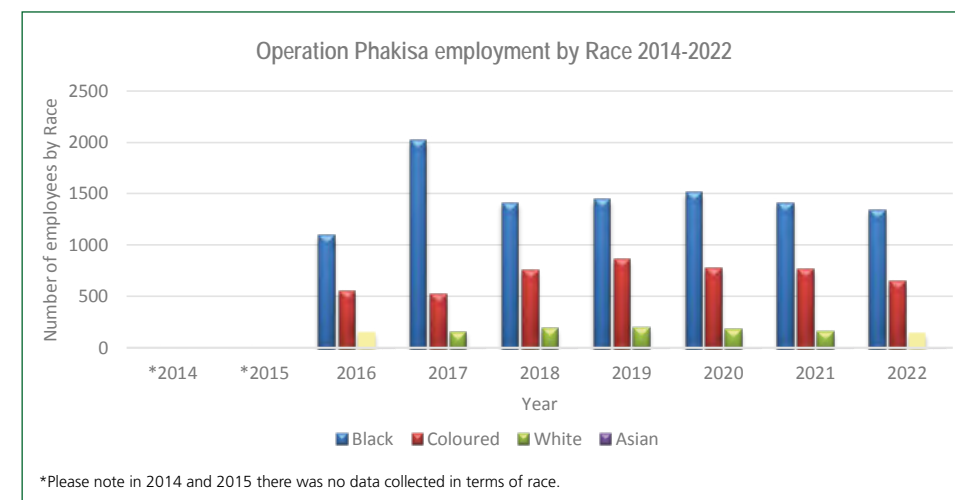
**Figure 2: Operation Phakisa Employment from 2014-2022**

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022
Operation Phakisa jobs per year	260	1 550	1 806	2 030	2 367	2 518	2 480	2 344	2 142
Aquaculture sector jobs per year	3 256	3 826	4 448	4 862	3 486	3 873	3 648	4 591	5 021

**Table 2: Operation Phakisa jobs and total aquaculture sector jobs from 2014 to 2022**

## Employment by Race

The country's population can be subdivided into four main race categories, namely African, White, Coloured and Indian/Asian. The African population constitutes the majority race category, accounting for approximately 80.2% of the country's population. The Coloured population contributes 8.8%, followed by the White population at 8.4% and the Indian population at 2.5% (Stats SA). In terms of race the Black population has been leading by 63% in terms of employment in Operation Phakisa farms, followed by 30% Coloured; White by 7% and the Asian population by 0.1% respectively.



**Figure 3: Operation Phakisa employment by race 2014-2022**

	Black	Coloured	White	Asian
2022	1345	651	143	2
2021	1416	763	163	2
2020	1515	781	182	2
2019	1449	866	200	3
2018	1411	760	194	2
2021	2022	519	159	1
2016	1093	558	154	1
*2015	-	-	-	-
*2014	-	-	-	-

**Table 3: Operation Phakisa employment by race from 2014-2022**



## Youth Employment

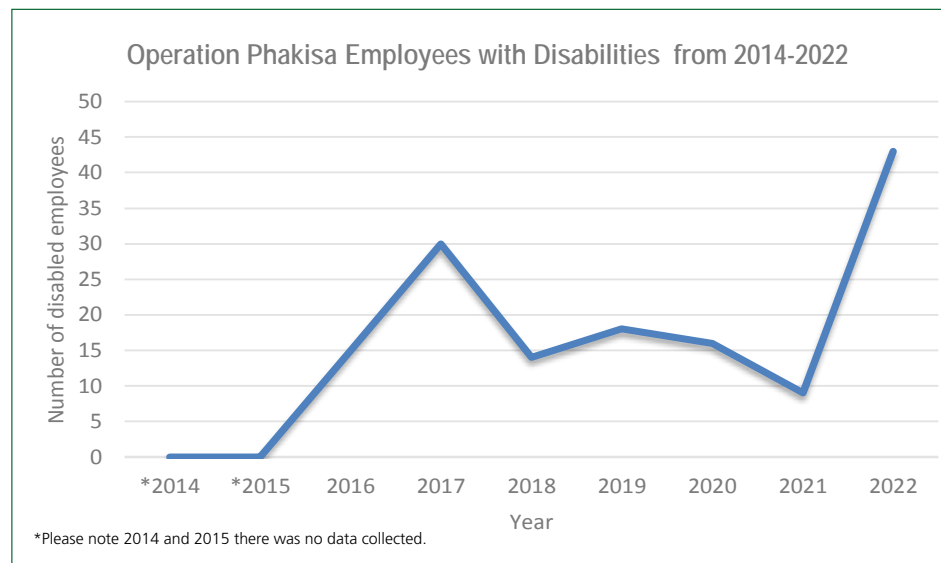
According to StatsSA youth unemployment in South Africa was on the rise increasing by 1.7% in 2022. In contrast, since the inception of the Operation Phakisa programme, youth employment has increased except for 2017 and 2020 due to the COVID-19 outbreak and closure of some Operation Phakisa farms. In 2022 youth employment accounted for 1 237 jobs which is 58% contribution from the total Operation Phakisa employment.



**Figure 4: Operation Phakisa youth employment from 2014-2022**

## Number of Employees with Disabilities

There was an increase in employment of 34 people with disabilities between 2021 and 2022 which equates to a 377% increase.



**Figure 5: Operation Phakisa employees with disabilities from 2014-2022**

## Employment of Veterans

In terms of veterans employed, an increase of 32 employees occurred in 2017 and thereafter decreased since 2018.



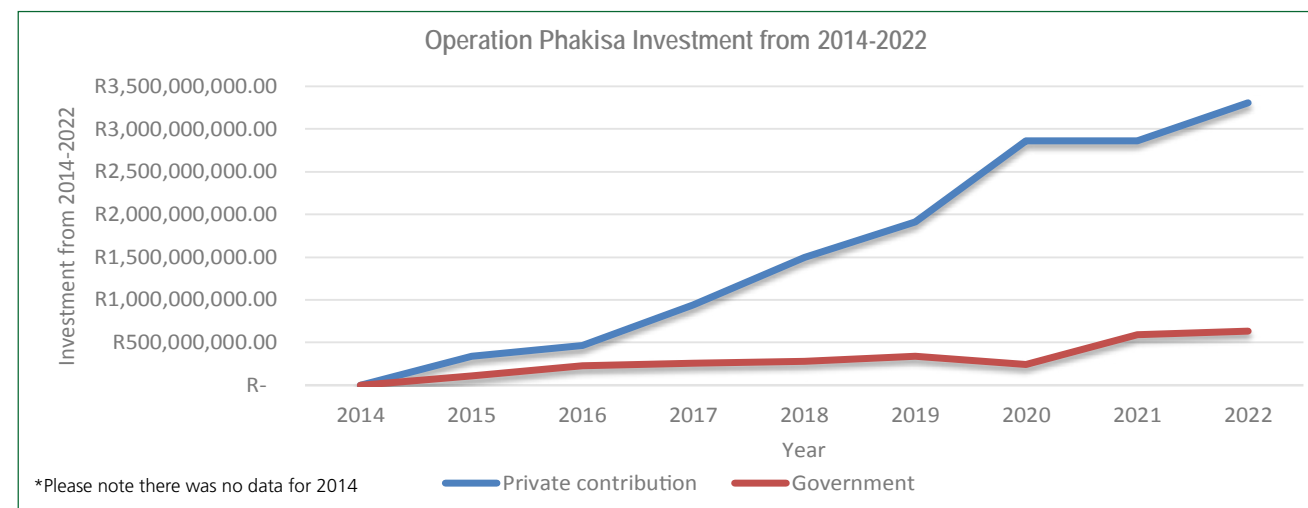
**Figure 6: Operation Phakisa employment of veterans from 2014-2022**

## Employment by Gender

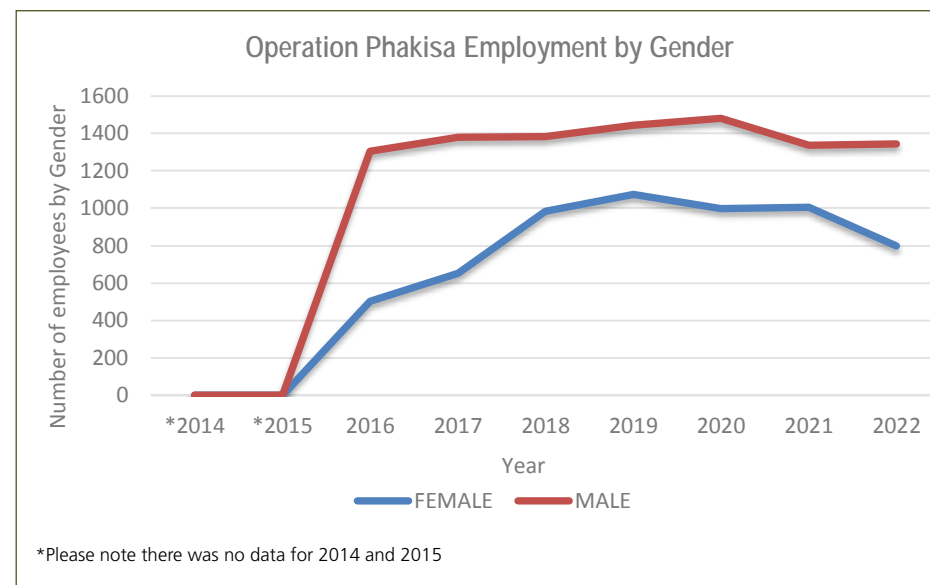
The female population accounts for most of the country's population. Of a total of 57.7 million people in South Africa, approximately 51.2% are female while the remaining 48.8% are male (Stats SA). Women accounted for 21% of those engaged in the primary sector (28% in aquaculture and 18% in fisheries), but they tend to have more unstable employment in aquaculture and fisheries, representing only 15 percent of full-time workers in 2020 (FAO,2023) . This coincides with the female representation figures at Operation Phakisa farms which accounted for 37% in terms of employment. There are around 798 females employed out of 2 141 total employees.

## Investment

Since 2015, aquaculture investment has been on the rise. Both government and private investment increased, however in 2020 investment plummeted, due to the COVID -19 outbreak and a closure of many Operation Phakisa farms. In 2021 an increase of 15% from the private sector is noted and 7.2% from government investment due to business returning to normal conditions again. In 2022 the total Operation Phakisa investment was R490 million of which R42 million was from government and R448 million was from the private sector. Additionally, the total investment since 2014 to 2022 was approximately R3.9 billion of which R633 million was from government and R3.3 billion was from the private sector.



**Figure 8: Operation Phakisa investment from 2014 to 2022**



**Figure 7: Operation Phakisa employment by gender from 2014 to 2022.**





# 1.5 Highlight Per Initiative

## Priority Initiatives Identified by the Aquaculture Lab to Support the Implementation of Catalyst Projects.

### 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-three (43) projects, and thirty-five (35) projects are producing farmed aquaculture animals.



### INITIATIVE 2 LEGISLATIVE REFORM

Aquaculture Development Bill: approved by Cabinet on 9 May 2018 and was introduced to Parliament on 15 June 2018. During the 2022 reporting period, further engagement with industry took place and is currently undergoing internal consultation.

Cabinet approved the Inland Fisheries Policy in August 2021 and the policy was gazetted in February 2022. The DFFE are drafting the implementation plan which is undergoing consultation with stakeholders.

### INITIATIVE 3 INTER-DEPARTMENTAL AUTHORISATIONS COMMITTEE

Environmental Authorisations issued for Operation Phakisa projects since October 2014:

- Twelve (12) Environmental Impact Assessments (EIA) were completed and authorised; two appeals were completed.
- Seven (7) coastal discharge permits were issued for aquaculture.
- Nine (9) biodiversity risk assessments completed (Barramundi, Coho, King Salmon, Siberian Sturgeon, Rainbow Trout, Catfish, Nile Tilapia, Mozambique Tilapia and Common Carp).
- Seven (7) land leases have been issued.
- Nineteen (19) new water leases were allocated and approved. One (1) in Gqeberha and eighteen (18) projects in Saldanha Bay (ADZ) which are Operation Phakisa aquaculture projects.
- Coastal lease and water use license were issued for Qolora ADZ. Extension of the Environmental Authorisation was granted and is valid until 29 September 2023

### INITIATIVE 4 GLOBALLY RECOGNISED MONITORING AND CERTIFICATION SYSTEM

European Union (EU) export approval: The NRCS, DFFE and industry completed and submitted the EU pre-audit questionnaire, this will be followed by a virtual audit in March 2023.

Highlights continued overleaf

## INITIATIVE 5 AQUACULTURE DEVELOPMENT FUND

- A virtual Aquaculture Finance and Investment Seminar took place in November 2021 due to COVID-19. Development funding institutions shared their funding requirements and aquaculture farmers shared their business experiences.
- Feasibility Studies: [https://drive.google.com/drive/folders/1z0rbuE2m-mvS1graeba7NaarSZkgKry9T?usp=drive\\_link](https://drive.google.com/drive/folders/1z0rbuE2m-mvS1graeba7NaarSZkgKry9T?usp=drive_link)
- Funding Directory: <https://drive.google.com/file/d/1SJgh5iutO8tqPpD51TbD1SBos12uurSu/view?usp=sharing>

## INITIATIVE 6 CAPACITY BUILDING AND SKILLS DEVELOPMENT FOR SUPPORT SERVICES

- The Aquaculture Technology Demonstration Centre (ATDC) in Gariep Free State: approximately 1 324 individuals from 2014 to 2022 were trained and the aim is to broaden it to SADC countries.

## INITIATIVE 7 COORDINATED INDUSTRY-WIDE MARKETING EFFORTS

- The Aquaculture Association of South Africa (AASA) Conference (AASA) was held at the University of Stellenbosch from the 11 – 15 July 2022. The attendees were represented by forty three (43) students, sixty three (63) from academia and research, twenty seven (27) from industry, sixty three (63) from government, thirty (30) from aquaculture support and one (1) NGO
- Promotional videos were developed for the Gariep Aquaculture Technology Demonstration Centre Aquaculture Research and Development unit
- DFFE hosted an investment pitching session hosted in collaboration with the African Development Bank Group. Four investment-ready farms presented their business plans

## INITIATIVE 8 PREFERENTIAL PROCUREMENT

In order to access public sector markets and designate local fish products, baseline market information is required. Collaboration with the Department of Correctional Services nutritional guidelines for the procurement of fish products was set in motion. The next trial to be conducted will be through the Tilapia Association of South Africa (TASA) in Gauteng.



## INITIATIVE 9 DEVELOP AND IMPLEMENT AQUACULTURE DEVELOPMENT ZONES (ADZS)

To promote investment into the sector and create an enabling environment, the DFFE 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.

### **Saldanha Bay ADZ: .**

The entanglement workshop trained industry on how to assist the South African Whale Disentanglement Network (SAWDN) in the event of a whale entanglement. This ensures better preparedness in the event of future entanglements.

Investors were sourced for mussel farms and processing facilities, which was vetted by the competition commission.



## 1.6 Year Eight Review

### 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-three (43) projects, and 35 projects are producing farmed aquatic animals. In order to supply demand and promote new entrants into the sector, the DFFE undertook a scoping exercise in the Northern Cape and KwaZulu Natal (KZN) provinces during April 2022.

#### Scoping conducted in KZN:

- Amanzi Fisheries Primary Co-operative.
- Isithumba Fish Farmers Primary Cooperative Limited.
- Aquadale Fish Farm Primary Cooperative Limited.
- Mr Zulu's project in Richards Bay (private farm yet to receive project name).

- Dube Aquaponics Project (recommendation of optimisation interventions made by aquaculture production scientists).

#### Scoping conducted in the Northern Cape:

- Sanddrift (remote site with access to land and water).
- Reitfontein (Alexcore mining area, between Alexander Bay and Port Nolloth, site has the potential for revitalisation).
- Dinivlei (Alexander Bay) site was a cattle farm and has good potential for freshwater aquaculture, market however will need to be developed for the products.
- Carolusberg old sewage infrastructure, site has low potential for redevelopment and is earmarked by the municipality for redevelopment of the sewage works plan.





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

## Small-Scale Framework for Aquaculture

The small-scale feasibility studies were published for the following species: catfish, marron, crayfish, Nile and Mozambique tilapia, oysters, 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 was finalised in March 2020. This will be 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 integrate as part of mainstream aquaculture activities. It seeks to ensure equal participation and prioritisation of youth and women within the industry.

### 15 Original Aquaculture Projects

SMME's = 4

#### HONDEKLIP BAY

New farm: Diamond Coast Abalone Ranching (operational)

#### DORING BAAI

Expansion of Doring Bay Abalone Farm (operational)

#### SALDANHA BAY

New farm: Molapong Cages (Not operational)  
Expansion of Blue Ocean Mussels (operational)  
Expansion of Saldanha Bay Oyster Company (operational)

#### JACOBSBAAI

Expansion: Jacobsbaai Sea Products (operational)

Coastal provinces  
Inland provinces

#### AMATIKULU

Expansion of Amatikulu ornamentals (operational)

#### HAGA HAGA

Expansion: Wild Coast Abalone Farm (operational)

#### HAMBURG

Expansion of Hamburg Oyster farm (operational)  
New farm: Hamburg Kob (operational)

#### GQEBERHA

New: Wild Coast Abalone Ranching (operational)

#### OVERBERG

Expansion of Roman Bay (operational)  
Expansion of Abagold (operational)  
Expansion of Marine Growers (operational)  
Expansion of HIK Abalone (operational)

### 28 New Operation Phakisa Projects Since 2014

SMME's = 20

#### KLEINZEE

Exp: Diamond Coast Aquaculture farm & ranching (operational)

#### SALDANHA

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

#### MORETELE, NW

New: Blue Green tilapia (not operational)  
New: Greenies tilapia (not operational)

#### GAUTENG

New: Northdene tilapia (not Operational)

#### MAKHANDA Eastern Cape

New: Equatorial Aquatics (ornamentals) (Operational)

#### MACLEAN TOWN, Eastern Cape

New: Somila Poultry Cooperative marron crayfish (not operational)

#### COEGA

New: RMS Abalone Farm (not operational)

#### GQEBERHA

Exp: Zwembesi oyster (operational)

#### OVERBERG

New: Hermanus Salmon (not operational)  
New farm: Pearly Beach Sea Farms (not operational)

Coastal provinces  
Inland provinces





## 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 create 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

The Aquaculture Development Bill was approved by Cabinet on 9 May 2018 and introduced to Parliament on 15th June 2018. During the 2022 reporting period, further engagement with industry took place and is currently undergoing internal consultation. Among the challenges encountered with regard to the Bill was that it was not processed by the fifth administration and due to realignment of mandates the Bill required further consultation.

### 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 on a national level. 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 in 2019, and the next step is implementation. Tools are currently being developed for the implementation process which includes:

- Framework or Strategy to be developed.
- The SEA information needs to be taken forward in terms of regulation/laws/tool development.

### Coastal Waters Discharge Permits

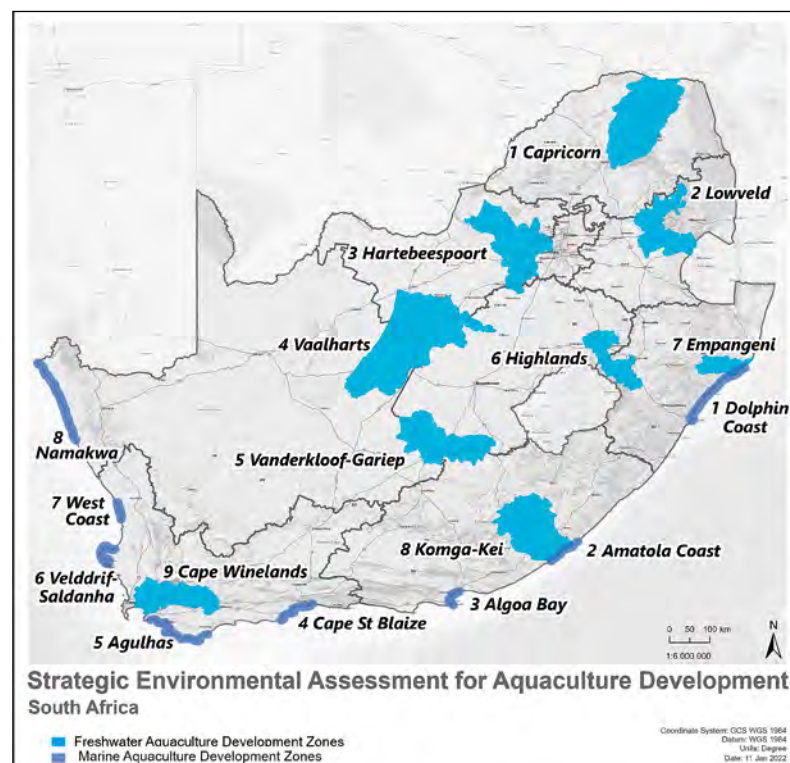
The General Discharge Authorisation (GDA) for coastal discharges, which includes aquaculture, is aimed at reducing the need for aquaculture operations to apply for a full Coastal Water Discharge Permit which required various specialist studies. The revised General Discharge Authorisation conditions were published for comment in 2019. The Minister approved the GDA in April 2022 and the process to transfer to GDA is currently underway. There will still be some monitoring but less onus and compliance likely to be less frequent or onerous too.

### Inland Fisheries Policy

Cabinet approved the National Freshwater (inland) Wild Capture Fisheries Policy in August 2021 and the policy was gazetted in February 2022. The DFFE are drafting the implementation plan which is undergoing consultation with stakeholders.

### 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 must 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. DFFE has communicated regulatory implications of a state legal opinion that was sent to industry stakeholders. The revised regulations were published on 16th 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 in Mpumalanga and Limpopo.



**Figure 9: Freshwater and marine areas screened for aquaculture through the SEA.**

## **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: Forestry, Fisheries and the Environment, Public Works and Infrastructure; Agriculture, Land Reform and Rural Development, Water and Sanitation, Public Enterprises (Transnet National Ports Authority) and Mineral Resources and Energy.

The numerous authorisations required for aquaculture have been mapped in detail and recommendations have been made in terms of streamlining and further improving efficiency. The key outcome of streamlining aquaculture authorisations was the proposal to create a project management centre at DFFE to assist with planning and follow up of authorisations. This is partly implemented through the registration of projects with Operation Phakisa. A Memorandum of Co-operation would need to be signed by various departments to create a virtual 'One Stop Shop'. The Director-General approved a submission on 26 September 2020 to revitalise and reappoint the IAC members with new letters that will be issued to relevant departments to nominate attendees. Letters were circulated and some nominations were received.

### **A. Environmental Authorisations issued for Operation Phakisa projects since October 2014:**

- Twelve (12) Environmental Impact Assessments (EIA) were completed and authorised; two appeals were completed.
- Seven (7) coastal discharge permits were issued for aquaculture.
- Nine (9) biodiversity risk assessments completed (Barramundi, Coho, King Salmon, Siberian Sturgeon, Rainbow Trout, Catfish, Nile Tilapia, Mozambique Tilapia and Common Carp).
- Seven (7) land leases have been issued.
- Nineteen (19) new water leases were allocated and approved. One (1) in Gqeberha and eighteen (18) projects in Saldanha Bay (ADZ) which are Operation Phakisa aquaculture projects.
- Coastal lease and water use license were issued for Qolora ADZ in September 2013 and May 2013, respectively. Extension of the Environmental Authorisation was granted in October 2020 and is valid until 29 September 2023.

### **B. Saldanha Bay Aquaculture Development Zone:**

- The Minister of DFFE approved the ADZ Environmental Authorisation on 8 January 2018 and the appeal decision was issued on 7 June 2018.
- Saldanha Bay ADZ could potentially create between 780 – 2 500 jobs, bring in additional investment of R400 million, unlock R800 million revenue per annum and contribute towards rural livelihoods and food security.
- Requirements to commence were met such as the appointment of Environmental Control Officer, establishment of the Aquaculture Management Committee (AMC) and Consultative Forum (CF).
- DFFE and Transnet National Ports Authority (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 annual external audit was conducted for February 2020, February 2021 and February 2022.

### **C. 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 Environmental Authorisation was issued on 26 January 2020.
- Establishment of the Aquaculture Management Committee (AMC) with the inaugural meeting held on 14 September 2022, this committee meets every second month.

### **D. COEGA Aquaculture Development Zone:**

- On 7 February 2018 the DFFE granted an integrated environmental authorisation for the development and operation of the Coega Land-Based ADZ in the Coega Industrial Development Zone.



## Progress: Initiative 4 Establishment of a Globally Recognized Monitoring and Certification System

Importing nations of aquaculture products require assurances that the products they receive are safe for human consumption, however, in South Africa there are currently only a few trained technicians and specialists that are able to provide these assurances. To address this challenge, Initiative 4 is an enabler to establish a 'Globally Recognised Monitoring and Certification System' to boost exports of South African aquaculture products. An additional food safety unit was not established due to the limitation of the fiscal environment. The DFFE is working with relevant departments and laboratories to sign Memorandum of Understandings (MOU) and validate laboratory and testing methods.

### Certification framework

The final certification framework for aquaculture products in South Africa 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

Currently South African Aquaculture products are not allowed into the EU market and an audit of the sector by the EU is required prior to any trade with the EU. The NRCS is currently engaging the EU on the audit process. The NRCS, DFFE and industry completed and submitted the EU pre-audit questionnaire, this will be followed by a virtual audit in March 2023.

### Oyster listing in China

There was an incorrect species listed by China for the oyster species farmed in South Africa, which led to South Africa being unable to sell oysters to its largest trading partner for this commodity. The NRCS and DTIC led the discussions with their counterparts in China to find a resolution, the matter was escalated to ministerial level in August 2021. The oyster listing was changed on the Chinese website on 6 September 2021, and trade resumed shortly after.

### Draft audits by NRCS of new farms planning to export to Russia

The department submitted a list of facilities interested to export product to Russia. The

NRCS was approached in December 2022 however no feedback was received from Russia to date .

### Standards

Four standards were developed/amended to date: raw bivalves, canned molluscs, live lobsters and canned fish.

### Laboratory capacity

Sufficient laboratory capacity is required to provide reliable test results for certification. The DFFE is undergoing a process of developing capacity with the Agricultural Research Council – Onderstepoort Veterinary Institute and the Western Cape Veterinary Institute to develop the capacity for veterinary medicine residues and norovirus testing.

### Sewerage Spill Algoa Bay

A substantial sewerage spill into Algoa Bay took place from 31 May to 2 June 2022, this resulted in an E. coli count of 1300 CFU/100g in the oysters and could result bay being downgraded to a Class B area. Some challenges include that bivalve farms cannot sell directly to the public. Sustainability of the proposed Algoa Bay Aquaculture Development Zone in the bay is at risk.

### Published Standards to date

#### A. List of published standards

SANS Number	Title	Date Approved
SANS 585:2022	The production of frozen fish, marine molluscs, and products derived therefrom	2022-02-04
SANS 587:2020	Canned fish, canned marine molluscs and canned crustaceans, and products derived therefrom	2022-08-26
SANS 729:2018	Live aquaculture abalone	2018-11-02
SANS 2879:2016	Live and chilled raw bivalve molluscs	2016-04-08
SANS 3091:2022	Chilled finfish, marine molluscs and crustaceans and products derived therefrom	2022-08-26

## 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 (DFIs) and departments:

Forestry, Fisheries and the Environment; Agriculture (DFFE), Land Reform and Rural Development (DLRRD): Comprehensive Agriculture Support Programme (CASP) and Mafisa Fund (MF), Industrial Development Corporation (IDC), Land Bank (LB), Eastern Cape Development Corporation (ECDC), Eastern Cape Rural Development Agency (ECRDA), Science and Innovation (DST), Jobs Fund (JF), National Empowerment Fund (NEF), Trade, Industry and Competition (DTIC), Small Business Development (SBD), 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) and 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. Feasibility studies are currently in the process of being updated.

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

- Feasibility Studies: [https://drive.google.com/drive/folders/1z0rbuE2mmvS1graeba7NaarSZkgKry9T?usp=drive\\_link](https://drive.google.com/drive/folders/1z0rbuE2mmvS1graeba7NaarSZkgKry9T?usp=drive_link)
- Funding Directory: <https://drive.google.com/file/d/1SJgh5iutO8tqPpD51TbD1SBos12uurSu/view?usp=sharing>

### Aquaculture Development and Enhancement Programme (ADEP)

New ADEP guidelines were published by the dtic and were effective from 1 April 2019. ADEP guidelines continuously being implemented. The Adjudication Committee sits once a month to assess new aquaculture funding applications.

### Aquaculture Finance and Investment Seminar

On 27 March 2019, the DFFE held the first Aquaculture Finance and Investment seminar which took place in Durban (2019). A virtual Aquaculture Finance and Investment Seminar took place in November 2021 due to COVID-19.





## 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 the DFFE. 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 (5) years in terms of quantifiable numbers.

### Aquaculture qualifications (through AGRISETA)

The aquaculture qualifications for 'Aquaculture Farmer' and 'Aquaculture Farm Assistant' were completed and approved by South African Qualifications Authority (SAQA) in 2018. It is available on the website, linked here:

<https://regqs.saqa.org.za/viewQualification.php?id=104904>

The development and approval of the aquaculture farmer qualifications framework was completed in partnership with AgriSETA. The DFFE and SAIMI were investigating Research Chairs and Community of Practice for aquaculture.

### International Training

- DFFE official attended training in Taiwan on value addition for aquaculture products.
- The Peoples Republic of China offered virtual training for Operations Management of Demonstration Centres (aquaculture), held in May 2022. Two (2) DFFE officials attended the training.
- The Peoples Republic of China offered virtual training for the Green Aquaculture Training Course for the Belt and Road Countries, held in May 2022. Five (5) DFFE officials attended the training.
- The Peoples Republic of China offered virtual training on the Fishery Village Revitalisation and Comprehensive Development for Developing Countries, held in August 2022, attended by several officials from the Eastern Cape and Limpopo Provinces.

- The Peoples Republic of China offered virtual training on the Rice and Aquaculture Cultivation for Developing Countries, held in August 2022, one (1) DFFE official attended the training.

### Training and Capacity building

A total of ten (10) DFFE interns attended aquaculture training at the Gariep Aquaculture Technology Demonstration Centre Aquaculture (ATDC) based in Gariep, Free State during March and September 2022.

### The Aquaculture Technology Demonstration Centre (ATDC)

The ATDC is located near Gariep Dam in the Free State. The programme has been a success over the years and the ATDC has trained approximately 1 324 individuals from 2014 to the end of December 2022. A total of 165 trainees were trained in 2014, 179 trainees in 2015, 474 trainees in 2016, 169 trainees in 2017, 127 trainees in 2018, 116 trainees in 2019, seven (7) in 2020, 49 trainees in 2021 and 38 in 2022. 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 courses) Booklet

The Aquaculture Skills Programme (Short courses) 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, Land Reform and Rural Development (DALRRD) 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. The Aquaculture Skills Programme (Short courses) booklet is currently in the process of being updated.

## 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 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 (2) 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.

### 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. The link to the videos can be found on the YouTube link here:

- Trout - [https://youtu.be/kh\\_CsOt6LXU](https://youtu.be/kh_CsOt6LXU)

- Tilapia - <https://youtu.be/jlaHBjZjQ8Q>
- Mussels - <https://youtu.be/Q-2tDrWfRJI>
- Oysters – <https://youtu.be/8V0u9t6V4p0>
- Abalone - <https://youtu.be/wDIFgVnRnyY>
- Catfish - <https://youtu.be/ocUBPctcovQ>

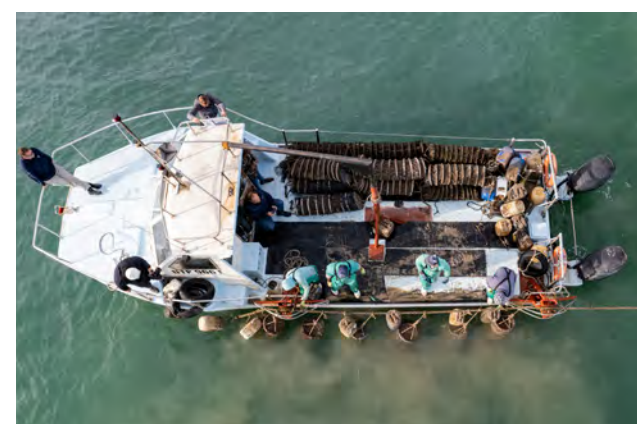
During 2022, promotional videos were developed for the:

- Gariep Aquaculture Technology Demonstration Centre <https://www.youtube.com/watch?v=koyehFSo3R0>
- Aquaculture Research and Development <https://www.youtube.com/watch?v=AOi7iZGlsQs>

### Investment Promotions

During the reporting period, an investment pitching online meeting was hosted in collaboration with the African Development Bank Group. Four investment-ready farms presented their business plans for funding, and one was selected for further engagement with the bank pending outstanding authorisations.

The DFFE participated in the AFSIC Investing in Africa seminar held in London during October 2022. The DFFE and Wesgro partnered to host an exhibition stand and participate in panel discussions to present aquaculture investment opportunities in South Africa.





## **Aquaculture Association of South Africa (AASA) Conference 2022**

The AASA conference was held at the University of Stellenbosch from the 11 – 15 July 2022. The attendees represented by forty three (43) students, sixty three (63) from academia and research, twenty seven (27) from industry, sixty three (63) from government, thirty (30) from aquaculture support and one (1) NGO. The conference was held over two (2) days and offered a further two (2) days for workshops and field trips. Total attendees at the workshops included twenty two (22) attendees at the aquaponics workshop; twenty seven (27) attendees at the abalone workshop and twenty one (21) attendees at the Tilapia workshop.

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

South Africa (through DFFE) 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.

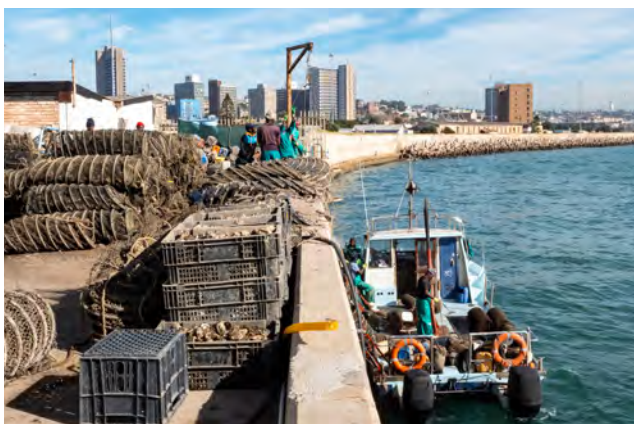
The African Chapter (AC) hosts structured webinars within the regions and through

partner organisations e.g., Aquaculture African Magazine, WorldFish etc. Through the regular WAS media platforms aquaculture information continues to flow to audiences including the flagship 'Journal of the World Aquaculture' (full of research and educational material). Website: <https://www.was.org/AC/default.aspx>

In terms of collaboration, WAS African Chapter continues to grow through collaborations by organisations such as FAO, SADC, World Aquatic Veterinary Medicine Association (WAVMA), Uganda Agriculture Research Council, Aller Aqua Feed company. Discussions with other entities for possible MoUs for co-operation, specifically for the annual flagship conference - Aquaculture Africa. The WAS AC Secretariat is formally housed at the AUDA-NEPAD in Midrand, South Africa through a signed hosting agreement.

## **AQUACULTURE AFRICA 2021 Conference and Exposition (AFRAQ21)**

This conference took place from 25 - 28 March 2022, in Egypt. AFRAQ21 attracted nearly 1700 registrations from 77 countries (both conference and visitors to the trade show). The well-organised exhibition platform featured 51 booths (44 companies/organisations) from 22 countries from around the world. In addition to networking opportunities which the conference rendered, the scientific/technical programme featured 34 sessions, 261 abstracts and 58 posters – where attendees gave presentations and learnt various lessons on sustainable aquaculture development.



## 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 (DCS) and South African Airways (Airchefs).

The discussion with the Department of Correctional Services (DCS) on including farmed freshwater fish in their procurement specification guidelines to all their regional facilities is underway. The catfish products acceptability trial took place on 4 May 2021 at the Kirkwood Facility in the Eastern Cape. It was well accepted by offenders and more acceptability trials are planned for tilapia products. Various meetings were conducted with DCS chief financial officer and nutrition team to understand the requirements for freshwater species

to be listed. The DFFE will assist with due diligence of producers.

### Challenges

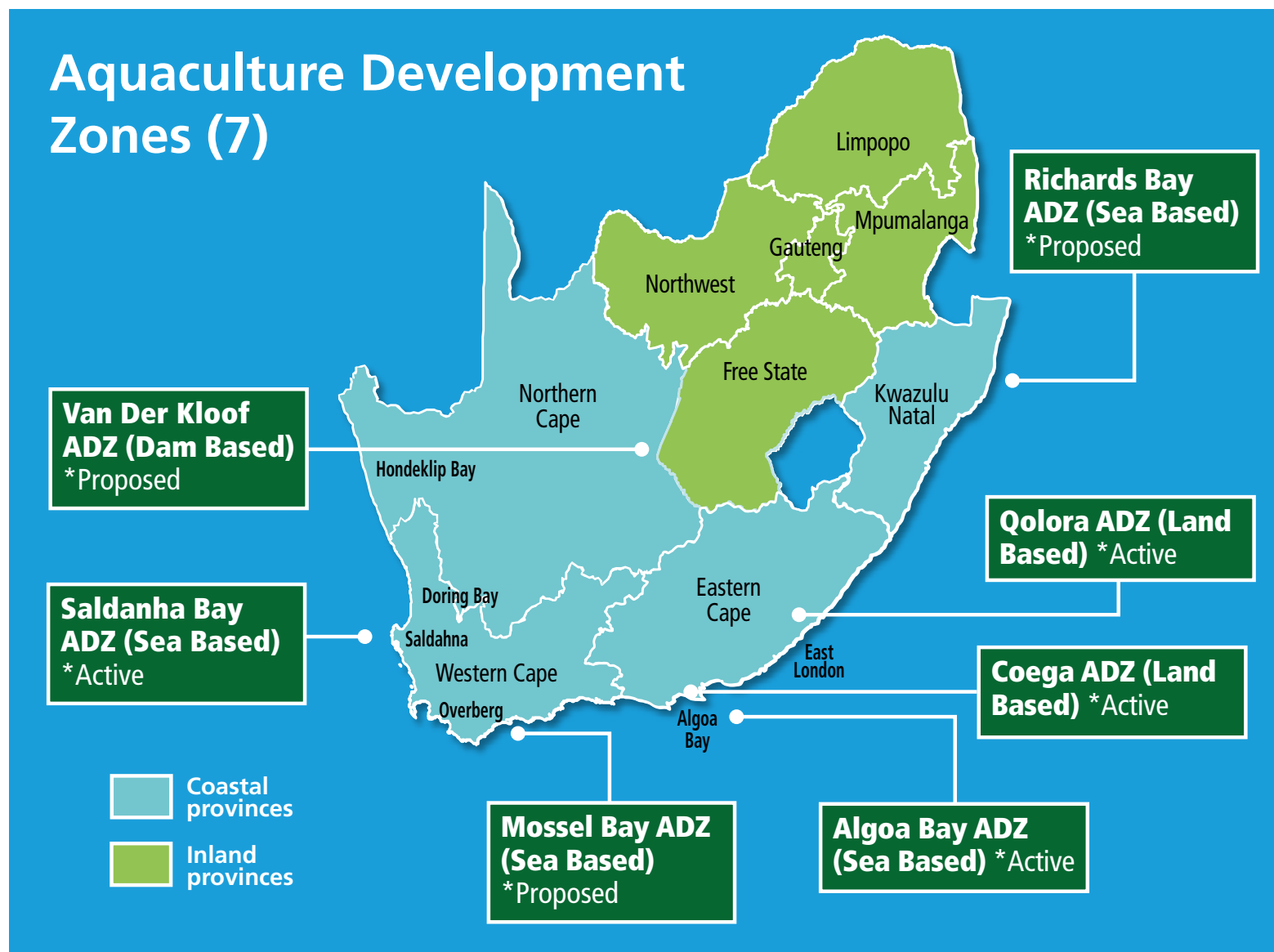
- South Africa has low fish consumption per capita.
- Difficulty in engaging with Department of Health, Education on procurement channels.
- Difficulties with departments who only procure marine fish species.
- Pricing of some of the commodities.

### Solutions

- Creating more awareness for aquaculture videos through Wesgro and looking into Proudly SA 'Buy Local' campaign and any other forums.
- Focus of preferential procurement to Correctional Services for trout and tilapia trials.
- Departments engaged in terms of their guidelines for procurement.
- Mussel meat was too expensive for correctional services and removed from the trial.



## Progress: Initiative 9 (New) Develop and Implement Aquaculture Development Zones (ADZ's)





To promote investment into the sector and create an enabling environment, the DFFE has embarked on a process to establish ADZ's. 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 (SEZ's) and the National Aquaculture Policy Framework. The DFFE identifies suitable ADZs 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.

There are currently seven ADZ's registered and monitored under initiative 9:

### **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.

The Amatikulu ADZ application for Environmental Authorisation has been declined. The department has submitted an appeal. The EIA appeals decision was referred to the

Minister of Justice on 8 September 2020 for consideration and the appeal was rejected. The ADZ was not further pursued.

### **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. The DFFE was informed of the Strategic Environmental Assessment being conducted by Transnet National Ports Authority in the Port of Richards Bay. TNPA gave permission to undertake an Environmental Impact Assessment of the same area at the end of 2021. The department participated in the government stakeholders meeting on 8 June 2022. The DFFE engaged TNPA on the incorporation of aquaculture in the SEA. The proposed aquaculture EIA Richards Bay is on hold until the DFFE establishes a way forward.

### **Qolora Aquaculture Development Zone:**

The Qolora ADZ 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.

An environmental authorisation extension was issued/granted to DFFE for the project on the 13 October 2020 until 29 September 2023. DFFE worked together with the DALRRD in obtaining a Valuation Certificate from the Office of the Valuer General. The valuation certificate will assist the DALRRD/DFFE with developing lease agreements for interested parties that would want to develop an aquaculture venture on the Qolora site. The valuation certificate was issued on 18 May 2020. The DFFE is working with the municipality to trigger the listed activities of the EA before 29 September 2023.

### **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 landowners, 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 to farm trout. The majority of permits were received, and the pilot has yet to commence.

## Saldanha Bay Aquaculture Development Zone

Refer to Initiative 3, Inter-departmental Authorisations Committee for details. The ADZ implementation continues, the Environmental Control Officer has been appointed for a three-year contract period (1 April 2022 and will continue until March 2025). Environmental monitoring continues within the ADZ and collaboration with WWF on awareness training for the industry with regards the Endangered, Threatened and Protected Species. The entanglement training workshop for industry (28 - 29 June 2022) trained industry on how to assist the South African Whale Disentanglement Network (SAWDN) in the event of a whale entanglement. This was at no cost to the industry and ensures better preparedness in the event of future entanglements. Specialised knives and disentanglement kits were procured to better equip the department, South African Border Patrol and SAWDN with responding to entanglements. Investors were sourced for mussel farms and processing facilities, which was vetted by the competition commission. Blended financing model engagements are under way with DFI's and projects.

## 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. Coega Development Corporation have started with the construction of enabling infrastructure in the ADZ and are spending in excess of R200 million on the first phase of



the ADZ in this regard. Coega ADZ are hard at work to get further funding for large-scale marine pipeline infrastructure to unlock abalone farming in the Coega ADZ. Funding is currently being sourced for the pipeline infrastructure.

## 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 appropriate species. An Environmental Assessment Practitioner needs to be appointed to undertake the EIA.

## Algoa Bay Aquaculture Development Zone

The DFFE 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.

Refer to Initiative 3. The Environmental Authorisation was issued on the 26 January 2020. The call for interest in the zone was published in February 2022, in the Daily Dispatch newspaper. The provincial aquaculture management committee (AMC) co-chair nominations were competed in 2022 and an inaugural AMC meeting was held on 14 September 2022. The ToR for the AMC were finalised and the committee meets every two months to consider environmental matters related to the implementation of the ADZ. There is a postponement of TNPA leases process due to ongoing pollution.



# 2. Year Eight Snapshot

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

- 2.1 The Oceans Economy Masterplan
- 2.2 The FAO and DFFE Partner Up to Develop South Africa's Aquaculture Sector
- 2.3 Team Phakisa Scope KwaZulu Natal for Potential Aquaculture Projects
- 2.4 Commercial Feasibility of Kelp Farming in South Africa
- 2.5 The National Aquaculture Research Forum
- 2.6 The South African Bivalves Report
  - Oysters Economic Report
  - Mussels Economic Report



## 2.1 The Oceans Economy Master Plan

Government approved the Reimagined Industrial Strategy (RIS) for South Africa in June 2019. A cornerstone of the RIS is the development of sector-focused Master Plans in 15 priority sectors, of which the oceans economy is one. The development of the Master Plan also gives effect to the Government's Economic Reconstruction and Recovery Plan to revitalise the South African economy, especially post COVID-19. A Master Plan is a comprehensive and clear plan of action developed by government, business and organised labour, which seeks to achieve a common policy objective, such as job creation and economic growth. It is typically time-bound and incorporates various actions by stakeholders, sequenced to achieve maximum socio-economic impact. The primary objective of this Oceans Economy Master Plan process is to develop an agreed-upon set of actions, with timeframes, that all stakeholders in key sub-sectors of South Africa's oceans economy commit to implementing for the benefit of each sub-sector. The key objectives of this Master Plan are to encourage sector growth, investment, job creation and to enhance competitiveness within South Africa's ocean's economy.

South Africa's oceans economy involves multiple, diverse and sometimes overlapping industries that operate (directly or indirectly) within the marine environment. Hence, this Master Plan includes separate, but mutually reinforcing, sub-sector plans that collectively form South Africa's Oceans Economy Master Plan. The Oceans Economy Master Plan builds on from the work of Operation Phakisa with three thrusts (stabilising, reviving, and growing) of the following five sub-sectors:

1. Marine Manufacturing and Repairs.
2. Marine Transport (including Freight, Logistics & Cargo).
3. Aquaculture (Freshwater and Marine).
4. Fisheries (Small-scale and Commercial).
5. Offshore Oil and Gas.

The Oceans Economy Master Plan is presented in two parts. Part one provides an overview of the global and South African oceans economy. It outlines the vision and associated set of targets for the South African oceans economy, as well as the pillars and foundations that are intended to frame the development of the sector through to 2035. Part two introduces individual plans for the five identified oceans economy sub-sectors, which are

intended to give life to the aspirational vision, objectives and strategic framework agreed upon by stakeholders to optimally develop the South African oceans economy through to 2035.

Over the past 2 years, 'Working Groups' and smaller 'Working Teams' for the above sub-sectors were convened with various stakeholders (comprising of labour, civil society, businesses and government) to develop high level interventions as well as detailed implementation plans for each sub-sector. The first iteration of the draft Oceans Economy Master Plan was disseminated to broader stakeholders and constituencies for comment, gap analysis and inputs, in December 2021. The final draft is being compiled and will include finalised implementation plans.

The eight (8) core action commitments/national priorities for the aquaculture sub-sector are:

1. Access to land and water sites
2. Research to guide diversification of commercially viable species to improve competitiveness and increase diversification of the sector
3. Ensure Environmental and Economic Sustainability
4. Stabilise and expand local and international markets
5. Skills and capacity development
6. Funding and Enterprise Development
7. Streamline authorisation and administrative requirements and processes
8. Small-scale support programme

To date, the Aquaculture Implementation Plan has been finalised (final draft) will thereafter be presented to the broader stakeholders when convened. The aquaculture sub-sector implementation plan was tabled with the Industry Reference Group (group of technical experts) in November 2022 with no further inputs until all the sub-sectors have presented. Implementation of ongoing and short-term interventions, that are already under the Operation Phakisa targets, are continuing.



## 2.2 The FAO and DFFE Partner Up to Develop South Africa's Aquaculture Sector

Aquaculture, the fastest growing food sector globally, is an emerging industry with the potential to unlock South Africa's blue economy. It contributes to job creation, poverty alleviation, and skills development, thereby improving livelihoods and boosting the country's Gross Domestic Product (GDP). To support the growth and development of South Africa's aquaculture sector, the Food and Agriculture Organisation (FAO) provides continuous support and training.

The Food and Agriculture Organisation (FAO) is an entity of the United Nations dedicated to providing quality food worldwide and reducing world hunger. A technical site visit was conducted in South Africa in November 2022. During this visit, the FAO, in collaboration with the Department of Forestry, Fisheries and the Environment (DFFE), under the Chief Directorate: Aquaculture Development and Freshwater Fisheries, identified the need for training interventions. These interventions aim to equip officials at the provincial and national level, as well as representatives from colleges, with the necessary training to support the development of freshwater aquaculture at both small and medium scales. The 'Training the Trainers' course was held at the Aquaculture Technology Demonstration

Centre (ATDC) in Gariep Dam from the 17 to 21 April 2023. The training encompassed various aspects, including:

- Technical dimensions of aquaculture.
- Economic dimensions of aquaculture, both commercial and small-scale.
- Business plan development.
- Governance.
- Aquaculture policy and strategy development.
- Information management and statistics.
- Aquaculture planning.
- Freshwater aquaculture production systems, such as aquaponics, ponds, Recirculating Aquaculture Systems (RAS), and cages.
- Economically viable models (backyard system).

The second training course, namely, the 'Aquaponic Systems Training' workshop, took



**The FAO, DFFE, participants from provincial government and various colleges attending the 'Training the Trainers' course at the Aquaculture Technology Demonstration Centre, (April 2023).**

place at the ATDC from 25 to 28 April 2023. The primary focus was to conduct a needs assessment and to design an aquaponics system. The system design will be implemented as a pilot project at both the Motheo TVET College and the ATDC.

The participants included government representatives from provincial departments across the country, individuals from Motheo TVET College, Glen College of Agriculture, and INMED (a non-governmental organisation). These individuals represent aquaculture trainers, aquaculture extension officers among other expertise in the aquaculture arena.

Some key takeaways from the Training the Trainer's course included the following:

- The DFFE economics team is set to compare the FAO economics model to the DFFE's Generic Economic Model and conducted road shows for the economic model in various provinces.
- Four groups were assigned the task of developing a project concept eligible for funding based on the small-scale aquaculture support programme; the draft Aquaculture Development Bill; and the Operation Phakisa Oceans Economy initiatives.
- A needs analysis is to be compiled and submitted to government for interventions. Some of which include capacity building for farmers in areas such as food safety.
- The FAO will share project management tools with the DFFE team to assist with monitoring and evaluation.
- An FAO expert will review the shellfish monitoring programme.

The 'Aquaponic Systems Training' workshop generated several noteworthy recommendations, including:

- Establishing a small-scale R5 000 aquaponics systems at both the ATDC and Motheo College.
- Collaborating with universities to assess the feasibility of Yumina (integrating fish with vegetables) / Bumina (integrating fish with fruit) systems, as well as IBC systems,

when exposed to environmental factors.

- Formalising a partnership through the signing of a Memorandum of Understanding (MOU) with the University of South Bohemia in the Czech Republic.

The Chief Directorate: Aquaculture Development and Freshwater Fisheries is committed to addressing the roadblocks faced by the South African aquaculture sector, particularly in

terms of capacity building. A robust approach to overcoming these challenges is to equip trainers with the necessary skills to provide valuable aquaculture advice, extension services, and training to farmers and stakeholders. This holistic approach emphasises the importance of training producers and providing them with the necessary resources. By doing so, a gradual exit strategy for government support can be implemented while ensuring continuous technical support for the long-term sustainability of the sector. Looking ahead, the FAO has identified another upcoming training course that will specifically focus on training financial institutions and other personnel responsible for funding aquaculture projects.



**The FAO team demonstrating aquaponic systems (April 2023).**

*"Aquaculture is a technological and skills-based sector. It was important for us to provide training to our government officials at provincial and national level based on the latest international trends. We value this strategic partnership with the FAO as they have highly skilled, experienced, and professional experts who work with almost 195 countries that are members of the United Nations"* – Chief Director: Aquaculture Development and Freshwater Fisheries, Mr. Belemane Semoli.

#### References:

- FAO training programme, South Africa DFFE-FAO Training Workshop On Aquaculture Management And Development
- Back to Office Report: Report On The Outcomes Of The "Training The Trainers" Offered By The Food And Agriculture Of The United Nations (FAO)
- The Food and Agriculture Organisation (FAO) website (<https://www.fao.org/about/en/>) , (<https://teca.apps.fao.org/teca/en/technologies/8763>)



## 2.3 Team Phakisa Scope KwaZulu-Natal for Potential Aquaculture Projects

The Department of Forestry, Fisheries and the Environment (DFFE) through the Directorate: Aquaculture Technical/Extension Services (D: ATS) and the Operation Phakisa Aquaculture Delivery Unit (OPADU) participated in technical site visits to assess aquaculture projects within KwaZulu-Natal province from 12-15 December 2022. Officials from D: ATS and OPADU were accompanied and assisted by representatives from the Agricultural Research Council (ARC) and the KwaZulu-Natal: Department of Agriculture and Rural Development (KZN: DARD). A total of six (6) projects were scoped.

The ARC is currently in the process of developing a mobile application (app) focused on freshwater aquaculture species. The primary objective of this app is to address the challenge of limited aquaculture extension services in the country. To achieve this, it is necessary to visit and profile aquaculture projects in order to assess their specific needs. The interactions within the app will then provide tailored solutions to address these needs. The main purpose of the app is to facilitate engagement on technical on-farm issues, allowing farmers to use their preferred language while receiving real-time extension support. In collaboration with KZN: DARD officials, the ARC aims to pilot the species app in KZN. This involves conducting site visits to identify farmer needs that can be incorporated into the development of the app. To provide technical support during the delegation visit, DFFE officials from the D: ATS and OPADU were invited by KZN: DARD.



**Fish grow-out tunnel at Sobusa Aquaponics (December 2022).**

Six projects were visited including proposed aquaculture farms, these include:

### **Sobusa Aquaponics Project**

The Sobusa Aquaponics Project, established in 2017, is located in Gubhethuka, Esikhaleni, within the UMhlathuze Local Municipality. Spanning 2.5 hectares of land, the project focuses on the cultivation of Mozambique tilapia (*Oreochromis mossambicus*) using a Recirculating Aquaculture System (RAS). Additionally, the project utilises a hydroponics tunnel for the production of crops such as tomatoes (*Solanum lycopersicum*) and lettuce (*Lactuca sativa*).

### **Kosi Bay Aquaculture Project**

The Kosi Bay Aquaculture Project is situated within the Umkhanyakude District Municipality, in close proximity to the Mozambique border. Spanning approximately 1.5 hectares of land, the project is managed by the Ingonyama Trust. The project consists of two sites: one site with stalls, a restaurant, freezing and processing containers, the other site contains grow-out tanks. The primary focus of the project is the cultivation of Mozambique tilapia (*Oreochromis mossambicus*) and vegetables, utilising RAS and concrete tanks.



**Kosi Bay Aquaculture Project site 1, restaurant and two storage units (December 2022).**



**Kosi Bay Aquaculture Project site 2, Aquaculture pond system (December 2022).**



**Kosi Bay Aquaculture Project site 2, Aquaculture pond system (December 2022).**



**The uMnini Dam (December 2022).**

## Spring Grove Dam

The Spring Grove Dam (a proposed aquaculture farm) is situated within the uMgungundlovu District Municipality, specifically in Nottingham Road. With a maximum capacity of 139 million m<sup>3</sup>, the dam primarily serves industrial and municipal water use and is managed by Msinzi Holdings. The KZN: DARD is currently putting forth a proposal for a 400 ton cage culture operation targeting rainbow trout (*Oncorhynchus mykiss*) to be farmed within the dam.

## Northdene Agroecology Research and Development Centre

The Northdene Agroecology Research and Development Centre is situated within the eThekweni municipality. The primary objective behind establishing this agro-ecology hub is to promote sustainable living and work towards achieving sustainable rural development. The project focuses on the production and supply of Mozambique tilapia (*Oreochromis mossambicus*) and African sharptooth catfish (*Clarias gariepinus*) fingerlings to small-scale farmers. The centre occupies a total land area of 7.64 hectares.



**Hatchery at Northdene Agroecology Research and Development Centre (December 2022).**

## uMnini Dam

The proposed aquaculture farm, uMnini Dam, is situated in uMgababa village within the eThekweni Metropolitan Municipality. This project primarily emphasises tourism-related activities and includes a resort accommodation and restaurant on-site, with the dam as the main tourist attraction. The owners intend to pilot cages for the cultivation of Mozambique tilapia (*Oreochromis mossambicus*). Notably, the dam maintains a consistent depth of approximately 11-14 meters.

## Makhathini Research Station

The Makhathini Research Station is situated on the Pongola flood plain, falling within the Umkhanyakude District Municipality. The site covers an approximate area of 1.5 to 2 hectares. The species cultivated at this location include Mozambique tilapia (*Oreochromis mossambicus*) and African sharptooth catfish (*Clarias gariepinus*). Since its establishment in the 1970s, the primary purpose of the station has been to support farmers in Northern KwaZulu-Natal through research, with a particular focus on livestock (goats and cattle) and crops (such as sugarcane, maize, and cotton). Based on the findings from research





**Seven circular concrete tanks, and one small indoor re-circulating system at the Makhathini Research Station (December 2022).**

conducted by Rhodes University in the early 1990s (Rouhani and Britz, 2011), it was recommended that the Makhathini Research Station be utilised for aquaculture.

Among the six projects mentioned, only three of them are currently operational. These include the Sobusa Aquaponics Project, Northdene Agroecology Research and Development Centre and the Makhathini Research Station. A few recommendations made for each site include:

## **Sobusa Aquaponics Project**

The current farming practices needs to be reviewed and improved. The DFFE to is responsible for conducting the review and making recommendations for system upgrades.

## **Kosi Bay Aquaculture Project**

Before initiating the project, it is necessary to conduct a thorough assessment of both sites by an engineer to ensure that the structures are suitable for the intended purpose.

## **Spring Grove Dam**

A fundamental step is to develop an implementation plan in collaboration with the relevant stakeholders.

## **Northdene Agroecology Research and Development Centre**

The DFFE and ARC are tasked with investigating opportunities for collaborative work with the Agro-Hub.

## **uMnini Dam**

The DFFE will provide assistance in developing a concept document that outlines the step-by-step process to be followed, starting from project initiation and leading up to implementation.

## **Makhathini Research Station**

The station holds the potential to be transformed into an incubation hub, specifically geared towards providing support for small-scale aquaculture. Consequently, additional investigation is necessary to evaluate the proposal thoroughly.

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## 2.4 Commercial Feasibility of Kelp Farming in South Africa

The Bivalve Shellfish Farmers Association of South Africa (BSASA) is responsible for the implementation of a multi-stakeholder Kelp Farming Project. This project is funded by UK AID under the United Kingdom government and is supported by various partners including the Department of Forestry, Fisheries and the Environment (DFFE). The aim is to trial kelp farming in South Africa and Saldanha Bay was chosen due to infrastructure availability, existing industry and the Aquaculture Development Zone (ADZ).

Phase one of the project, implemented from 2021 to 2022, focused on a pre-feasibility study and demonstrated positive potential for kelp farming in South Africa. The prefeasibility report on growing kelp in South Africa is available.

The phase two feasibility study will extend over a period of 30 months and will build on phase one achievements. This includes a series of stakeholder engagements and workshops over the duration of phase two.

BSASA plans to initiate experimental farms in the Saldanha Bay ADZ using space in the West Coast Oyster Growers (WCOG) lease areas in small and big bay respectively. While the cultivation of *Gracilaria gracilis* was authorised in the Environmental Authorisation (EA) issued in 2018, the three species which now form part of the focus of BSASA investigations (*Macrocystis pyrifera*, *Laminaria pallida* & *Ecklonia maxima*) were not. A change of scope to the EA is required.

According to Bolton, 2022 kelps are huge brown seaweeds, which are often defined as only belonging to the order Laminariales (*Phaeophyceae*). Seaweeds are large algae that dwell in the ocean and estuaries. Around 25% of the world's coastlines, enormous kelp forests are formed by the largest of the algae, which are included in this group (Krumhansl et al., 2016). However, kelps here are defined as the Laminariales (Bolton, 2010, Krumhansl et al., 2016), which make up most of the global seaweed use and

aquaculture (Cottier-Cook et al., 2021). Other large brown algae, generally not as large as kelps, are ecologically and economically significant in some parts of the world.

Kelps are restricted to cold and warm temperate seas all over the world, as well as the Arctic, and do not grow in warmer, tropical waters or the Antarctic. It is safe to assume that kelp cannot develop in areas with year-round seawater temperatures above 20°C. The small kelp *Ecklonia radiata* grows at 50 to 60 meters in clear water off Sodwana in extreme northeastern South Africa and southern Mozambique, according to Wernberg

et al., 2019, and formerly in Oman, according to Coleman et al., 2022. They do grow in a few locations in the geographical tropics where the seawater is cooler, for example, in regions with upwelling of cooler water (e.g., northern Namibia).

Large kelps (with plants extending to several meters in length) anchor sizable kelp forests to rocky coasts along temperate and arctic coastlines. However, there are larger kelp forests (*Laminaria ochroleuca*) in northwest Africa and enormous and substantial kelp forests (Benguela upwelling zone) on the west coasts of South Africa and Namibia (Rezzoum, 2017). Most of Africa's inshore shoreline is too warm for kelps. Where they exist, kelp forest habitats are significant on a commercial scale (Blamey

and Bolton, 2018) and are affected by climate change.

Kelps are referred to as "ecosystem engineers" since they are the dominant species that lay the groundwork for the entire ecosystem. Kelp offers food and habitat for a wide variety of marine life. Without at least one kelp species, there cannot be a kelp forest. Kelp forests are among the world's most productive ecosystems in terms of photosynthesis (carbon fixation) per unit area per year.





## Kelp in South Africa

South Africa's western coast is home to a large forest of kelp. This forest stretches from Koppie Alleen on the southernmost tip of South Africa all the way into southern Namibia. They offer a range of benefits to both people and the environment. There are four kelp (*Laminariales*) species in South Africa *Ecklonia maxima*, *Laminaria pallida*, *Macrocystis pyrifera* and *Ecklonia radiata*, which are found along around 1000 km of coastline in the chilly, nutrient-rich waters of the Benguela current. It is a large marine ecosystem that makes up most of the kelp forests in South Africa. Today, kelp availability and distribution are changing dramatically over the world because of changing climatic circumstances. However, there is some indication that South African kelp forests are growing, contrary to other locations, because of the southerly wind's increasing strength and duration generating an upwelling of cool, nutrient-rich water. Our coastline's dominant characteristic, kelp, offers both direct and indirect advantages to humans. Furthermore, we must make sure that this crucial resource is maintained responsibly and given the proper care at a time when shifting climate circumstances may have unanticipated effects on our oceans.

## Kelp production in aquaculture

Marine aquaculture, also known as mariculture, is the industrial farming of animals that are found in estuaries and the ocean. More than 35 million tonnes of seaweed, valued at US\$ 14.7 billion in 2019 (Cottier-Cook 2021), or more than 99% of all seaweed produced worldwide, are farmed in aquaculture. East Asia accounts for more than 99% of manufacturing, with China; Indonesia, Philippines, the Republic of Korea, and Japan accounting for more than 97%. The majority of seaweed aquaculture in the world is based on a small number of species.

## Benefits Of Kelp

Kelp has the capacity to significantly lessen ocean acidification as it grows rapidly without fertilizer and absorbs extra nitrogen and phosphorus as well as carbon dioxide, which can exacerbate climate change. Many products, including toothpaste, shampoo, salad dressing, pudding, pastries, dairy goods, frozen foods, and even medications, include kelp.

## Economic Aspect

Seaweed aquaculture is currently the sole profitable economic endeavour in southern Africa. According to a South African economic assessment of kelp ecosystems, their yearly economic value is estimated to be US \$434 million, considering the money made

from kelp-dependent fisheries, ecotourism, and indirect ecosystem services like coastal protection and carbon fixation. However, kelp forests have much more to offer than just money. One method to contextualise the worth of nature is to place monetary values on its numerous contributions, but doing so runs the risk of reducing value to measurable indications.

As a result, less tangible aspects like cultural and relational worth continue to be disregarded. Unfortunately, studies on the benefits of kelp have rarely strayed from the realm of economic valuation. With the collecting of beach-cast material, drying, and export for the extraction of alginate, as well as the use of recently obtained kelp for abalone feed and the development of a plant growth enhancer, economic exploitation of this resource began decades ago. The gathering and harvesting of kelps from natural kelp beds is the foundation of this enterprise. Seaweed concessions that have annual caps on the amount that can be gathered sustainably apply to these operations. The kelp business is currently estimated to be worth 10 000 tonnes annually, and major expansion will depend on the viability of kelp production on a commercial scale.

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## 2.5 National Aquaculture Research Forum: Inaugural Workshop Report

In South Africa, the aquaculture sector has been identified as a priority area for growth that can contribute towards job creation, economic development, import substitution, transformation, and provide opportunity for alternative livelihoods in rural communities. As aquaculture is a technology driven industry that relies on research, the Branch: Fisheries Management, within the Department of Forestry, Fisheries and the Environment (DFFE), developed the Aquaculture Research and Technology Development Programme (ARTDP) in consultation with various stakeholders in 2012. The aim of the ARTDP was to provide an over-arching strategic framework for aquaculture research and technology development in South Africa, with the purpose to guide other government departments, academia, funding agencies and private sector on aquaculture research focus areas. The National Aquaculture Research Forum (NAQUARF) is proposed to oversee implementation of the ARTDP, identify knowledge gaps, co-ordinate research priorities, evaluate and monitor outputs, mobilise resources and disseminate key information.

The previous NAQUARF was established under the Department of Agriculture, Forestry and Fisheries (DAFF) under the DAFF Research Apex Body. Following the move of the Fisheries Management Branch to the Department of Forestry, Fisheries and the Environment in 2019, the NAQUARF was re-constituted in 2022 with new representation and mandate.

In November 2022, the National Aquaculture Research Forum held an inaugural workshop with the purpose to discuss the objectives of the NAQUARF:

- Identify research priorities, strengthen research collaborations, and identify research gaps through presentations from key research institutions on their existing Research & Innovation (R&I) and from industry on their R&I needs; and
- Review and update the ARTDP.

The workshop covered five themes to drive implementation:

- Theme one: national strategies and industry research priorities
- Theme two: lessons learnt from other multi-stakeholder research platforms
- Theme three: establishment of a platform and alignment with NAQUARF
- Theme four: strategic research & innovation agenda development (SRIA)
- Theme five: identification of research gaps, priorities, and collaborations

### Summary and Key Actions

- Finalisation of inaugural workshop report by the DFFE and circulated to all members.
- Action: industry to consult with their members about the establishment of an industry-led platform and whether AASA is the right vehicle (formal feedback supplied to task group meeting).
- Meeting with smaller task group and exploration of additional stakeholders to include going forward.
- The Department of Science and Innovation (DSI) and the Technology and Innovation Agency (TIA) to explore potential seed funding mechanisms for an industry led platform.
- DSI to explore inclusion of aquaculture in biosecurity hubs.
- DSI and DFFE to unpack stronger alignment and collaboration around aquaculture research aspects through bilateral meeting.
- Further research mapping at different institutions to be facilitated through DFFE (medium-term).
- Aquaculture Research and Technology Programme (e.g., Strategic Research & Innovation Agenda) to be updated:
  - Short-, medium- and long-term goals to be established.
  - High level research focus areas to be updated.
  - ARTP to be circulated to members prior to next meeting.
- Draft ToR for NAQUARF to be circulated to the members for comment and finalised at the next meeting.



# Oyster Economic Report: Overview of the Subsector

## 1. Background

Oysters make up a notable proportion of aquaculture products worldwide. A variety of these species are cultured using various innovative methods. Presently, the Pacific oyster is the only oyster species that is commercially cultivated in South Africa, with a spat originally imported from Chile. Pacific oyster (*Crassostrea gigas*) is the most cultivated oyster in the world as it grows relatively quickly and can attain market size in six months under optimal conditions.

The FAO (2022), reports that over 5.4 million tons of oysters are farmed per annum across the world, adding that oysters are a universally recognised aquaculture species that efficiently yields a high-demand product in a competitive manner. The world leaders in Pacific oyster farming are China and Korea, that produce 5 139 000 and 303 000 tons per annum, respectively Japan (176 000 tons), the United States of America (153 000 tons) and France (84 000 tons) are also significant producers (SeaFish,2023)

Despite unprecedented growth rates globally, in the South African context, there has been little success in expanding the oyster aquaculture sector. This is particularly evident when comparing South Africa and global production estimates of oysters.

The oyster sub-sector in South Africa contributed 5.40% towards the overall aquaculture sector in 2019 and contributed 7.49% towards the marine aquaculture sector demonstrating a decrease of 83.53 tons (17.92) from 2018. In 2021, oyster sub-sector contributed 5.1% towards the overall aquaculture sector and contributed 6.32% towards the marine aquaculture sector, demonstrating a decrease of 72.13 tons (22.66%) from 2020. This decrease in production output is the result of a substantial number of farm closures caused by the COVID-19 outbreak, which prohibited production and significantly impacted output. As it stands, there are seven (7) operational oyster farms that contribute to the aquaculture sector in South Africa.

However, in spite the challenges, the oyster sub-sector demonstrates economic feasibility in South Africa, because of critical success factors such as reliability and availability of spat, as well as zero feed cost-linked production.

## 2. Oyster production over ten years

Pacific oyster has been effectively farmed at various facilities along the Northern Cape, Western Cape and the Eastern Cape coastlines, with production volumes fluctuating between 250 to 300 tons since year 2000. During the period under review (2012 – 2021), oyster production has been increasing steadily since 2012.

Figure 1 below represents South Africa's oyster production for the period 2012 – 2021. Oyster production increased from 2012 to 2013, from 242 tons reaching 277 tons in 2013. Production dropped slightly in 2014 to 266 tons. Thereafter, since 2015, oyster production in South Africa increased significantly reaching its highest in 2018 realizing a production of 466 tons. Between 2019 and 2020, oyster production decreased by 16.97 tons due to the COVID-19 outbreak and closure of some farms. However, production improved and increased to 390 tons at the end of 2021.

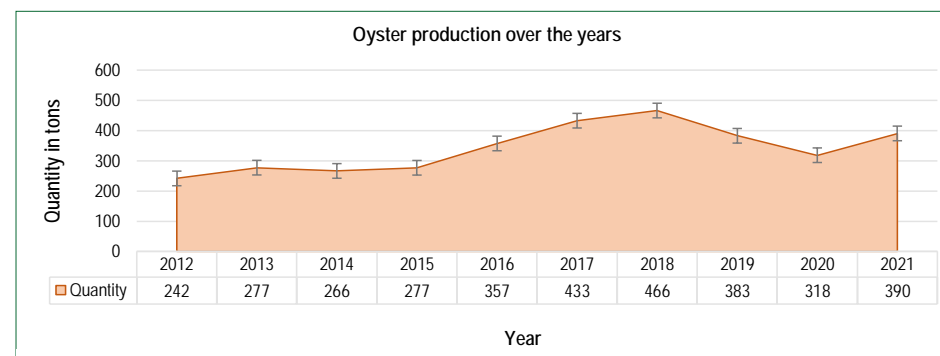


Figure 1: Oyster production over ten years (2012 – 2021).

## 3. Exports-Imports

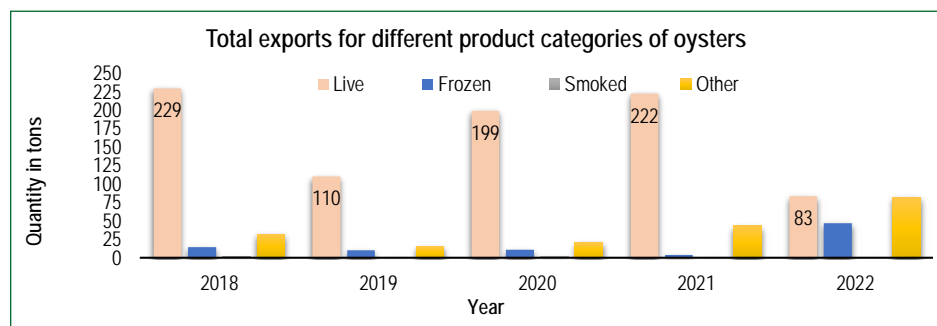
### 3.1. South African exports for oysters

The oyster sub-sector in South Africa has shown steady growth. South Africa exports by volume live, frozen, smoked and other category, is reported in Table 1 below. According to SARS data, oysters are categorised according to the different HS codes as depicted in Table 1 below. In South Africa, the vast majority of the exported product is live, fresh or chilled product category (3071100) of Pacific oysters.

**Table 1: Product categories for oysters and HS codes.**

Codes	Product description
3071100	Live, fresh or chilled
3071200	Frozen
3071910	Smoked
3071990	Other

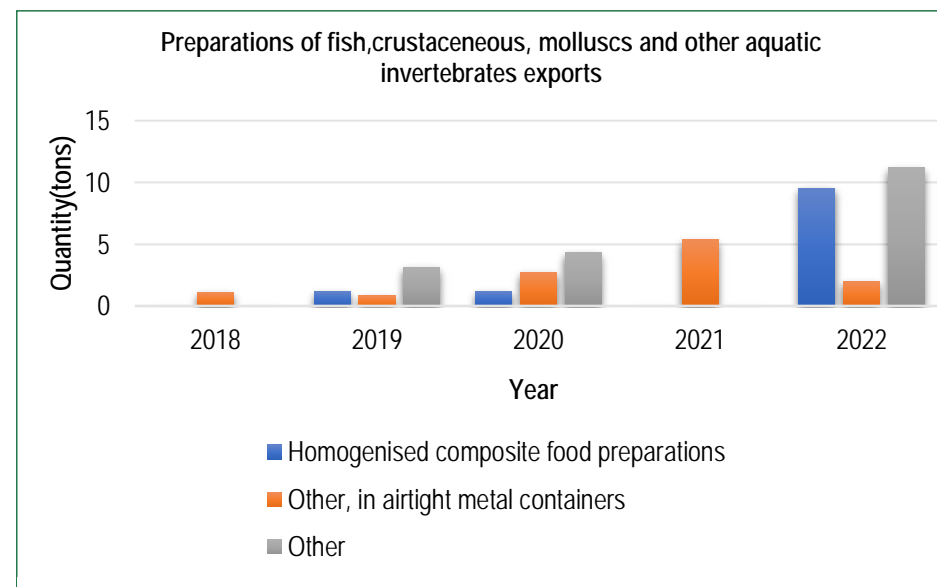
Figure 2 below shows that the live, fresh or chilled oysters have consistently been the most exported category of South African oysters. In 2018, South Africa exported 229 tons of Pacific oysters. This decreased in 2019 to 110 tons. However, the exports increased substantially between 2020 and 2021 from 199 to 222 tons respectively. Year 2022 recorded the lowest export volume for live Pacific oysters. Overall, “frozen, other and smoked” categories are the least exported categories for Pacific oysters.



**Figure 2: Oyster categories exported between 2018-2022.**

In terms of preparations of fish, of crustaceans, molluscs, or other aquatic invertebrates, South Africa only exported about 1.13 tons of ‘Other’ oysters in airtight containers.

However, from 2019 there was exports of other categories of prepared oysters, specifically in 2022 where South Africa exported about 9.54 tons of homogenised oysters and ‘Other’ oysters (see Figure 3 below).



**Figure 3: Preparations of fish, of crustaceans, molluscs, or other aquatic invertebrates’ exports.**

### 3.2. Top export destinations for live South African oysters in 2022

The leading destinations for live, fresh or chilled South African oyster exports are highlighted in Table 2 below. Hong Kong remains the biggest importer of live South African oysters, followed by Namibia and China (see tables 1 – 6 below).

In 2021, 40% of the total live, fresh or chilled oysters were exported to Hong Kong, followed by Taiwan (36%) and Namibia (9%). Majority of oysters are exported to the



Asian market while a small proportion is channeled to the African market. Tables 1 - 6 below shows the exported volumes of live South African oysters to the international markets.

**Table 2: Exports of oysters in 2018.**

Countries	Quantity (tons)	Value (R)
Hong Kong	98,67	R 11 881 686,00
Namibia	71,00	R 707 912,00
China	48,82	R 5 153 759,00
Taiwan	35,46	R 4 532 588,00
Mozambique	6,35	R 165 944,00
Zimbabwe	4,00	R 24 992,00
Botswana	3,71	R 86 044,00
Eswatini	2,76	R 36 049,00
Lesotho	2,48	R 7 575,00
Zambia	2,26	R 82 755,00
Mauritius	1,48	R 211 319,00
Democratic Republic of Congo	0,45	R 50 539,00
Kenya	0,45	R 14 126,00
Malawi	0,33	R 12 810,00
Ghana	0,25	R 25 735,00
Nigeria	0,04	R 2 531,00
Uganda	0,02	R 3 806,00
Total	278,53	R 23 000 170,00

South Africa mostly exported its oysters to Hong Kong in 2018 with 98.67 tons as can be seen in the Table 2 above. Other top five countries importing South African oysters were Namibia with 71 tons followed by China with 48.82 tons; Taiwan with 35.46 tons; and Mozambique with 6.35 tons.

**Table 3: Exports of oysters in 2019.**

Countries	Quantity (tons)	Value (R)
Hong Kong	60,97	R8 613 151,00
Taiwan	25,64	R3 152 615,00
China	22,07	R2 780 062,00
Namibia	13,28	R 696 753,00
Mauritius	7,17	R573 322,00
Botswana	2,35	R137 587,00
Mozambique	1,86	R83 779,00
Eswatini	1,14	R46 954,00
Zimbabwe	0,83	R5 077,00
Lesotho	0,72	R5 789,00
Zambia	0,55	R21 411,00
Malawi	0,25	R22 256,00
Unclassified	0,23	R8 099,00
Democratic Republic of Congo	0,12	R25 866,00
Ghana	0,07	R12 734,00
Kenya	0,03	R1 137,00
Seychelles	0,01	R674,00
Total	137,28	R16 187 266,00

From Table 3 above the top five South African markets of oysters in 2019 were Hong Kong with 60.97 tons which was the major exporter; followed by Taiwan with 25.64 tons; China with 22.07 tons; Namibia with 13.28 tons and Singapore with 7.17 tons.

**Table 4: Exports of oysters 2020.**

Countries	Quantity (tons)	Value (R)
Taiwan	112,02	R25 719 712,00
Hong Kong	70,29	R26 926 211,00
Namibia	18,50	R967 761,00
China	14,15	R2 043 802,00
Mauritius	9,18	R546 460,00
Botswana	2,94	R77 751,00
Lesotho	1,76	R48 515,00
Singapore	1,66	R551 030,00
Mozambique	1,52	R72 995,00
Democratic Republic of Congo	1,08	R25 305,00
Malaysia	0,37	R145 760,00
Eswatini	0,33	R43 378,00
Zambia	0,11	R3 060,00
Zimbabwe	0,08	R9 663,00
Ghana	0,07	R17 049,00
Unclassified	0,02	R727,00
United Arab Emirates	0,02	R451,00
Tanzania	0,01	R2 899,00
Seychelles	0,00	R408,00
Malawi	0,00	R497,00
Total	234,12	R57 203 434,00

In 2020 Taiwan imported most of South African oysters with 112 tons followed by Hong Kong with 70.29 tons; Namibia with 18.50 tons; China with 14.15 tons; and Mauritius with 9.18 (see Table 4 above).

**Table 5: Exports of oysters in 2021.**

Countries	Quantity (tons)	Value (R)
Hong Kong	97,20	R18 406 721,00
Taiwan	82,45	R24 298 237,00
Namibia	26,22	R2 453 953,00
United States of America	19,84	R368 426,00
China	15,67	R2 102 052,00
Democratic Republic of Congo	8,05	R907 820,00
Singapore	5,84	R1 063 775,00
Botswana	3,72	R25 788,00
Mozambique	3,30	R76 716,00
Lesotho	2,12	R130 521,00
Tanzania	0,88	R71 817,00
Zambia	0,82	R46 655,00
Malaysia	0,72	R194 820,00
Eswatini	0,52	R82 103,00
Saint Helena, Ascension and Tristan da Cunha	0,41	R9 828,00
Zimbabwe	0,24	R12 742,00
Thailand	0,22	R58 237,00
Ghana	0,15	R26 456,00
Kenya	0,13	R15 000,00
Seychelles	0,11	R3 980,00
United Arab Emirates	0,05	R349,00
Unclassified	0,01	R1 627,00
Malawi	0,00	R583,00
Total	268,65	R50 358 206,00

It is evident that the major market for South African oysters is Hong Kong as it can be seen as the top importer for South African oysters for several years such as 2021 with 97.20 tons and previous years. Hong Kong is followed by Taiwan with 82.45 tons and Namibia, United States of America and China with 26.22, 19.84 and 15.67 tons respectively (see Table 5 above).



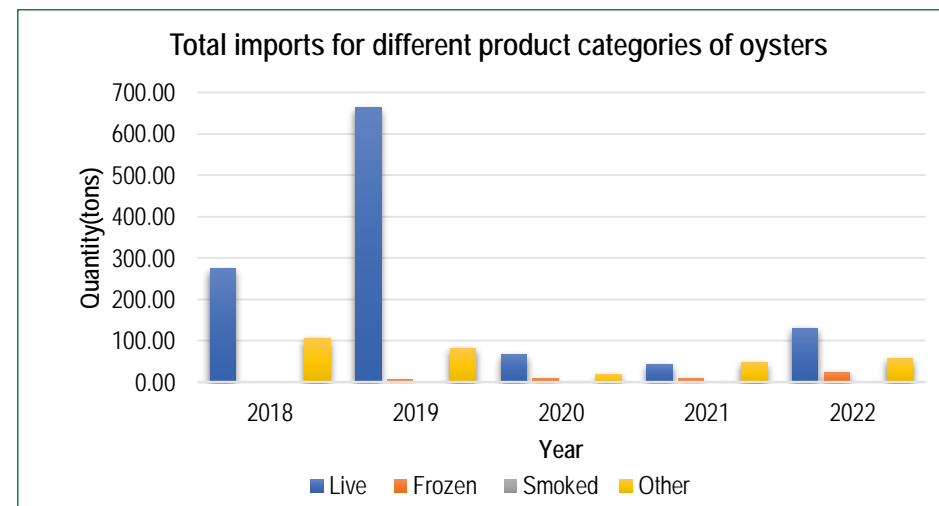
**Table 6: Exports of oysters 2022.**

Countries	Quantity (tons)	Value (R)
Namibia	49,20	R3 140 361,00
United States	37,24	R690 245,00
Spain	36,46	R7 109 966,00
Hong Kong	36,31	R5 439 312,00
China	16,43	R2 311 702,00
New Zealand	11,26	R191 666,00
Democratic Republic of Congo	7,81	R814 587,00
Mozambique	6,38	R138 394,00
Zambia	2,50	R72 036,00
Lesotho	2,48	R20 281,00
Eswatini	1,30	R127 269,00
Taiwan	1,13	R159 841,00
Tanzania	1,11	R168 519,00
Ghana	0,95	R184 586,00
Nigeria	0,34	R39 737,00
Zimbabwe	0,29	R23 088,00
Botswana	0,25	R21 234,00
Mauritius	0,15	R29 162,00
Seychelles	0,09	R4 623,00
Malaysia	0,04	R2 695,00
Egypt	0,01	R3 225,00
Total	211,71	R 20 692 529,00

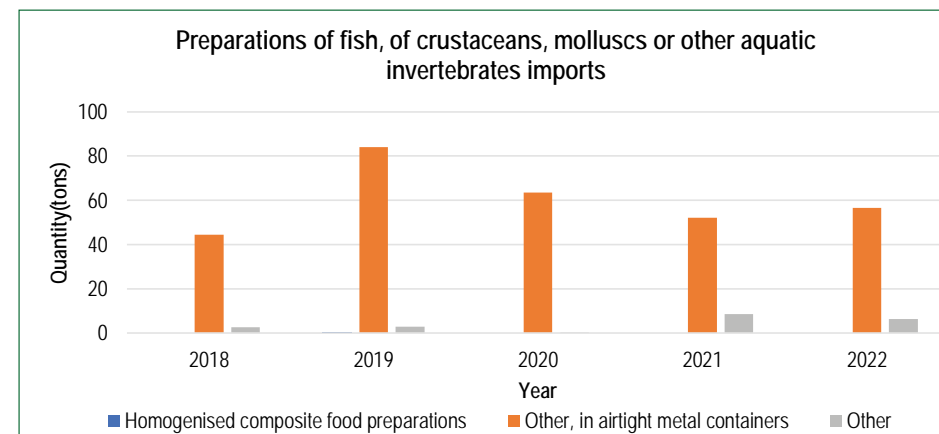
Namibia and Mozambique in the African countries have been South Africa's top importers of oysters as seen in 2022, Namibia imported 49.20 tons and Mozambique 6.38 tons. Other countries that were major importers of South Africa's oysters in 2022 were the United States of America with 37.24 tons followed by Spain and Hong Kong with 36.46 and 36.31 respectively (see Table 6 above).

### 3.3 South African oysters Imports

The imports of oysters have been fluctuating between 2018 and 2022. Imports of oysters decreased to 99.55 tons in 2020. 2019 recorded the highest volume of oyster imports. However, imports increased steadily between 2021 and 2022 (99.55 tons to 211.11 tons), Live oysters make up most of the South African imports, accounting for more than 70% of the oyster's imports (see Figure 4 below).



**Figure 4: Imports for different product categories of oysters.**



**Figure 5: Preparations of fish, of crustaceans, molluscs, or other aquatic invertebrates' imports.**

South Africa did not import homogenised composite food preparations in 2018 to 2020, 2021 and 2022 however, in 2019 South Africa imported less than a ton. Additionally, in 2019 there were a significant (84.02 tons) imports of 'Other' oysters in airtight metal containers.

**Table 7: Imports of oysters in 2018.**

Countries	Quantity (tons)	Value (R)
Namibia	186,88	R5 545 838,00
Unclassified	153,70	R2 954 964,00
China	3,24	R4 727 196,00
Chile	1,35	R1 045 495,00
Total	345,17	R14 273 493,00

South Africa imported 54% of oysters from Namibia in 2018 as can be seen in the Table 7 above. Followed by the Unclassified countries with 45% then other countries combined with 1% of oysters to South Africa.

**Table 8: Imports of oysters in 2019.**

Countries	Quantity (tons)	Value (R)
Namibia	742,18	R7 435 447,00
China	94,35	R9 177 653,00
Chile	1,79	R1 166 490,00
United Kingdom	0,12	R142 488,00
South Korea	0,02	R2 295,00
France	0,01	R926,00
Japan	0,00	R211,00
Total	838,47	R17 925 510,00

South Africa mostly imported 89% of its oysters from Namibia in 2019 as can be seen in the Table 8 above. Other countries combined exported 11% of oysters to South Africa.

**Table 9: Imports of oysters in 2020.**

Countries	Quantity (tons)	Value (R)
Namibia	85,41	R4 649 771,00
China	71,98	R7 551 901,00
Chile	0,45	R237 457,00
Taiwan	0,14	R1 494,00
France	0,05	R9 323,00
United Kingdom	0,03	R148 047,00
Total	158,06	R12 597 993,00

Again, as it can be seen in Tables 9, 10 and 11 South Africa has been importing 90-99% of its oysters from Namibia followed by China and other countries.

**Table 10: Imports of oysters in 2021**

Countries	Quantity(tons)	Value(R)
Namibia	88,68	R7 065 269,00
China	71,37	R5 721 605,00
United States	0,00	R261,00
South Korea	0,00	R44,00
Total	160,05	R12 787 179,00

**Table 11: Imports of oysters in 2022**

Countries	Quantity(tons)	Value(R)
Namibia	177,47	R12 254 823,00
China	96,40	R8 393 009,00
Mexico	0,00	R114,00
Total	273,87	R20 647 946,00



### 3.3. Total South African imports and exports for oysters (2018 – 2022)

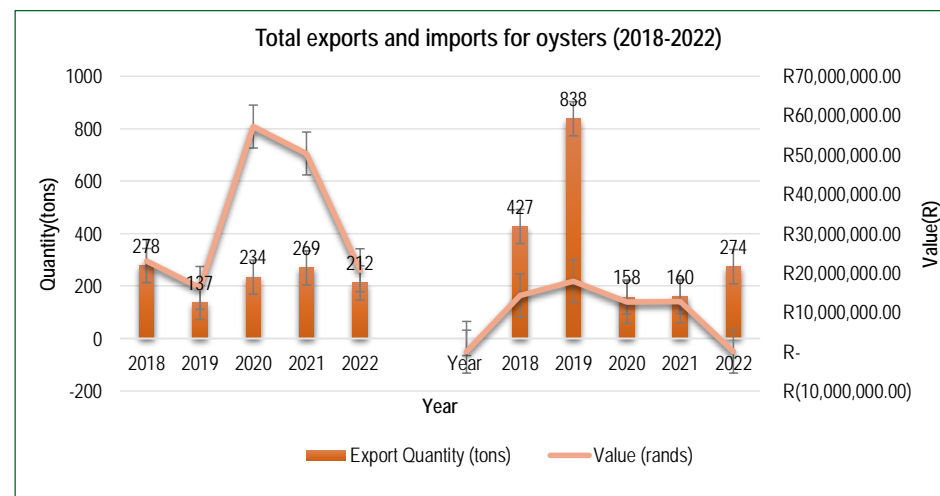
According to SARS statistics (2018 – 2022), overall South Africa has exported a total of approximately 278 tons of oysters valued at R23. million in 2018 (as depicted in Table 12). Exports decreased significantly from 278 to 137 tons in 2019 (R16.1 million). Exports increased in 2020 and 2021 to 234 tons and 269 tons respectively. In terms of imports, South Africa is a net importer of oysters, as imports exceed exports. 2019 recorded the highest volume of imports of 838 tons. South Africa imports decreased thereafter in 2020 to 158 tons. In 2022, South African imports for oysters were 274 tons which exceeded 2022 exports. This resulted in a negative trade balance for most of the periods under review (Figure 6).

**Table 12: Total export for oysters from 2018 – 2022**

Year	Export Quantity (tons)	Value (rands)
2018	278	R23 000 170
2019	137	R16 187 266
2020	234	R57 203 434
2021	269	R50 358 206
2022	212	R20 692 529

**Table 13: Total imports for oysters (2018 –2022)**

Year	Import Quantity (tons)	Value (rands)
2018	345	R14 273 493
2019	838	R17 925 510
2020	158	R12 597 993
2021	160	R12 787 179
2022	274	R20 647 946



**Figure 6: Total exports and imports for oysters.**

## Conclusion

The aquaculture sector has the potential to directly and indirectly contribute to the growth of the local, provincial and national economy through being competitive and sustainable at national, provincial, local and community level. Marine aquaculture is viewed as a commercially viable industry providing export opportunities. The oyster sub-sector in South Africa has shown considerable growth and the demand is increasing. The data indicates that South Africa imports more than it exports oysters. This clearly indicates that there is more opportunity for new farmers to enter the market and capitalise on this gap.

# Mussels Economic Report: Overview of the Subsector

At global level, mussel's production amounted to 2.2 million tons in 2020. China is the main producer contributing to 43% of the global mussel's production in 2020, followed by the European Union-27 and Chile, with 20% and 19% respectively (European Market Observatory for Fisheries and Aquaculture Products, 2022).

Mussel species farmed in South Africa are the native black mussel and Mediterranean mussel. Saldanha Bay in the Western Cape is the growth point of this sub-sector. Currently there are 21 operational mussel farms in South Africa. The mussel sub-sector is among the largest contributors to South African mariculture industry. Production systems include long lines and rafts to produce mussels that can be harvested within approximately seven months.

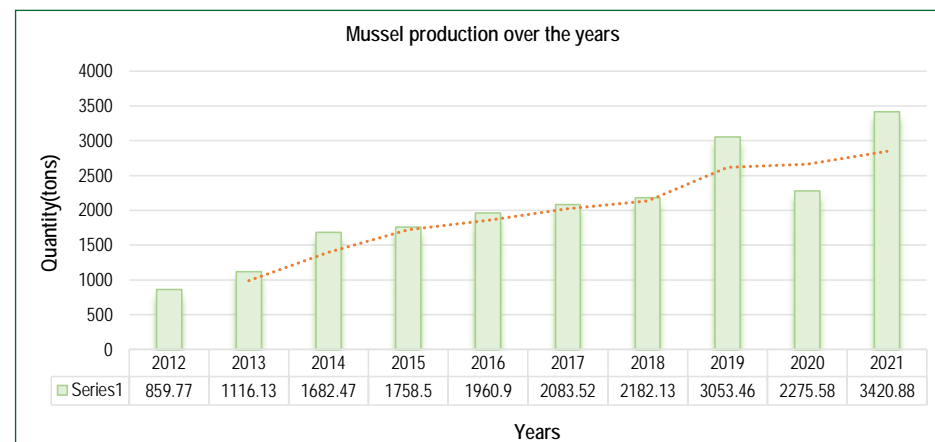
This report provides a comparison of the bivalve exported and imported in 2018, 2019, 2020, 2021 and 2022 to unpack the impact of the COVID-19 pandemic on the bivalve industry international trade. The structure of the report will cover bivalve production and exports and imports. Bivalve trade data were analysed from the Harmonised System (HS) code data that is provided by the South African Revenue Services (SARS) to classify different goods that are exported and imported from South Africa.

## 1. Mussel Production in South Africa since 2012

The production of mussels has shown a growth trend since 2012 (see Figure 1). Between 2012 to 2019 mussel production has been increasing consistently from 859.77 tons to 3053.46 tons by the end of 2019. Thereafter, production decreased to 2275.58 tons in 2020 due to the Covid-19 outbreak. The year 2021 recorded the highest production volumes for mussels in South Africa reaching an impressive 3420.88 tons.

## 2. Mussel Exports and Imports

The mussel sub-sector in South Africa has shown steady growth. South Africa exports by volume live, frozen, smoked and other category, is reported in Table 1 below. According to SARS data, mussels are categorised according to the different HS codes as depicted in Table 1 below.



**Figure 1: Total South African mussel production (2012 – 2021).**

**Table 1: HS codes for mussels**

Codes	Product description
307.31	Live, fresh or chilled
307.32	Frozen
307.39.10	Smoked
307.39.20	Frozen, not shelled (excluding smoked)
307.39.30	Frozen, in half shells (excluding smoked)
307.39.40	Frozen, shelled meat (excluding smoked)
307.39.90	Other
1605.53.10	Homogenised composite food preparations
1605.53.21	Smoked
1605.53.22	Other
1605.53.90	Other

2.1 Exports

Mussels are fast becoming South Africa’s biggest source of income from marine products and the industry is gaining a considerable export market. However, the majority of South African mussels are consumed in the domestic market. Figure 2 below shows the export volumes for South African mussels according to categories from 2018 – 2022.

South African exports volumes have been increasing substantially since 2018 until 2021 from 114.34 tons in 2018, reaching 318.73 tons in 2021. The exports increased from 318.73 tons to 386.66 tons for 2022. Moreover, South African exports for mussels exceeds imports and this has been notably consistent throughout the years as seen in Tables from 2018 – 2022 below. Frozen mussels accounted for more than 80% of the total export volume in 2021 and 2022.

South Africa mainly exports its mussels to other African countries such as Namibia, Mozambique, Mauritius, Zambia and Botswana etc. Namibia is the leading importer of South Africa smoked, shelled meat mussels, frozen and not shelled and other categories of mussels. The United States of America imports the largest volumes of South African frozen mussels, while half shelled mussels are mainly exported to Singapore. In terms of imports, South Africa mainly imports mussels (smoked) from China as indicated below.

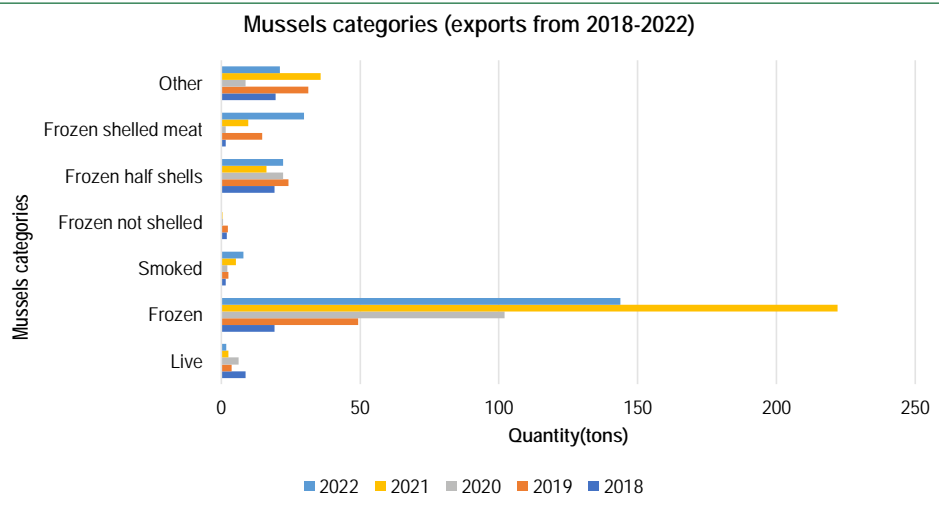


Figure 2: Mussels exports categories from 2018 – 2022.

In terms of preparations of fish, of crustaceans, molluscs, or other aquatic invertebrates South Africa did not export from 2019 to 2021. However, in 2022 South Africa exported 325.69 tons of smoked prepared mussels (see Figure 3).

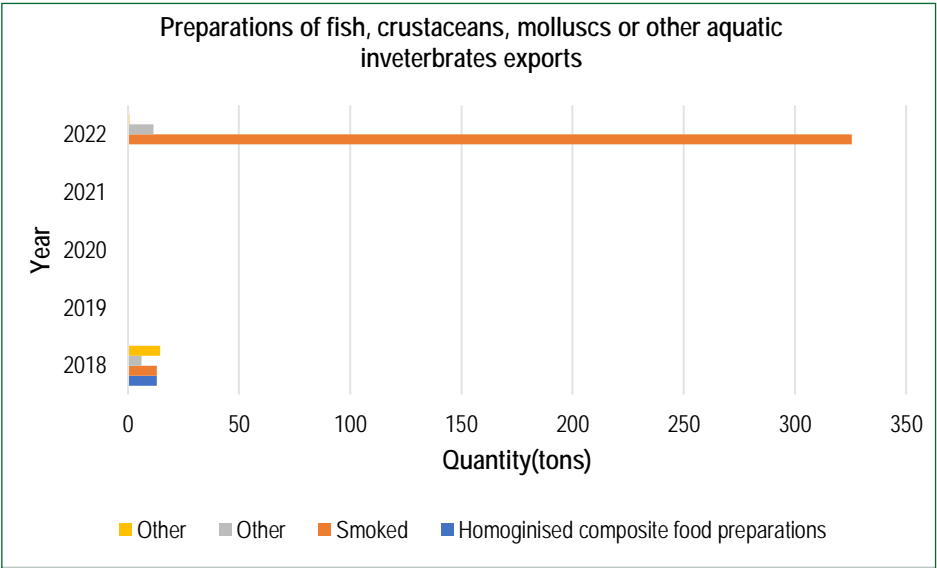


Figure 3: Preparations of fish, of crustaceans, molluscs, or other aquatic inveterbrates exports.





**Table 2: Exports of mussels in 2018.**

Countries	Quantity (tons)	Value (R)
Namibia	63,33	R2 080 783,00
Mozambique	14,99	R404 906,00
Mauritius	9,32	R560 087,00
Botswana	6,65	R164 014,00
Zambia	5,73	R248 392,00
Lesotho	3,49	R26 385,00
Angola	2,93	R158 889,00
Zimbabwe	2,87	R193 860,00
Eswatini	1,50	R86 610,00
Democratic Republic of Congo	0,93	R61 927,00
Malawi	0,92	R73 170,00
Ghana	0,56	R32 475,00
Unclassified	0,43	R4 272,00
Maldives	0,21	R15 110,00
Saint Helena, Ascension and Tristan da Cunha	0,16	R11 430,00
Nigeria	0,14	R13 036,00
Uganda	0,13	R8 212,00
Hong Kong	0,03	R175,00
Kenya	0,02	R3 035,00
Total	114,34	R4 146 768,00

South Africa mostly exported its mussels to Africa in 2018 as can be seen in the Table 2 above. The top five countries importing South African mussels were Namibia with 63.33 tons followed by Mozambique with 14.99 tons then Mauritius, Botswana and Zambia with 9.32, 6.65 and 5.73 tons respectively in 2018.

**Table 3: Exports of mussels in 2019.**

Countries	Quantity (tons)	Value (R)
Namibia	43,18	R2 160 753,00
United States	20,88	R1 431 553,00
United Arab Emirates	16,56	R1 419 097,00
Mauritius	14,72	R877 384,00
Singapore	8,15	R746 609,00
Mozambique	4,58	R 315 010,00
Zambia	3,74	R 226 685,00
Botswana	3,43	R114 855,00
Eswatini	2,60	R228 122,00
Lesotho	1,68	R10 645,00
Zimbabwe	1,61	R106 981,00
Nigeria	1,38	R84 992,00
Malawi	0,75	R51 401,00
Democratic Republic of Congo	0,72	R43 218,00
China	0,35	R267 394,00
Kenya	0,31	R16 776,00
Hong Kong	0,25	R154 715,00
Ghana	0,12	R6 150,00
Congo	0,07	R7 727,00
Uganda	0,05	R2 862,00
Rwanda	0,01	R210,00
Unclassified	0,00	R2 327,00
Central African Republic	0,00	R76,00
Total	125,13	R8 275 542,00

Illustrated in Table 3 above, the top five South Africa markets of mussels in 2019 were Namibia with 43.18 tons (which was the major exporter), with the introduction of other countries such as the United States of America with 20.88 tons, followed by the United Arab Emirates with 16.56 tons, Mauritius with 14.72 tons and Singapore with 8.15 tons.

**Table 4: Exports of mussels in 2020**

Countries	Quantity (tons)	Value(R)
United States	137,04	R8 336 211,00
Namibia	27,91	R1 157 613,00
Singapore	19,20	R1 201 992,00
Australia	14,56	R501 771,00
Mozambique	5,88	R355 489,00
Zambia	5,21	R246 593,00
Mauritius	4,09	R340 475,00
Botswana	3,66	R121 250,00
Malawi	3,26	R73 109,00
Zimbabwe	2,76	R183 230,00
Eswatini	2,02	R66 259,00
Hong Kong	1,84	R859 708,00
Lesotho	1,17	R33 385,00
Seychelles	0,81	R43 884,00
Taiwan	0,78	R227 494,00
Ghana	0,74	R44 719,00
Democratic Republic of Congo	0,62	R5 293,00
China	0,30	R147 414,00
Nigeria	0,15	R6 276,00
Ethiopia	0,10	R7 692,00
Tanzania	0,05	R5 620,00
Saint Helena, Ascension and Tristan da Cunha	0,05	R3 470,00
Sudan	0,00	R26,00
Total	232,20	R13 968 973,00

In 2020, United States imported the majority of South African mussels with 137.04 tons, followed by Namibia with 27.91 tons, Singapore with 19.20 tons, Australia with 14.56 tons and Mozambique with 5.88 (see Table 4 above).

**Table 5: Exports of mussels in 2021.**

Countries	Quantity (tons)	Value (R)
United States	224,47	R12 804 462,00
Namibia	29,25	R1 341 895,00
Eswatini	17,92	R67 012,00
Austria	7,68	R131 065,00
Mozambique	7,16	R410 337,00
Mauritius	6,93	R612 196,00
Singapore	5,85	R414 274,00
Zambia	4,82	R213 783,00
Nigeria	2,68	R163 389,00
Zimbabwe	2,61	R167 461,00
Botswana	2,60	R141 784,00
Tanzania	1,82	R109 500,00
Malawi	1,21	R87 097,00
Democratic Republic of Congo	0,96	R52 936,00
Lesotho	0,92	R14 826,00
Seychelles	0,67	R42 611,00
Kenya	0,61	R65 837,00
Ghana	0,44	R22 399,00
Netherlands	0,05	R9 200,00
Hong Kong	0,05	R15,00
Saint Helena, Ascension and Tristan da Cunha	0,02	R1 873,00
Total	318,73	R16 873 952,00

It is evident that the major market for South African mussels is the United States of America as it can be seen as the top importer for South African mussels for several years such as 2021 with 224.47 tons and the previous years. The US is followed by Namibia with 29.25 tons then Eswatini, Austria and Mozambique with 17.92, 7.68 and 7.16 respectively (see Table 5 above).

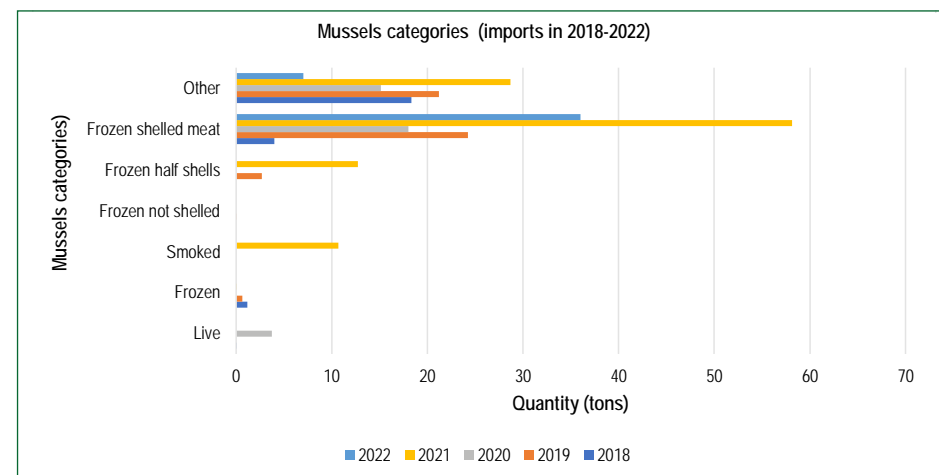
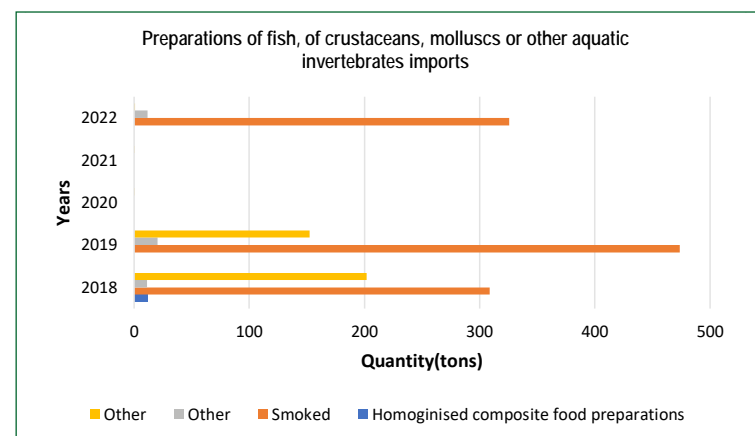
**Table 6: Exports of mussels in 2022.**

Countries	Quantity (tons)	Value (R)
United States	280,61	R13 627 504,00
Namibia	38,40	R1 743 221,00
Australia	15,79	R575 893,00
Singapore	9,30	R409 409,00
Zambia	8,33	R401 997,00
Mauritius	8,20	R964 588,00
Mozambique	8,08	R445 431,00
Democratic Republic of Congo	5,12	R560 000,00
Zimbabwe	3,73	R284 302,00
Botswana	2,28	R144 440,00
Tanzania	1,93	R119 187,00
Malawi	1,19	R93 957,00
Ghana	1,08	R104 411,00
Eswatini	0,66	R43 293,00
Ethiopia	0,60	R47 600,00
Angola	0,51	R36 803,00
Lesotho	0,29	R8 236,00
Nigeria	0,27	R33 519,00
Kenya	0,25	R28 076,00
Seychelles	0,03	R1 290,00
Unclassified	0,00	R540,00
Total	386,66	R19 673 697,00

In Table 6 above it can be seen that Namibia and Mozambique in the African countries have been South Africa's top importers of mussels. For instance, in 2022 Namibia imported 38.40 tons, Mauritius and Mozambique with 8.20 tons and 8.08 respectively. Other countries that were major importers of South Africa's mussels in 2022 were the United States of America with 280.61 followed by Australia and Singapore with 15.79 and 9.30 respectively.

## 2.2 Imports

The imports of mussels have been fluctuating between 2018 and 2022. Imports have increased steadily between 2018 and 2019 (557.20 tons to 694.93 tons), decreasing afterwards to 327.44 tons in 2020. 2019 recorded the highest volume of mussel imports. Frozen shelled meat makes up most of the South Africa imports, accounting for more than 80% of the mussel imports (see Figure 4).

**Figure 4: Mussels imports categories from 2018 – 2022.****Figure 5: Preparations of fish, of crustaceans, molluscs, or other aquatic invertebrates imports**



In terms of preparations of fish, of crustaceans, molluscs, or other aquatic invertebrates South Africa did not import in 2020 to 2021. However, in 2019 there was significant (473.64 tons) imports of smoked preparations of fish, of crustaceans, molluscs or other aquatic invertebrates. Also, in 2018 and 2022 the major imports were smoked preparations of fish, of crustaceans, molluscs or other aquatic invertebrates (308.70 tons and 325.69 respectively).

**Table 7: Imports of mussels in 2018.**

Countries	Quantity(tons)	Value(R)
China	531,22	R34 496 363,00
Denmark	11,57	R1 351 837,00
Cocos (Keeling) Islands	10,00	R292 712,00
Namibia	2,05	R35 164,00
New Zealand	1,05	R517 147,00
Angola	0,87	R36 612,00
Unclassified	0,32	R7 004,00
Italy	0,12	R2 658,00
Ireland	0,00	R74,00
Total	557,20	R36 739 571,00

South Africa mostly imported 95% of mussels from China in 2018 as can be seen in the Table 7 above. Other countries combined exported an insignificant 5% of their mussels to South Africa.

It can be seen in Tables 8, 9, 10 and 11 South Africa has been importing 90 – 99% of its mussels from China and an insignificant 1% from other countries combined.

**Table 8: Imports of mussels in 2019.**

Countries	Quantity (tons)	Value (R)
China	692,22	R55 134 886,00
Mozambique	2,00	R20 000,00
New Zealand	0,70	R320 753,00
France	0,00	R1 344,00
Total	694,93	R55 476 983,00

**Table 9: Imports of mussels in 2020.**

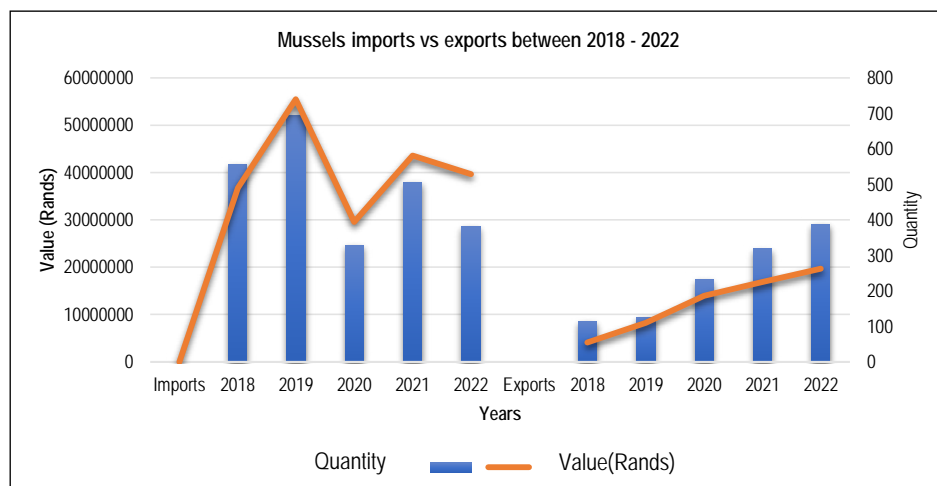
Countries	Quantity	Value (R)
China	324,24	R28 170 122,00
Denmark	0,00	R494,00
Namibia	0,01	R782,00
New Zealand	1,56	R1 219 983,00
Spain	1,62	R170 348,00
Total	327,44	R29 561 729,00

**Table 10: Imports of mussels in 2021.**

Countries	Quantity (tons)	Value (R)
China	487,68	R40 108 985,00
Denmark	14,78	R2 356 184,00
New Zealand	1,27	R951 813,00
Namibia	0,79	R49 635,00
Portugal	0,74	R66 877,00
South Korea	0,21	R13 143,00
Italy	0,01	R 1 769,00
Antarctica	0,01	R 7,00
Total	505,49	R43 548 413,00

**Table 11: Imports of mussels in 2022.**

Countries	Quantity (tons)	Value (R)
China	378,82	R38 649 856,00
Hong Kong	0,36	R4 456,00
New Zealand	1,58	R1 035 370,00
Spain	0,02	R5 219,00
Total	380,77	R39 694 901,00



**Figure 6: Comparison of imports vs exports between 2018 – 2022.**

**Table 12: Comparison of imports vs exports 2018 – 2022.**

Imports	Quantity (tons)	Value (R)
2018	557,2003	R36 739 571,00
2019	694,9296	R55 490 756,00
2020	327,4401	R29 561 729,00
2021	505,49	R43 548 413,00
2022	380,77	R39 694 901,00

Exports	Quantity (tons)	Value (R)
2018	114,34	R4 146 768,00
2019	125,13	R8 275 542,00
2020	232,2028	R13 968 973,00
2021	318,73	R16 873 952,00
2022	386,66	R19 673 697,00

In conclusion South Africa has been a major importer of mussels in comparison to exports (see figure 6 and Table 12). This could be mostly because mussels are saturated in South Africa hence less exports and more imports to meet the demand of mussels by the domestic market. Additionally, South Africa must diversify mussel markets so as to gain access to larger market potential and increase in the business's overall market share. Moreover, the above analyses show that mussel production has been increasing and in South Africa there is high demand for mussels, and therefore this serves as a positive indication for improved production prospects in the future.





# 3. Advertisement: A Call For New Projects

The Department of Forestry, Fisheries and the Environment hereby invites 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 (greenfield)

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/](http://www.operationphakisa.gov.za/operations/oel/aquaculture/).

All applications and enquiries can be forwarded to: [Aquaculturephakisa@dffe.gov.za](mailto:Aquaculturephakisa@dffe.gov.za) or call Ms Bongiwe Gxilishe on 021 402 332

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





# 4. Contact Details

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