# South African Kelp Farming Project
# (Phase 2 -Project number: 300708-201)

Funded through UK aid by the UK government.

## Project Quarterly Report

| | |
|---|---|
| √ | **Quarter 1 (Apr – Jun 2023)** |
| | Quarter 2 (Jul – Sept 2023) |
| | Quarter 3 (Oct – Dec 2023) |
| | Quarter 4 (Jan - March 2024) |

Compiled by: Dr Lizeth Botes

On behalf of:

Bivalve Shellfish Farmers Association of South Africa (BSASA)

# Declaration of the Project Manager

I hereby declare as Project Manager (on behalf of BSASA) and as per FCDO Accountable Grant Arrangement with BSASA that (please encircle):

1. All FCDO funding has, to the best of my knowledge, been used on the project's deliverables and assets as outlined in the Grant Arrangement

(YES)/NO (If no, please provide explanation)

2. All assets bought with FCDO funding to date are, to the best of my knowledge, being recorded and can confirm that I have verified the assets, that they are in good working condition and being used for the purposes of the project.

YES/(NO) (If no, please provide explanation)

Blue Ocean Mussels (BOM) site:
A physical check will be done in the 2nd quarter to verify that all assets have been moved from the Viking sites to BOM's site.

DFFE Sea Point Research Aquarium site: A physical check will be done in the 2nd quarter once the incubators have been repaired and returned after possibly being affected (directly or indirectly) by the building issues at the DFFE site.

3. All progress of project deliverables are satisfactory and still within the FCDO Grant Arrangement time frames & budget, and that I have timeously reported on delays due to unforeseen circumstances.

YES/NO (If no, please provide explanation)

Delays as explained within this report will affect progress somewhat but are being managed and carefully monitored by making the necessary changes (and still within the budget) where required.

5. To the best of my knowledge, am not aware of suspicions or complaints of any incidences of sexual exploitation, abuse and sexual harassment (SEAH).

(Confirm)/Unable to confirm (If unable to confirm, please provide explanation)

Dr Lizeth Botes _____ _____

(Project Manager)

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# Glossary

| | |
|---|---|
| ADZ | Aquaculture Development Zone |
| AMC | Aquaculture Management Committee |
| BOM | Blue Ocean Mussels |
| BSASA | Bivalve Shellfish Farmers Association of South Africa |
| DFFE | Department of Forestry, Fisheries and Environment |
| DSI | Department of Science and Innovation |
| EA | Environmental Authorisation |
| EMPr | Environmental Monitoring Programme |
| FCDO | Foreign, Commonwealth & Development Office |
| POC | Paternoster Oyster Company |
| PM | Project Manager |
| RAs | Research Assistants |
| RED | Research and Evidence Directorate within the FCDO |
| SA | South Africa |
| SABS | South African Bureau of Standards |
| TOR | Terms of Reference |
| UCT | University of Cape Town |
| UK | United Kingdom |
| VA | Viking Aquaculture |
| WCOG | West Coast Oyster Growers |

# 1. Introduction

The Government of the United Kingdom (UK) of Great Britain and Northern Ireland acting through the Research and Evidence Directorate (RED) at the Foreign, Commonwealth & Development Office (FCDO), deliver science and technology partnerships to maximise the UK's development impact internationally.

In 2021-2022 the FCDO commissioned the non-profit Bivalve Shellfish Farmers Association of South Africa (BSASA), in collaboration with the Department of Forestry, Fisheries and Environment (DFFE), to conduct a short three-month pre-feasibility study (Phase 1) to assess the potential for the commercial cultivation of African kelp along South Africa's West Coast. The final output report positively concluded/recommended that a Phase 2 Feasibility Study be conducted.

In 2022-2023, the FCDO commissioned BSASA to continue to Phase 2 of the project with the Accountable Grant Agreement signed at the end of July 2022, but only gaining momentum toward the end of 2022 when two Research Assistants (RAs) and a Project Manager (PM) were appointed in late Nov 2022 as part of the implementation team that is made up of multiple entities/organisations as described in section 1.2.b. The already established Saldanha Bay Aquaculture Development Zone (ADZ) was identified as the study area for grow-out trials to be conducted in/on already existing industry infrastructure & structures. Phase 2 is planned to be conducted over a 30-month period while looking into the following activities:

- Refining kelp hatchery/nursery technologies
- Testing and refining kelp grow-out technologies in Saldanha Bay
- Conducting food safety analyses that could inform future food safety standards and certification
- Monitoring environmental parameters and assessing environmental benefits/risks that could inform actions required as part of DFFE's Environmental Management Programme (EMPr)
- Conduct stakeholder engagements to disseminate information and obtain insights into Kelp Value Chain and employment opportunities
- Investigate the financial feasibility of kelp farming in South Africa (SA)

The main goal of the project in totality, is to make the information and research results available to a broader stakeholder base, existing industry and new potential entrants in order to build a sustainable Kelp Aquaculture Industry for SA.

## 1.1 Phase 2: Year 1 (2022-2023):

With the project only gaining momentum toward the end of 2022, the months toward the FCDO year end in March 2023 were utilised to establish the project. Progress over those months were captured in the 2022-2023 Project Year-end Report.

## 1.2 Phase 2: Year 2 (2023-2024) & Quarter 1:

Much of the 1st quarter (Q1) was spent on repositioning the project to accommodate a site change and accounting for assets, a change in the Project Implementation team, drafting and updating a Project Plan (Annexure A), considering the request from the RAs to use the data generated from their respective components toward MSc degrees and, implementing tasks that were planned for Q1 (as explained in the section1.2.c.

## 1.2. a) New site and site visit:

After Blue Ocean Mussels (BOM) had expressed interest in getting involved in the project, representatives of the Project team met with BOM to discuss their role in the project, options around the use of both rafts and long-lines, sharing of resources etc. The meeting was then followed up with a site visit to have a look at the site positioning, orientation of rafts, dimensions etc. This was followed by a broader team meeting after which planning commenced to move the project assets to the new project grow-out site (see picture below). In the weeks following Dr L Botes, Dr B Macey and the two RA's assisted BOM in drafting a research proposal that aligned to the broader Kelp study to accompany their research permit application, all of which was submitted by the end of May with BOM receiving their research permit by the of June. Their approval from the Saldanha Aquaculture Management Committee (AMC) to install long-lines is pending but more emphasis will be placed on this process in the 2nd quarter (Q2). In the meantime, out-planting on rafts can commence from July onward.

Some noteworthy advantages that come with this site is that it is situated close to the mouth of the bay which allows for greater access to nutrient rich water from the cold Benguela Upwelling System. It is a much deeper site (~12-14m deep) and it is positioned further away from other aquaculture activities thus, also providing a more secure site ito assets. It also provides access to both rafts and long-lines (though the site is still awaiting approval from the Saldanha AMC for the installation of their long-lines which may affect project progress if there is a delay in this regard).

North

West


East

South

**Figure 1: Farms in Small Bay, Saldanha Bay**

## 1.2. b) Implementation team update:

The project is being implemented with multiple organisations involved, each bringing different components and strengths to the project. Going forward, BOM's site will serve as the grow-out site for the project. Roles and responsibilities are briefly outlined below:

<u>The Project Sponsor/Funder representatives:</u>

Ms Leanne Jones (Team Leader, Southern Africa Research and Innovation Hub [SARIH], FCDO).

Ms Kristin Klose (FCDO Technical Advisor- Science, Technology and Innovation)

Mr Jaco Louw (FCDO Policy and Partnerships Manager)

The Implementation team:

**Industry:**

Mr V Pienaar (Chairperson of BSASA as lead implementation and host organisation, Imbaza Mussels)
Mr M Tarrant (BSASA Secretary & Boland Financial Services)

BSASA member representatives and project participants:
Mr S Visser (COO of Blue Ocean Mussels [BOM])
Mr T Maswanganye (Assistant Farm Manager at BOM)

BSASA appointed
Dr L Botes (Project Manager)
Ms F Hill (Research Assistant)
Ms N Xulu (Research Assistant)

**Government:**

Department of Forestry, Fisheries and Environment (DFFE) Representatives:
Ms A Bernatzeder (Director of Aquaculture Research – strategic support)
Dr B Macey (Specialist Scientist: Aquaculture Research – scientific input)
Mr John Foord (Food safety officer)
Dr Mark Rothman (Specialist Scientist: Fisheries Research – seaweed research)
Dr Grant Pitcher (Specialist Scientist: Aquaculture Research – environmental monitoring)
Andre du Randt (Scientific Technician: Aquaculture Research – environmental monitoring)
Ms Koena Seanego (Candidate Scientist for Environmental interactions)

**Academia:**

Representative:
Scientific Advisor: Emeritus Prof JJ Bolton (Associated with University of Cape Town [UCT])

**Stakeholder Engagement Consultant:**

Bio Solutiones Technicas (BST)
Representative: Ms B Brown-Webb

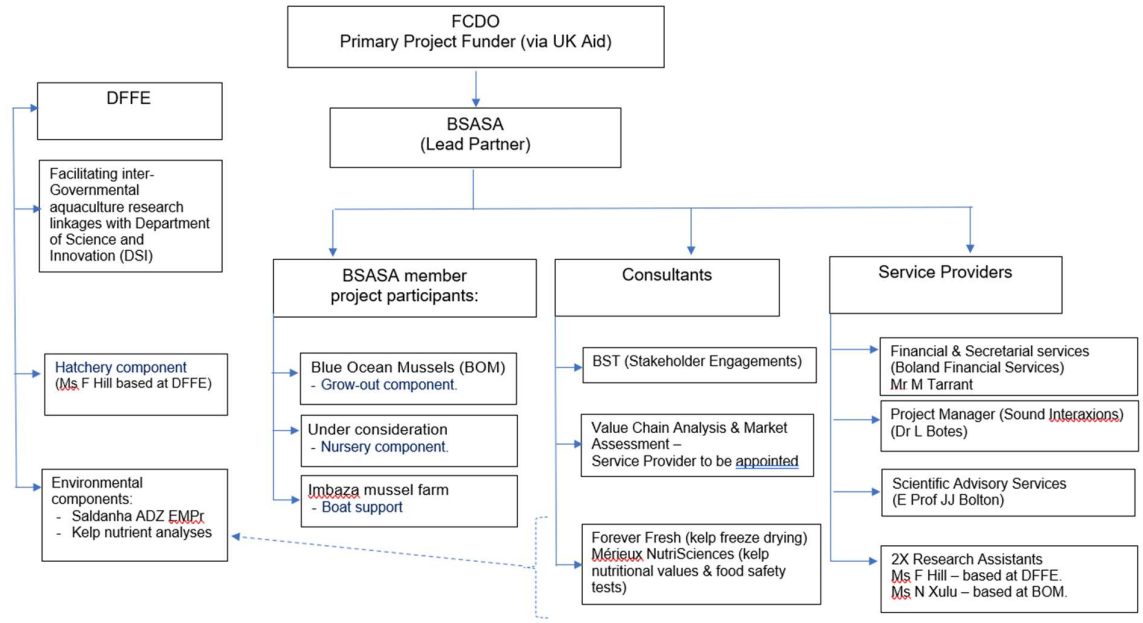


**Figure 2. Diagrammatic representation of Project team**

### 1.2. c) Research Assistants request to register for MSc's:

After a request from the Research Assistants (RAs) to use the data generated from their respective components with associated tasks toward a MSc, it was agreed that the RAs would register with UCT with Emeritus Prof JJ Bolton (primary UCT supervisor), Dr B Macey/Dr M Rothman (co-supervisors from the DFFE as UCT Research Associates) and Dr L Botes (co-supervisor as Project Manager and link between the project and MSc's). Careful consideration in the students Memorandum of Understanding (MOU) was given to ensure that all data and intellectual property (IP) generated are available and open to all interested parties and that recognition is given to the funding source as per FCDO Grant agreement.

# 2. Progress on project objectives & deliverables

The section below summarises the different project components providing an overview of progress to date, with more detailed description for further reading within the respective progress reports attached as Annexures. Meeting schedules were amended to accommodate 1x on-line Oversight meeting with the FCDO per month, 1x on-line Project Team meeting per month and 1x face-to-face Research meeting per month. Due to the fact that the project team members are all situated far apart, the face-to face research meetings are particularly helpful to improve collaboration/communication and discuss challenges within the project.

## 2.1 Hatchery technologies of targeted species:

- **Hatchery component based at the DFFE Sea Point Research Aquarium:**
  Ms Hill spent April/May collecting and sporulating the 3 kelp species in order to prepare for the up-coming winter months which would be ideal for out-planting. She worked tirelessly so that the project has enough spools for out-planting every 2 weeks. Toward the end of April/beginning of May, both project incubators were converted to having red-lights in order to house the *M. pyrifera* gametophytes in the one and the gametophytes of the *E. maxima* and *L. pallida* in the other incubator so that she can spend less time collecting kelp sori material during winter when it is cold, slippery and wet at the Kommetjie slipway as well as for safety reasons. She also had stocked up the front lab with *M. pyrifera* sporophytes and the back lab with *E. maxima* and *L. pallida* sporophytes.

  Unfortunately, during May/beginning June, Cape Town experienced heavy winter rain fall which resulted in new roof leaks and some electrical problems in various rooms at the Research Aquarium, including the Hatchery front and back lab where the kelp spools were kept. Ms Hill subsequently started noticing mould growing on the ceiling and walls of the Hatchery which could be the reason for the contamination on her spools. By June, the electrical issues in both her front and back lab resulted in her not being able to use the front lab and partially able to use the back lab. The incubator that has been stationed at Sea Point has, similar to the incubator that was previously stationed at Viking's Bufflejags abalone farm, started frosting up possibly due to the high moisture content in the air and was thus sent to United Scientific so an automatic defrosting cycle could be fitted. Collectively, the on-going challenges at the building have caused significant damage to the growing sporophytes which resulted in many spools being discontinued. At this point the front lab was not functioning, so the spools which Ms Hill managed to save (albeit with signs of weakness) were moved to the back lab where she could maintain the temperature at 13.5°C (which is above the temperature at which *Macrocystis* was kept, and below the temperature at which *Eucklonia* and *Laminaria* were kept). More details are available in Ms Hill's monthly reports hereto

attached at Annexure B. During late June/early July the electricals of the other incubator was also affected but this will be reported on in the Q2 progress report once more information is available.
The roof leak and associated electrical incidences were reported by the DFFE to Public Works and we await feedback from the Service Providers who visited the site.

- **Viking Aquaculture's Buffeljags Abalone Farm Hatchery Facility**
  Viking Aquaculture (VA) officially decided at the end of May to withdraw their participation (WCOG and Buffeljags Abalone farm) in the project as of end of June 2023 to continue with their own kelp hatchery and grow-out experiments with some initial results showing success of their hatchery seeded twine of *M. pyrifera* at 3m of depth. They will continue collaborating with DFFE on other research projects.

## 2.2 Grow-out trials & Monitoring of environmental parameters:

- **Viking Aquaculture's West Coast Oyster Growers (WCOG) facility (APRIL/MAY/JUNE):**
  After experiencing delays in the arrival of the Niskin sampling bottles from an overseas supplier, Ms Xulu received the Niskin bottles in Apr at which point Dr Botes assisted her by explaining how sampling at the three depths would be done. Once Ms Xulu received all the consumables necessary to do the preparations of the samples for analysis by UCT, Ms Xulu started collecting water samples which would be delivered to UCT for analysis on a monthly basis. During Q1 Ms Xulu presented the data that was collected by the HOBO loggers over May and June, but difficulty was experienced with the calibration of the sensors which was sorted out with the assistance of Dr Pitcher and his team from the DFFE by the end of June. The data however for Q1 is not usable and it is expected that the data from Q2 onward should be comparable with data from Small Bay collected by Dr Pitcher and his team with DFFE's monitoring equipment.
  Ms Xulu spent much of her time during June, ensuring that the moving of the project rope ladders, anchors and other assets to BOM will be completed by the end of June and so that the setting-up of rope ladders on the rafts at BOM will be in time for the planned Q2 outplants.
  Ms Xulu and Ms Hill have also set up an experiment to assess if attachment of wild juveniles to grow-out ropes could serve as an alternative method to out-planting hatchery sporophytes (more details available in her monthly reports hereto attached as Annexure C).

- **Blue Ocean Mussels' (BOM) facility (JULY ONWARDS)**
  By the end of June, BOM had successfully secured their Research Permit from the DFFE, however approval from the Saldanha AMC for long-line installations still needed to be obtained. Ms Xulu also successfully relocated the project assets with only 8 rope ladders remaining at WCOG (1 still in use by Ms Loubser, 3 with wild juvenile kelps on, and 4 which will be relocated in Q2. With the assistance and guidance of Mr V Pienaar and Dr L Botes, she has also arranged for modifications to be done on the 12 rope ladders that will be used during the planned Q2 July out-planting on the rafts.

## 2.3 DFFE Environmental Management Programme (EMPr) update:

At the end of the 2022-2023 financial year, the document produced by Ecosense was sent to the Saldanha Bay ADZs Aquaculture Management Committee (AMC) for inputs after which the go-ahead was given for the DFFE to proceed with a Part 1 amendment (minor) in order to include Kelp into the Environmental Authorisation. More information on this will be provided as information becomes available.

## 2.4 Food safety testing of kelp:

The aim of the investigation is to study the nutritional value and potential food safety risks of wild kelp vs farmed kelp. The data will eventually be used toward the drafting of food safety standards for the kelp industry and serve as a comprehensive overview of the potential for kelp use in human and animal nutrition.
Initial data from the three candidate species collected in the Kommetjie region (as part of Phase 1) showed that all three kelp species had a high mineral content, and the essential minerals were within the range recorded for other seaweed species, with the exception of Fe, Mn, and Zn, which were notably higher. Furthermore, all heavy metals fell within the range of values reported for other brown seaweed species, except for *M. pyrifera* that showed the highest Al, Pb, and Cd contents.

For Phase 2 of the project, specimens of wild kelp (*E. maxima* and *L pallida*) were collected from three sites in Saldanha Bay and freeze-dried by Forever Fresh (Somerset West, Western Cape) and subsequently sent to Mérieux NutriSciences laboratories in Cape Town for food safety analysis. Since *M. pyrifera* does not occur naturally in Saldanha Bay it was not included for testing.
The collected specimens were successfully processed, dried and analysed and data was received from the testing laboratories during the reporting period. A full report on the food safety analysis of the two kelps is attached to this report as Annexure D. Once farmed specimens of the three candidate species are available, the kelps will be tested and compared to those from the wild specimens.

During Q1, Dr Brett Macey also drafted a project proposal to South African Bureau of Standards (SABS) to request the development of standards for seaweed for food consumption purposes. The proposal was submitted on the 12$^{th}$ of June 2023.

## 2.5 Stakeholder Engagements & Information dissemination activities:

Initial plans to host a face-to-face mini-workshop in Q1 to explore ways of getting the community and civil society groupings in the West Coast region involved in some of the project components, has together with a workshop planned for Q2 (focussed on potential kelp farmers) been postponed due to a consortium of operators going into business rescue. We were advised by BSASA's Chairperson and Mr F Endemann (member of the Saldanha AMC and Provincial government extension officer) to postpone the workshops until the matter has been resolved and more clarity is available on how our stakeholder lists and list of invitees will be affected.

## 2.6 Value Chain Analysis & Market Assessment:

The Project Manager drafted a Terms of Reference (TOR) for a Kelp Value Chain Analysis and Market Assessment study comparable to that done in countries elsewhere. The TOR was reviewed by Ms Bernatzeder and some of her DFFE investment and economics colleagues and subsequently sent out at the end of June to potential service providers. The study is meant to build on the initial data from the Market Overview Section within the Pre-feasibility study and will be:
~ Reviewing the initial data within the pre-feasibility study and other similar studies.
~ Identifying local and international value chain actors, gaps within the value chain and the reason for those gaps in order to assist in the development/expansion of the current SA Kelp value chain.
~ Developing a visual mapping of the current value chain to better understand the different roles, actors, and value addition activities. The mapping will take into account the entire spectrum of actors, including primary activities (such as, but not limited to, provision of raw product; inbound logistics; operations; outbound

logistics; pre-processing; processing; marketing &sales) and secondary activities (such as but not limited to, services, procurement; technology development; infrastructure; human resources) supporting and coordination activities; and institutional actors.

~ Estimate the current socio-economic aspects of the kelp value chain and identify the high potential employment drivers across the kelp value chain.

~ Identifying possible local and international markets; and market trends of kelp and kelp value added products. Furthermore, identifying most suitable market for South African cultured/ wild harvested kelp and the associated product development that needs to be done.

~ Identifying the most suitable products (to best meet demand locally and internationally) which should/could be manufactured/beneficiated locally as a value-added product (as opposed to exporting raw product and buying back value added products) e.g. alginate. This should include estimated kelp quantities needed and potential market price range.

~ Identifying barriers of entry and red tape to access the markets identified above. Identifying solutions for overcoming the gaps, barriers, red tape and other obstacles in order to sell to potential markets both locally and internationally.

~ Identifying any bottlenecks or constraints that may affect the value chain's overall efficiency. (e.g. Pre-processing/ storage)

~ Assessing the need for an Export Council (or collaborative marketing effort) to create a South African brand and awareness of South African products in local and especially export markets.

~ Identifying the requirements to develop "low hanging" value-added products (i.e. research, funding, partnerships etc.).

~ Identifying how coastal communities and future farmers can be integrated into the value chain to ensure entrepreneurial opportunities, job creation and participation.

~ Outlining a roadmap for the expansion and strengthening of a Kelp Industry value chain which would lead to the development of an environmentally and financially sustainable kelp farming industry in South Africa.

~ Make concrete recommendations of how such a roadmap could be implemented in order to un-lock opportunities for potential interested parties wanting to enter the SA Kelp farming industry and associated value chain.

# 3. Challenges & Recommendations

## 3.1. Challenges experienced in each project component with accompanying recommendations

### 3.1.1 Hatchery technologies of targeted species:

- **Hatchery facility at DFFE Sea Point facility**

  Noting the challenges in the DFFE based kelp hatchery and since the Industry based hatchery at VA is not available to the project anymore, several discussions were held to explore backup and additional facilities to strengthen the hatchery/nursery component of the project. Discussions were also held around setting up bigger tanks to serve as a nursery with the possibility of flow-through and wave-makers in order to grow the sporophytes slightly bigger before being out-planted. By the end of June, it became apparent that Ms Imke Meyer that previously worked as the Phase 1 Hatchery Research Assistant and subsequently appointed at a Hatchery Facility in Paternoster (namely Paternoster Oyster Company [POC]), was

interested in getting involved with the project again. It subsequently also came to light that the Paternoster Hatchery Facility also applied for a kelp research permit which they received by the end of June and thus, well positioned to assist with the hatchery/nursery components within the project.

**Recommendation:**
Potential inclusion and collaboration with the Paternoster based hatchery facility will be discussed in the Q2 progress report.

### 3.1.2 Grow-out trials & Monitoring of environmental parameters:

- **Grow-out facility transition from Viking's WCOG to BOM's site**

Small challenges to convert the rope ladders for attachment to rafts were experienced but Ms Xulu's swift action in arranging the necessary assistance to make the recommended changes below allowed for the changes to be made without any delay to progress.
Challenges were experienced with misunderstandings around the identification of rafts and spacing of rope ladders on the rafts. The uncertainty about how the out-planting techniques may be affected together with the uncertainty of the availability of spools from the Hatchery will be discussed at the Q2 research meeting.

**Recommendation:**
Rope ladders needed to be extended and spliced so as to accommodate the distance of the raft above water where the ladders would be tied onto (as opposed to long-lines that are at sea-surface level). Teething problems at the new site regarding raft identification and spacing out of the rope ladders can be resolved by working more closely together and making an effort to invite the BOM assistant farm manager along on the planned Q2 outplants.

~Monitoring of Environmental parameters
Dr Pitcher indicated that the data collected at the WCOG site will not be usable due to the fact that there seemed to be an issue with how the equipment calibration was done. There were also some misunderstandings around the nutrient samples, specifically wrt which parameters will be analysed, how it will be analysed and costs involved.

**Recommendation:**
It was recommended that Ms Xulu spend some time with Dr Pitcher to attend to the calibration issues. Given the UCT price increases, Dr Botes needed to check that the parameters identified can be covered with the available budget and it was recommended that Ms Xulu contact UCT to obtain clarity on how the water samples will be analysed.

### 3.1.3 Food safety testing of kelp:

N/A

### 3.1.4 Stakeholder Engagements & Information dissemination activities:

Workshops that were postponed due to businesses going into business rescue, to commence once more clarity is available on how our stakeholder lists and list of invitees will be affected.

**Recommendation:**

It is recommended that the PM follow up with Mr V Pienaar and Mr F Endemann as to the status of the situation.

## 3.2. General recommendations:

The following matters need to be addressed with urgency to avoid further delay to the project's progress:

- The matter regarding the BOM's long-lines approval by the AMC
- The building issues at the DFFE Research Aquarium
- The return of the 2nd growth chamber/incubator
- Increasing capacity and inclusion of Hatchery and Nursery components closer to Saldanha Bay

# 4. Closing remarks & Thinking ahead

## 4.1 Closing remarks

Although the team was faced with several challenges during Q1, it has had no impact on the team's enthusiasm and determination. I am confident that the meetings and discussions that are scheduled to take place during Q2 will sufficiently address the challenges.

## 4.2 Thinking ahead ….

### 4.2.1. Anticipated work for the 2023-2024 per quarter

| 2023-2024 | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Quarter 1 | | | Quarter 2 | | | Quarter 3 | | | Quarter 4 | | |
| Project deliverable | April | May | June | July | August | September | October | November | December | January | February | March |
| Hatchery trials | | | | | | | | | | | | |
| Nursery component ?? | | | | | | | | | | | | |
| Grow-out trials | | | | | | | | | | | | |
| Environmental monitoring | | | | | | | | | | | | |
| Food Safety Testing | | | | | | | | | | | | |
| 1. Analysing results obtained in March 2023 | | | | | | | | | | | | |
| 2. Testing farmed kelp | | | | | | | | | | | ?? | |
| Stakeholder Engagements: community mini-workshop | | | | | | | | | | | | |
| 1. Drafting of TOR | | | | | | | | | | | | |
| 2. Mini-workshop/meeting with community members to unpack possible involvement | | | | | | | | | | | | |
| 3. Value-chain workshop focussed on kelp farming component | | | | | | | | | | | | |
| Value Chain Analysis & market research | | | | | | | | | | | | |
| 1. Drafting of TOR | | | | | | | | | | | | |
| 2. Advertising | | | | | | | | | | | | |
| 3. Study commence | | | | | | | | | | | | |
| PM physical check of assets at all sites | | | | | | | | | | | | |
| PM output report & budgeting | | | | | | | | | | | | |

### 4.2.2. Considerations for 2024-2025 and beyond

Over and above the on-going research on the hatchery and grow-out components that will be required in order to optimise cultivating techniques and determine which of the 3 species will be most suitable for cultivation in Saldanha Bay, the following will also need attention ….

- Awareness Creation & Education programme aimed at the public (to minimise future resistance toward the development of a seaweed farming industry)

- Plan for research use and dissemination
  Portal of sorts where interested parties and possible new-entrants can access relevant information such as available kelp farming manuals and research outcomes (from our projects and elsewhere in the world), funding avenue, links to government departments providing assistance to start-ups etc. Since BSASA does not have a website, we may want to explore options to either set something up or making use of a platform already in place.

- Roadmap for setting up a kelp farm
  Financial costing for start-up initiatives including what's needed ito equipment, boats etc.
  Red-tape Road map (steps & time) for new entrants ito licencing, permits etc.
  Resources available ito access to funding and mentorship

- Volunteer & training programme for new-entrants
  PM can could possibly start giving some thought as to exploring how endeavours such as these can be implemented.

# 5. Acknowledgements

The PM would like to thank (on behalf of the BSASA and the implementation team) the FCDO for the continued funding support despite the recent project challenges.

The PM would also like to thank the implementation team for inputs that contributed to compiling this report.

# 6. Appendixes

(Note: please contact the project manager for access to the annexures)

## 6.1. Annexure A: Project Plant & Research Protocol

Kelp Project Plan &
Research protocols .p

## 6.2. Annexure B: Ms Hill monthly reports

Hatchery Assistant
Monthly Report April

Hatchery Assistant
Monthly Report - May

Hatchery Assistant
Monthly Report - June

## 6.3. Annexure C: Ms Xulu monthly reports

N. Xulu April 2023
Monthly Report.pdf

N. Xulu May 2023
Monthly Report.pdf

N. Xulu June 2023
Monthly Report.pdf

## 6.4. Annexure D: Dr Macey Food safety testing progress report

BM Ph2 Kelp Project_
Food Safety Reports_