



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:

Physical check undertaken to verify that all assets have been moved from WCOG to BOM's site.

DFFE Sea Point Aquarium hatchery site:

Physical check undertaken to verify that all assets are present and that both incubators are in working condition.

Paternoster Oyster Company (POC) site:

Physical check undertaken to verify that all newly purchased items were used to set-up the industry-based hatchery.

3. Progress of all project deliverables is satisfactory and 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)

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)



Project Manager

16/10/2023

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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
CTD data	Conductivity, Temperature and Depth data
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
GeO ₂	Germanium dioxide
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
SOP	Standard Operating Procedures
TOR	Terms of Reference
UCT	University of Cape Town
UK	United Kingdom

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 concluded/recommended that a Phase 2 Feasibility Study be conducted.

In 2022-2023, the FCDO commissioned BSASA to proceed to Phase 2 of the project with the Accountable Grant Agreement signed at the end of July 2022. Phase 2 only gained 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. The composition of the implementation team described in section 1.3.c. The 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 and will focus on the following activities:

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

The overall goal of the project in totality, is to disseminate information and research results available to a broad stakeholder base, including the existing kelp industry and new potential entrants in order to build a sustainable Kelp Aquaculture Industry in SA.

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

While the project only gained momentum around November 2022 it was successfully established by the FCDO's financial year end in March 2023. Progress during those months were captured in the 2022- 2023 Project Year-end Report.

1.2 Phase 2: Year 2 (2023-2024) Quarter 1 (Apr-Jun 2023):

Much of the 1st quarter (Q1) was spent on repositioning the project to accommodate a grow-out site change and accounting for assets, a change in the Project Implementation team, drafting and updating a Project Plan, 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 (progress of which were captured in the Phase 2: Yr2-Q1 report)

1.3 Phase 2: Year 2 (2023-2024) Quarter 2 (Jul-Sep 2023):

Similar to quarter one (Q1), quarter two (Q2) focused on strengthening the project by furthering progress at the new grow-out site, setting up an industry-based hatchery, updating the Project Implementation team, restoring the DFFE hatchery at Sea point and implementing the tasks that were planned for Q2 (as explained in section 2 of this report).

1.3. a) Progress at the new Grow-out site:

All project assets were moved successfully to Blue Ocean Mussels (BOM) and after receiving their research permit by the end of June 2023, the PM assisted BOM's Assistant Farm Manager in preparing the necessary documentation to obtain approval for the installation of two experimental kelp long-lines from the Saldanha Aquaculture Management Committee (AMC). The deployment locations were approved by the AMC on 8 Aug 2023 and two experimental kelp long-lines were installed in close proximity to the two corresponding experimental mussel rafts toward the end of Aug 2023 (see Figures 1 and 2).



Figure 1: Farms in Small Bay, Saldanha Bay

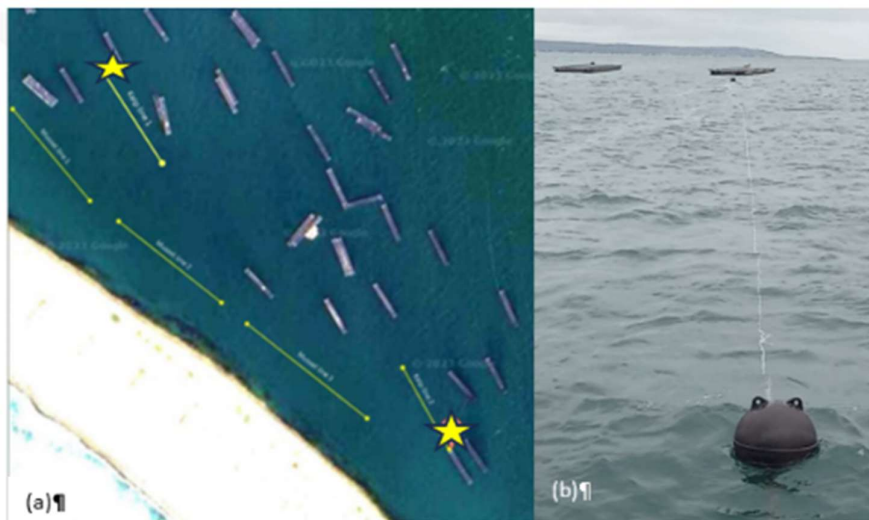


Figure 2: (a) AMC positions approved ★ (b) Experimental Kelp long-line installed in close proximity to the experimental mussel raft (photo credit T Maswanganye).

1.3. b) New industry-based hatchery site:

The PM met with the management (Mr M Smith, Mr J Louw and Ms I Meyer) of the hatchery facility at Paternoster Oyster Company (POC) on 13 Jul 2023 to discuss their possible role as an industry-based kelp hatchery/nursery facility as part of the SA Kelp Farming Project. These discussions were followed up with a broader project team meeting upon which the role of the facility was discussed. Subsequently, POC prepared the room that was identified (see Figures 3a) and the project paid for the tanks, chillers and light fittings (see Figure 3b) that were installed in order for the 1st batch of spools to be set-up by the end of Aug 2023. Further progress will be discussed in Section 2 of this report.

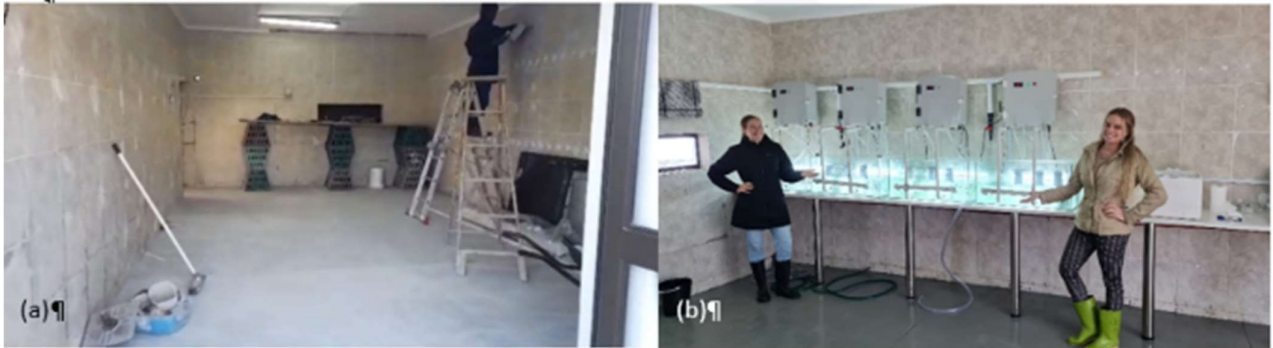


Figure 3 (a) POC hatchery preparation (photo credit I Meyer) (b) POC hatchery after set-up with the 1st batch of kelp spools (Photo credits: I Meyer and LBotes)

1.3. c) Implementation team update:

The project is being implemented in collaboration with several organisations, each bringing different components and strengths to the project. Going forward, BOM's site will serve as the grow-out site for the project and POC's facility will serve as the industry-based hatchery. Roles and responsibilities are briefly outlined below:

The Project Sponsor/Funder representatives:

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 Global Science Lead: Programmes and Finance)

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)

Mr M Smith (Manager at Paternoster Oyster Company [POC])

Ms I Meyer (Hatchery Manager at POC)

BSASA appointed

Dr L Botes (Project Manager)

Ms F Hill (Research Assistant)

Ms N Xulu (Research Assistant)

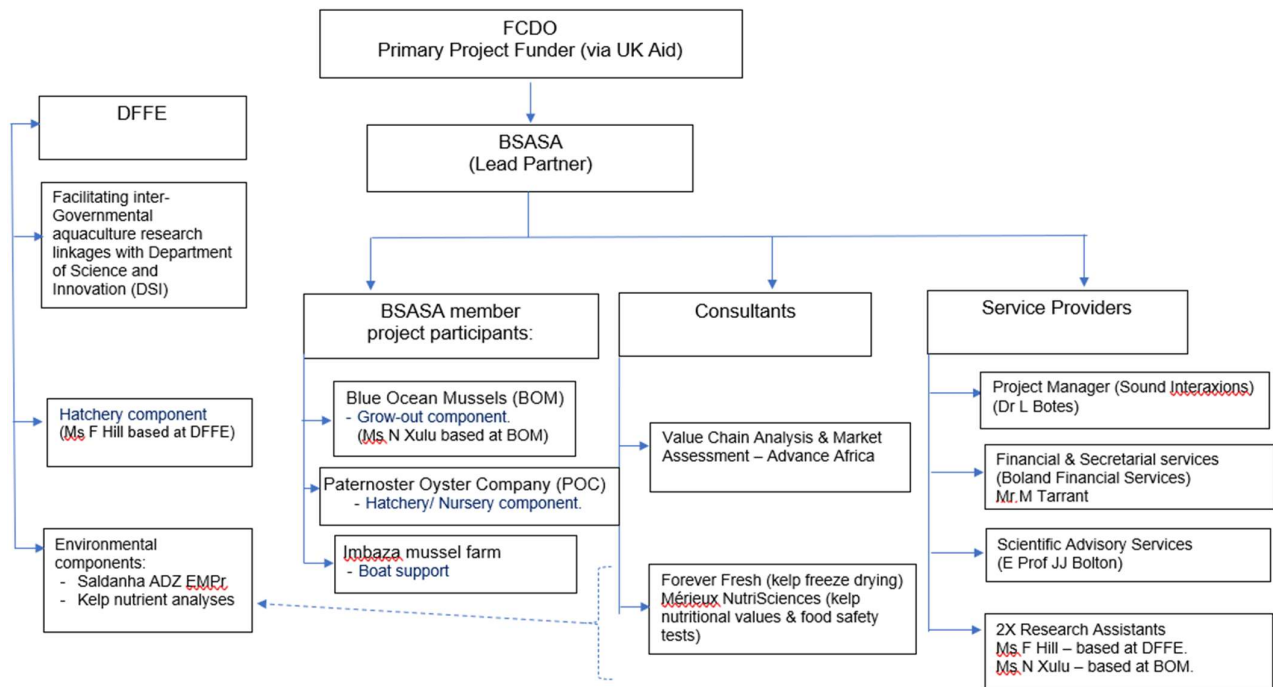
Government:

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])

Figure 4. Diagrammatic representation of project team



2. Progress on project objectives & deliverables

The sections below summarise the different project components and provide an overview of progress to date. The actual progress reports, attached as Annexures, provide the detail. 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 to discuss challenges within the project.

2.1 Hatchery technologies of targeted species:

➤ **DFFE Sea Point Research Aquarium hatchery facility:**

A few weeks into Q2, both incubators as well as the two temperature controlled laboratories at the DFFE

Sea Point aquarium malfunctioned due to storm related roof leaks and associated electrical problems. Attempts were made to rescue some of the *M. pyrifera* and *L. pallida* spools (unfortunately no *E. maxima* spools survived the ordeal). One batch was out-planted on 12 July 2023 and another on 1 Aug 2023 (all on the experimental mussel rafts).

Since we did not have high expectations that the sporophytes would survive, we were pleasantly surprised to note by mid-Aug 2023 that, not only did we have success with the outplant that took place on 11 May 2023 prior to the hatchery failure, but we also had success with the two outplants that took place after the hatchery failure. This was a very welcome win that elevated the project into a very positive gear (more info on the growth of the kelps in the section 2.2 of this report).

During August, Ms Hill spent her time restocking spools in jars in the two project incubators (see figure 5) that were serviced while waiting for laboratory reparations to take place at the Sea Point hatchery. A total of four trials are now in the project incubators. She also enthusiastically assisted with stocking up the POC hatchery tanks (see figure 7) with spools of the 3 target species collected from Kommetjie as well as the 3 target species collected from Jacobsbaai in order to do growth comparisons between kelps collected from different geographical locations. By Sept 2023, much to the delight of Ms Hill, the new microscope finally arrived. The microscope is pivotal for tracking the different growth stages of the sporophytes on the spools as shown in figure 6 below.

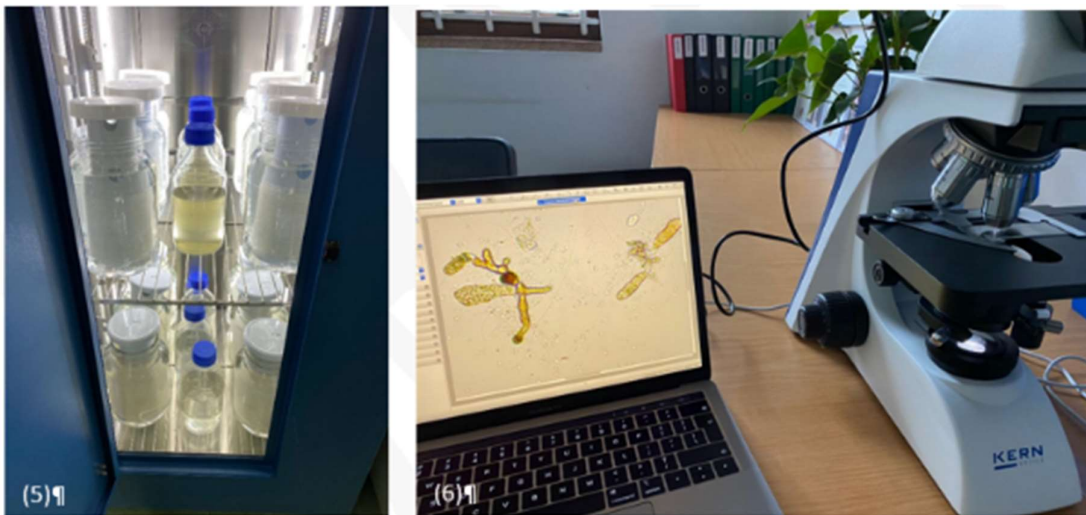


Figure 5. Spools of all 3 species (from Kommetjie and Jacobsbaai) stored in jars in both project incubators.
Figure 6. Newly settled sporophytes visible under the microscope. (Photo credits: F Hill)

Lastly, toward the end of Q2, Ms Hill was notified that the storm damage and associated water leaks and damage to the temperature-controlled laboratories at the DFFE Sea Point hatchery had been repaired. More details on Ms Hill's activities during Q2 can be found in her monthly reports, attached as Annexure A.

➤ **Paternoster Oyster Company Hatchery/Nursery Facility**

As previously mentioned, the POC hatchery/nursery facility was set-up in a record time of just under a month (see figure 7). By the end of Aug 2023, the 1st batch of spools of all 3 species from both Kommetjie and Jacobsbaai was set-up, upon which Ms I Meyer started monitoring their growth (see figure 8).



Figure 7. Spools of all 3 species (from Kommetjie and Jacobsbaai) in tanks at POC (Photo credit: LBotes)

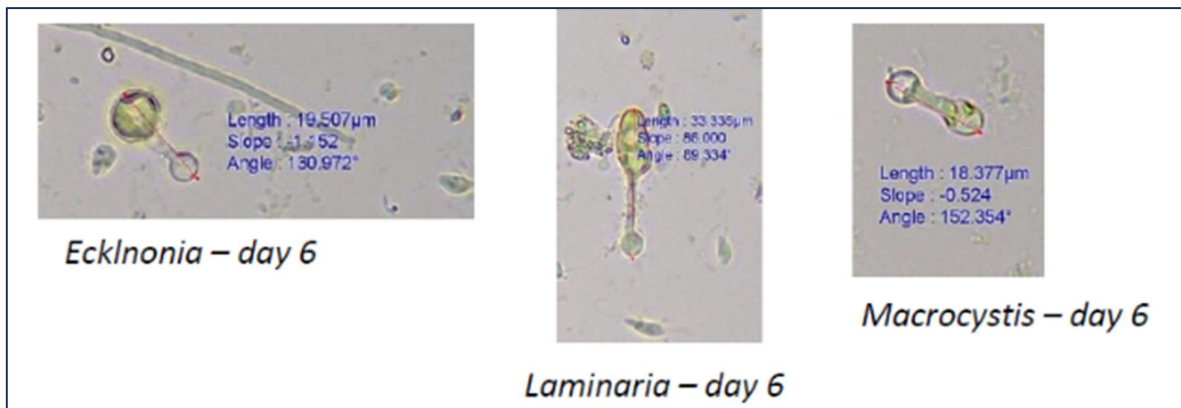


Figure 8. Growth of the 3 target species as on day 6 of development (Photo credits: I Meyer).

After just 1 month in the hatchery (toward the end of Sept 2023), the sporophytes reached ~3mm in size (see figure 9a) which is the size that the sporophytes at Sea Point reached after 2 months. Below is a relative comparison of the same batch of spools set-up at Sea Point and POC (see figure 9b). Currently the kelp size is ~5mm (see figure 9c) which is the size that was reached at Sea Point after 2 and a half months. Unfortunately though, when the experiment was set-up, the spore solution of the 3 species from Kommetjie was made up at Sea Point (to stock the incubators at Sea Point and the tanks at POC) with sea water from Sea Point which seems to be of a lesser quality than that at POC. This, and the unavailability of the required chemicals to minimise contamination, resulted in both the kelps and the contamination growing surprisingly well in the tanks at POC. This experiment will therefore have to be re-done to include the diluted Iodine step before sporulation and the Germanium dioxide (GeO_2) step after sporulation to minimise contamination as well as using the better quality water from POC. In the next quarter, and if budget allows, we hope to take once off nutrient samples at both hatchery sites for comparative purposes. More details on Ms Meyer's activities during Q2 can be found in her monthly report hereto attached as Annexure B.



Figure 9a (to the left) Dark brown sporophytes at POC ~3mm in size after 1 month (Photo credit: I Meyer)
 Figure 9b (to the right) Sporophytes at Sea Point still spots after 1 month (Screenshot from F Hill video clip)
 (Note: This is a relative comparison as I attempted to scale to the twine size)



Figure 9c. ~5mm *M. pyrifera* at POC (Photo credit: I Meyer)

2.2 Grow-out trials & Monitoring of environmental parameters:

➤ Blue Ocean Mussels' (BOM) grow-out facility

Progress at the grow-out site is briefly outlined below. More detailed information is available in Ms Xulu's monthly reports, attached as Annexure C. While we are very excited about the outplants being successful, it should be noted that the growth rate of the kelps out-planted on 12 July 2023 and 1 Aug 2023 should be interpreted with caution as they may have been negatively impacted or stunted during the hatchery failure at Sea Point.

(a) Progress on hatchery produced sporophytes:

• Sporophytes out-planted on 11 May 2023

M. pyrifera sporophytes of a few millimetres were out-planted on 11 May, which reached an average size of ~50cm by 11 Aug, ~85cm by 24 Aug 2023 and ~1.63 m (2.2 m was the maximum length) by the end of Sept 2023 (see figure 10 below).



Figure 10. (a) 11 Aug 2023 (b) 24 Aug 2023 (c) end of Sept 2023 *M. pyrifera* (Photo credits: N Xulu and L Botes)

• Sporophytes out-planted on 12 July 2023

M. pyrifera and *L. pallida* sporophytes of a few millimetres that were out-planted on 12 July 2023 had reached an average size of 1.3 cm in the case of *M. pyrifera* and 4.5 cm in the case of *L. pallida* (maximum size in both cases was ~10cm) at the beginning of Sept. By the end of Sept 2023, some *M. pyrifera* sporophytes had already reached ~44cm and some *L. pallida* sporophytes reached ~17cm. (See Figures 11 & 12 below).



Figure 11. *M. pyrifera* (a) Beginning of Sept 2023 (b) End of Sept 2023 (Photo credits: N Xulu)

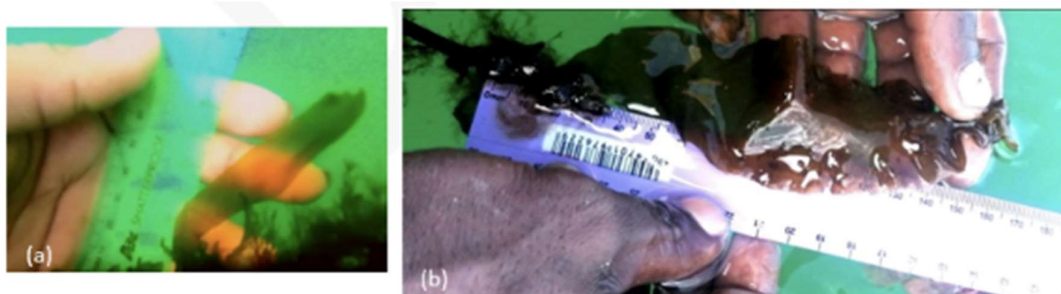


Figure 12. *L. pallida* (a) Beginning of Sept 2023 (b) End of Sept 2023 (Photo credits: N Xulu)

- Sporophytes out-planted on 1 Aug 2023

Some of the *M. pyrifera* and *L. pallida* sporophytes that were out-planted at the beginning of August had by the end of September 2023 reached ~38cm (in the case of *M. pyrifera*. figure 13.a) and ~8cm (in the case of *L. pallida* figure 13.b).

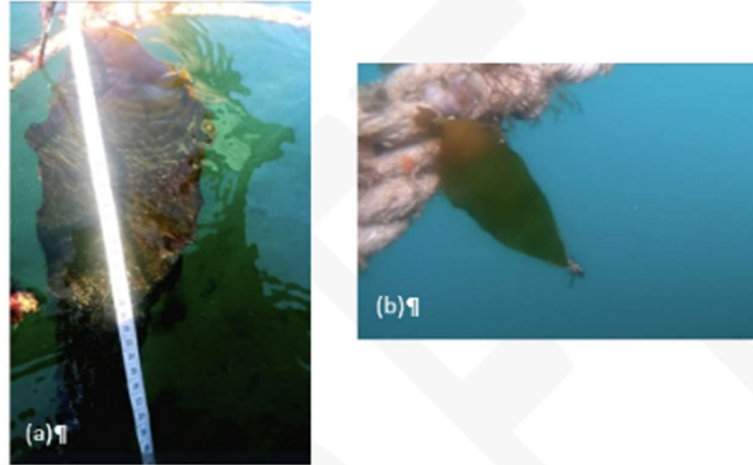


Figure 13. (a) *M. pyrifera* at the end of Sept 2023 (b) *L. pallida* at the end of Sept 2023 (Photo credits: N Xulu)

It should however be noted that there was quite a large size variation in both species at all depths. From the monitoring that took place during the months to date, it seems that the largest specimens in both species were found at the 2m depth. However, it will be interesting to see if this will change to sporophytes growing better at deeper depths as we approach summer months when light intensity and day length increases. Ms Xulu will in the coming months continue to monitor the growth of the sporophytes in order to process the data into growth curves.

(b) Progress on sporophytes grown from wild holdfast fragments:

Ms Xulu has also out-planted holdfast fragments of *M. pyrifera* on the experimental mussel rafts and long-lines to see if this could serve as an alternative farming method if resources for a hatchery are not available.

- Holdfasts out-planted on 31 Aug 2023 (on the experimental mussel rafts)

After holdfast collection and fragmentation, *M. pyrifera* were out-planted (see figure 14) on the experimental mussel raft closest to Saldanha Bay mouth (thus theoretically more exposed to wind and possibly getting better nutrient-rich upwelled water) as well as on the experimental mussel raft furthest away from the mouth (thus theoretically slightly more sheltered from wind but possibly receiving less nutrient rich upwelled water).

Approximately one month after the outplant, both the frond lengths as well as the area of the holdfasts at all three depths (2m, 4m and 6m) at both experimental rafts had shown good growth. On both of the experimental rafts, some of the specimens also developed more fronds as well as pneumatocysts (bladders). However, initial observations also suggest that the holdfast fragments out-planted on the mussel rafts closest to the mouth are outperforming those on the mussel raft situated furthest away from the mouth. Further growth comparisons will be done in the months to come.



Figure 14. (a) Holdfast attached with cable ties (b) blade growth (c) holdfast growth (Photo credits N Xulu and LBotes)

- Holdfasts out-planted on 13 Sept 2023 (on the experimental long-lines)

Fragmented holdfasts of *M. pyrifera* were also out-planted on the experimental long-lines closest to the mouth as well as on the experimental long-lines furthest away from the mouth (see figure 15). Growth measurements will be done in the months to come.



Figure 15. Long-line with ladder containing fragmented holdfasts (Photo credit: LBotes)

(c) Progress on monitoring of environmental parameters:

During Q1 some difficulties were experienced with the calibration of the HOBO sensors. Since then, the instruments were successfully re-calibrated and compared with the Conductivity, Temperature and Depth data (CTD data) supplied by the DFFE. Water temperature at the three depths (2m, 4, and 6m) during August fluctuated between 12.5°C and 13.9°C, while from early to mid- September fluctuated between 13.8°C - 15°C. From mid to end September water temperatures rose above 15°C. Temperatures at and above ~18°C are normally indicative of decreasing nutrient levels, which may slow the growth rate of the kelp. Higher summer temperatures and higher light intensities will of course also be challenging when out-planting sporophytes from the hatchery where *M. pyrifera* is kept at 12°C and where *L. pallida* and *E. maxima* are kept at 15°C.

It is hoped that the BOM site, being situated close to the mouth, will enable the kelps to grow/survive throughout the coming summer months when the south-easterlies cause upwelling of cold nutrient rich water.

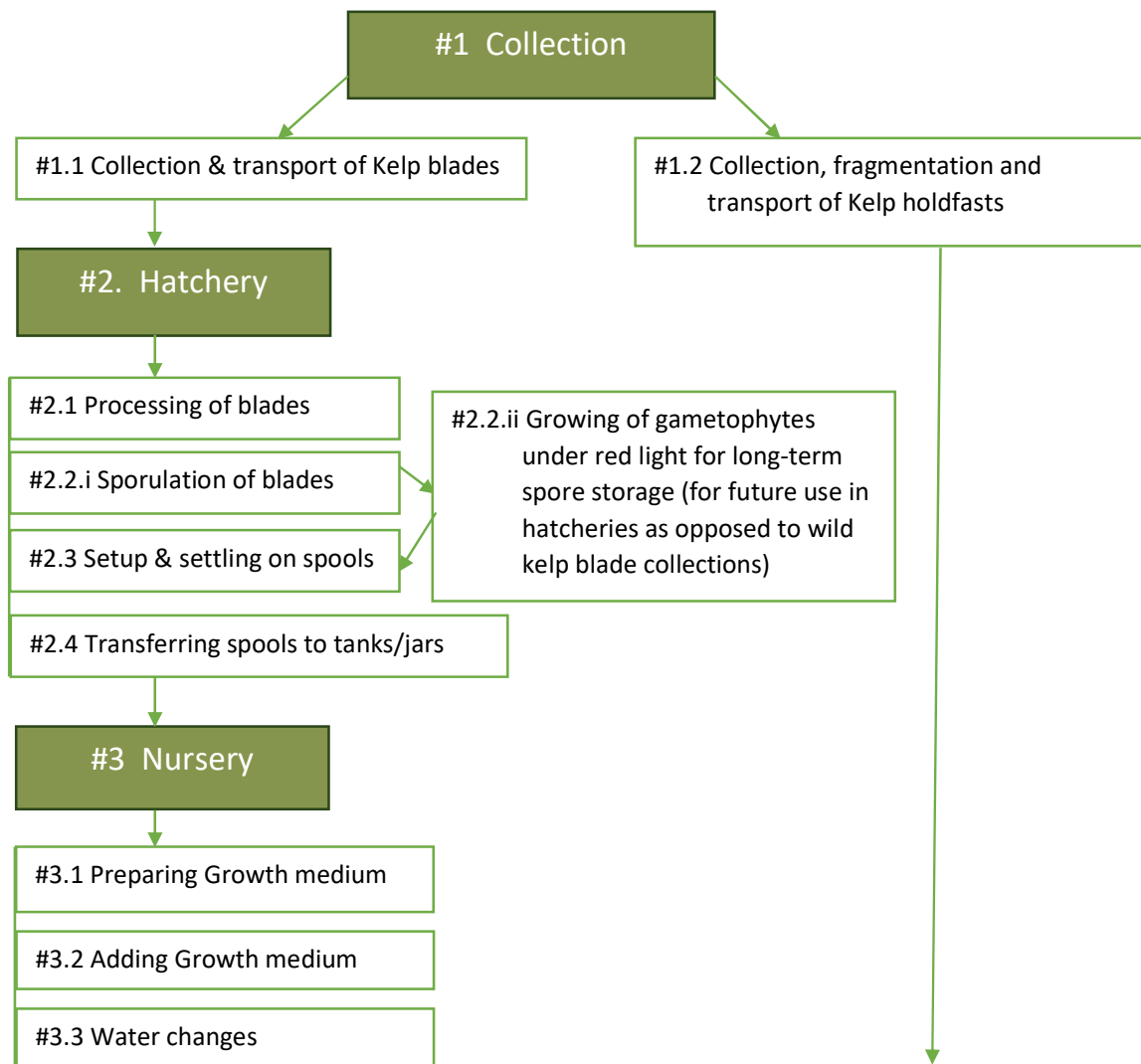
Unfortunately, an increase in south-easterlies during summer may also present challenges to undertake the required monitoring as the winds tend to pick up during the afternoons when Ms Xulu gets access to the Imbaza boat once the Imbaza teams are done with their mussel farming duties. These challenges will be addressed as they arise.

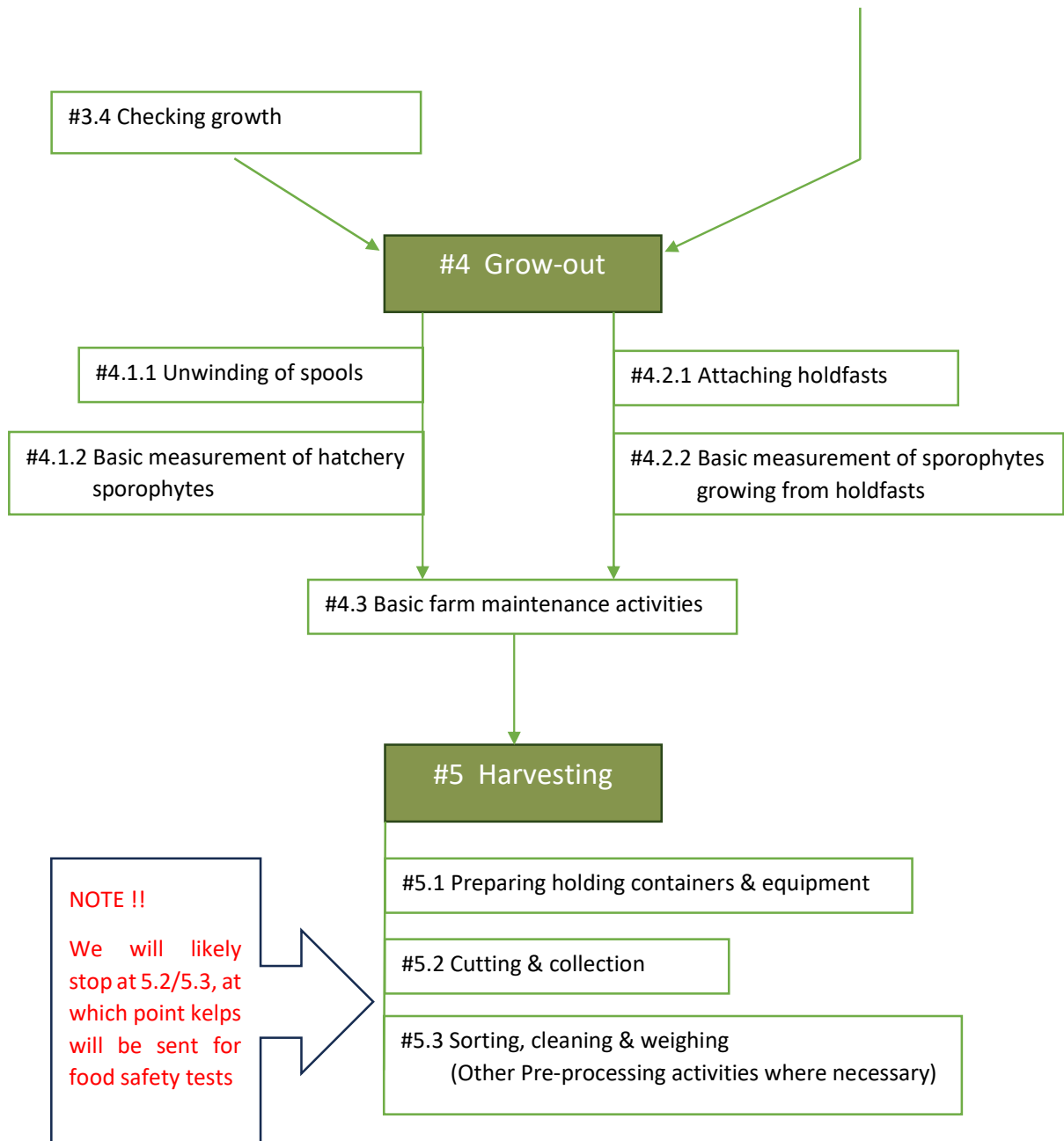
2.3 Updating of Project Plan (containing Research protocols & SOPs):

The purpose of this document is to summarise the overarching project plan and associated research protocols. It is a living document that is continuously being updated to reflect the research developments, with particular reference to the Standard Operating Procedures (SOPs). As the Research Assistants (RAs) trial the protocols under the guidance of the Implementation team, the SOPs will be updated to eventually be released with the rest of the deliverables of this project in the hope of establishing a sustainable kelp farming industry in South Africa.

The draft diagram below outlines the SOPs which will likely be relevant to the industry with draft copies of SOP 1.1 and 1.2 attached hereto as Annexure D. The rest of the SOPs will be added as the project progresses and thus will remain open for inputs/comments until the point that it will be signed off when the project draws to a close at the end of March 2025.

Kelp Standard Operating Procedures (SOP) Outline





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 wild candidate species collected in the Kommetjie region (as part of Phase 1) showed that all three kelp species have 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, fronds/blades of two species 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. A full report on the food safety analysis of the two kelps was attached to the Q1 report as Annexure D.

We plan to harvest fronds from *M. pyrifera* that was out-planted on 11 May 2023 during quarter 3 (Q3). The material will be used to:

- have it tested for food safety and to compare these findings to wild kelp that were tested earlier in the year
- to assess whether subsequent growth will take place from the holdfasts remaining on the grow-out ropes

During Q1, Dr B Macey assisted with the drafting of a project proposal to the South African Bureau of Standards (SABS) to request the development of standards for seaweed for human consumption. The proposal was submitted on the 12th of June 2023, and following minor amendments has been submitted (on 3 Aug 2023) to the technical committee to start the process of developing the standard.

2.5 Value Chain Analysis & Market Assessment:

The Kelp Value Chain Analysis and Market Assessment study commenced at the beginning of Sept 2023 with the aim to:

- ~ Review the initial data within the pre-feasibility study and other similar studies.
- ~ Identify 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.
- ~ Develop 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.
- ~ Identify 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.
- ~ Identify 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.
- ~ Identify 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.
- ~ Identify any bottlenecks or constraints that may affect the value chain's overall efficiency. (e.g. Pre-processing/ storage)
- ~ Assess 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.).

- ~ Identify how coastal communities and future farmers can be integrated into the value chain to ensure entrepreneurial opportunities, job creation and participation.
- ~ Outline 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 to un-lock opportunities for potential interested parties wanting to enter the SA Kelp farming industry and associated value chain.

The study will be conducted in three parts with the draft of PART 1 (Value Chain Analysis) attached here as Annexure E. The draft of PART 2 (Market assessment) will be available toward the end of Oct 2023, and the draft of PART 3 (Value Chain Roadmap) will be available toward the end of Nov 2023 at which point the entire document will be finalized and submitted as a single document that will be circulated to all interested parties. It is the intention that this document, together with the rest of the project documents, will form the basis to further the development of a sustainable South African Kelp farming industry.

2.6 DFFE Environmental Management Programme (EMPr) update:

At the end of the 2022-2023 financial year, the document produced by Ecosense (commissioned by this project) 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.

Currently, DFFE is busy with the application process for a Part 1 amendment. More information on this will be provided as information becomes available.

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

Previously the hatchery spools were placed and kept in small tanks (with no flow through but with aeration), however contamination proved to be a challenge. Since then, Ms Hill has moved to placing the hatchery spools in jars (one spool per jar but with no added aeration). Some spools are however still presenting with contamination.

➤ Hatchery facility at POC

Upon completion of the POC hatchery, the 1st batch of spools of the 3 target species from Kommetjie were set up. Ms Hill undertook the sporulation step at Sea Point with sea water from the Sea Point Research Aquarium which may have contained some contaminants. She also poured the remainder of the spore solution into the POC tanks which, in future, should rather be decanted. Additionally, at the time we did not have access to Iodine and GeO₂ which are used to limit/eliminate contamination.

Recommendation applicable to both hatchery facilities:

It is recommended that both hatchery facilities move forward with the inclusion of Iodine & GeO₂ steps to minimise contamination with unwanted species that compete with the kelps for nutrients and oxygen,

which may slow down the growth of the kelps. The experimental set-up should thus be repeated but with the entire process taking place at POC using sea water from POC.

3.1.2 Grow-out trials & Monitoring of environmental parameters:

➤ **Grow-out facility at BOM's site**

With the project now having two of the three kelp species growing on the experimental mussel rafts and long-lines, it will likely become impossible for Ms Xulu to manage all the grow-out tasks and environmental monitoring on her own. We are fast approaching the point where she will be needing assistance with basic tasks such as cleaning, as well as back-up for when we approach the Festive Season.

Recommendation:

PM to discuss with BOM assistance with land-based cleaning, making up and adjustments of rope ladders as well as with Imbaza for continued support for assisting with basic sea-based tasks.

3.1.3 Stakeholder Engagements & Information dissemination activities:

The workshops originally planned for Q2/Q3, were postponed due to some businesses going into business rescue. Workshops will take place once we have greater clarity 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. Also, since the Value Chain Analysis and Market Assessment study has consulted a wide audience of not only those who are currently in the kelp industry but also those who are interested in getting involved in the kelp industry, it is recommended that we perhaps consider consolidating the workshop efforts. A workshop for all parties/entities who are interested in getting involved in the kelp industry and more specifically the kelp farming industry, should follow after completion of the Value Chain Analysis and Market Assessment study as this would provide a platform for further discussions and give all participants in the study a chance to provide inputs.

3.2. General recommendations:

The following matters need to be addressed during the next quarter to further progress:

- Culturing and out-planting of *Ecklonia maxima*, while continuing with the other two species.
- Re-doing the experimental set-up of all the target species at POC.
- Arranging assistance to Ms Xulu to ensure ongoing monitoring over the Festive Season and when she will be visiting Kelp Blue in Jan 2024.
- Finalising arrangements for the RAs visit to Kelp Blue
- Furthering discussions around the Roadmap that will be proposed in the last section of the Value Chain Analysis & Market assessment

4. Closing remarks & Thinking ahead

4.1 Closing remarks

Contrary to the setbacks experienced during the Q1, Q2 has proven to be a complete turnaround. The project is now firmly positioned and established to maintain momentum during the next two quarters of the current financial year and to undertake the necessary planning for project deliverables in the next financial year.

4.2 Thinking ahead

4.2.1. Anticipated work for the 2023-2024 per quarter

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

4.2.2. Considerations for 2024-2025 and beyond

Over and above the on-going research on the hatchery and grow-out components to optimise farming techniques and to determine which of the 3 species will be most suitable for cultivation in Saldanha Bay, the following will also need attention (some of which is also reflected in the Kelp Value Chain and Market Assessment study):

- 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 information dissemination
Developing a 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.

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

- Kelp traceability/tracker system
As in any other food industry, tracking systems to trace products back to its origin will become important in the kelp industry. A very basic manual tagging system could be looked at as a starting point which could form the basis of more automated systems once an industry is established.

- Roadmap for setting up a kelp farm
Financial costing for start-up initiatives including equipment needs.
Administrative planning matters (steps & time) for new entrants in terms of licencing, permits etc.
Availability of resources for start-ups e.g. funding and mentorship

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 challenges we encountered during Q1.

The PM would also like to thank the entire implementation team as well as the external consultants for their efforts in pulling together to position the project during Q2 on a very firm foundation. The contributions from the team toward compiling this report are also very much appreciated.

6. Appendices

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

6.1. Annexure A: Ms F Hill monthly reports



F Hill Monthly Report - July 2023.pdf



F Hill Monthly Report - Aug 2023.pdf



F Hill Monthly Report - Sept 2023.pdf

6.2. Annexure B: Ms I Meyer monthly reports



POC Kelp hatchery
report_Sept23.pdf

6.3. Annexure C: Ms N Xulu monthly reports



N Xulu July 2023
Monthly report.pdf



N Xulu Aug 2023
Monthly report.pdf



N Xulu Sept 2023
Monthly report.pdf

6.4. Annexure D: Project Plan (Research Protocol & SOPs)



BSASA SOP #1.1..pdf



BSASA SOP #1.2..pdf

6.5. Annexure E: Part 1 Value Chain Analysis & Market Assessment



Part 1 South African
Kelp Value Chain & M