

# 3RD QUARTER PROGRESS REPORT

2022



KELP FOREST  
FOUNDATION



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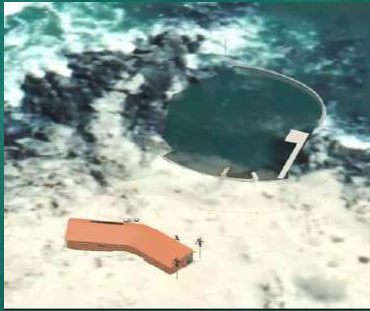
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# Q3 HIGHLIGHTS

July



Tidal Pool Design Phase began

August



2Q Board Meeting



CU Model: First stage presented

Lifesaving lessons



September



Samantha presenting at Mayma Azul

KFF, Kelp Blue and reNature announced as winners of MIT Solve



Visit to Wageningen University



# 2Q BOARD MEETING

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The second quarter board meeting was held online. The Kelp Forest Foundation board came together to discuss:

- fundraising strategy
- future research efforts
- and how to foster more global collaborations with experts in the field.



*Clockwise: Kat Bruce (Board Member), Daniel Hooft (Board Member), Sarah Mathies (Board Member), Samantha Deane (MD), Tim Flannery (Board Member and Chief Scientist).*

# AWARDS

## MIT SOLVE: WINNERS



Together with reNature and Kelp Blue, the Kelp Forest Foundation was selected as a **Solver of the MIT - SOLVE 2022 Challenge** in the category Climate: Ecosystems + Housing. We are thrilled with the win. Our project will be to **regenerate soil**, instead of just repairing damage, **by using cultivated kelp**.

The MIT Solve’s Global Challenges seek to find social entrepreneurs who are using technology to solve today’s most pressing problems. We will be designing and implementing a system where we apply cultivated giant kelp biostimulants within regenerative agriculture, specifically agroforestry. This will improve:

- 1) **crop health**: solving abiotic stress by enhancing plant resilience; and
- 2) **farm health**: contributing to a negative carbon agriculture that supports farmers.

By ameliorating soil and substituting chemical fertiliser with biostimulants, we work towards our goal of upgrading local ecosystems to produce better goods and services, thereby increasing the farmers and their communities’ environmental and economic resilience.

*The project team, clockwise: Valentin Pitiot (Kelp Blue), Augely Kiedi (reNature), Felipe Villela (reNature), Samantha Deane (KFF)*



*Felipe presenting our solution at the MIT Solve event which was held during Climate Week in New York on September 18th*





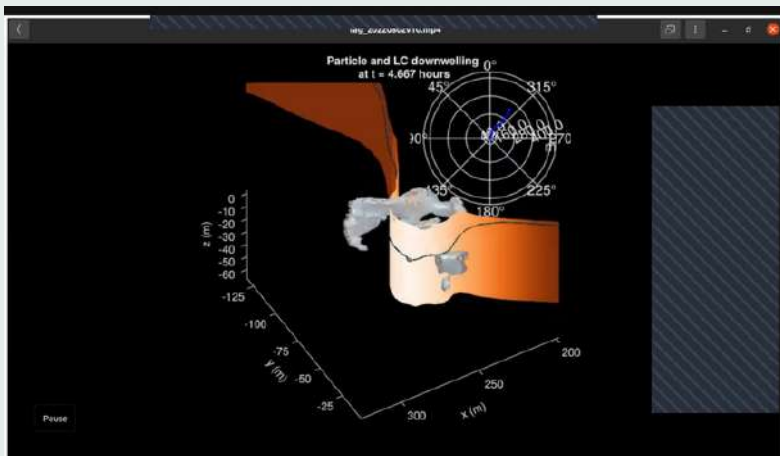
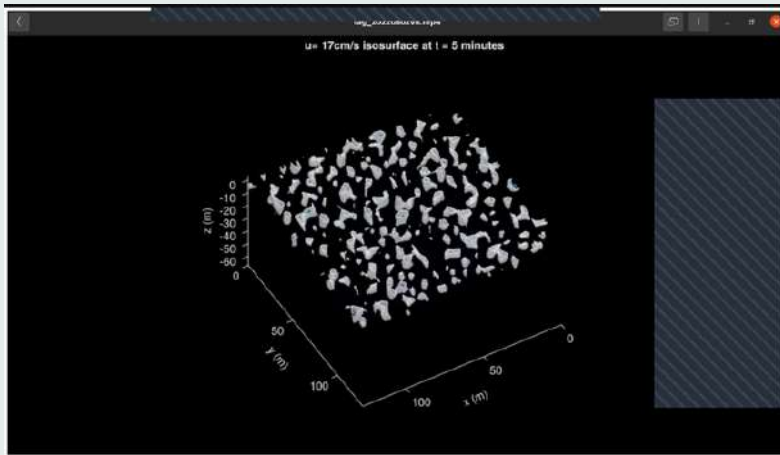
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# RESEARCH PROGRESS



# CARBON SEQUESTRATION

## KELP CDR MODEL: FIRST STAGE



Top and middle: Model images showing particle movement  
Bottom: clockwise John Taylor (CU), Samantha Deane (KFF), Xu Ben Zhang (KFF), Ke Li (CU)

Dr. John Taylor and dr. Ke Li of Cambridge University (CU) presented the first stage of their open-source three-part modelling system which will help us assess the carbon sequestration pathways of kelp in the ocean.

The three-part model consists of:

- 1) A hydrodynamic model capturing ocean physics to track the fate of the kelp carbon.
- 2) A multi-component biogeochemical model, capturing changes to primary productivity (which is the rate at which energy is transformed into biomass) and the biological carbon pump.
- 3) A kelp growth model simulating kelp growth to estimate the release of particulate and organic carbon from kelp.

After this first stage, the hydrodynamic model will help show the movement of particles in the ocean, taking into account the effects of hydrodynamics, wind, and Langmuir circulation patterns.

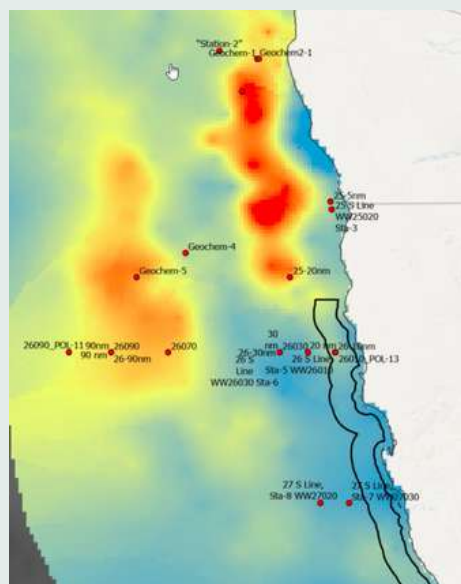
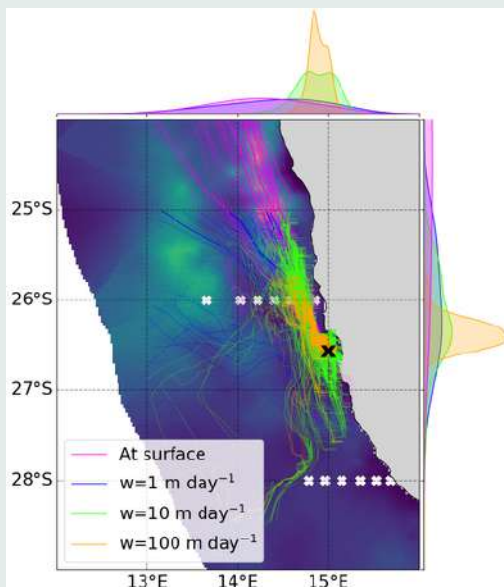


# CARBON SEQUESTRATION MODEL PAIRED WITH SEDIMENT RESEARCH

A team of scientists from different top universities working on kelp carbon sequestration convened online to discuss how the different models can be paired with sediment research. The oceanographic/physical model that is developed by CU helps track particle trajectory from the Kelp Blue pilot site. This physical model indicates where kelp detritus is likely to end up, based on ocean currents and Langmuir circulation patterns. When combined with ETH Zurich's already identified carbon hotspots in the Namibian seabed, this will identify the likely areas of kelp carbon accumulation. KFF will then create a baseline study by collecting sediment core samples from these areas and analyse their carbon/kelp content for future comparison.



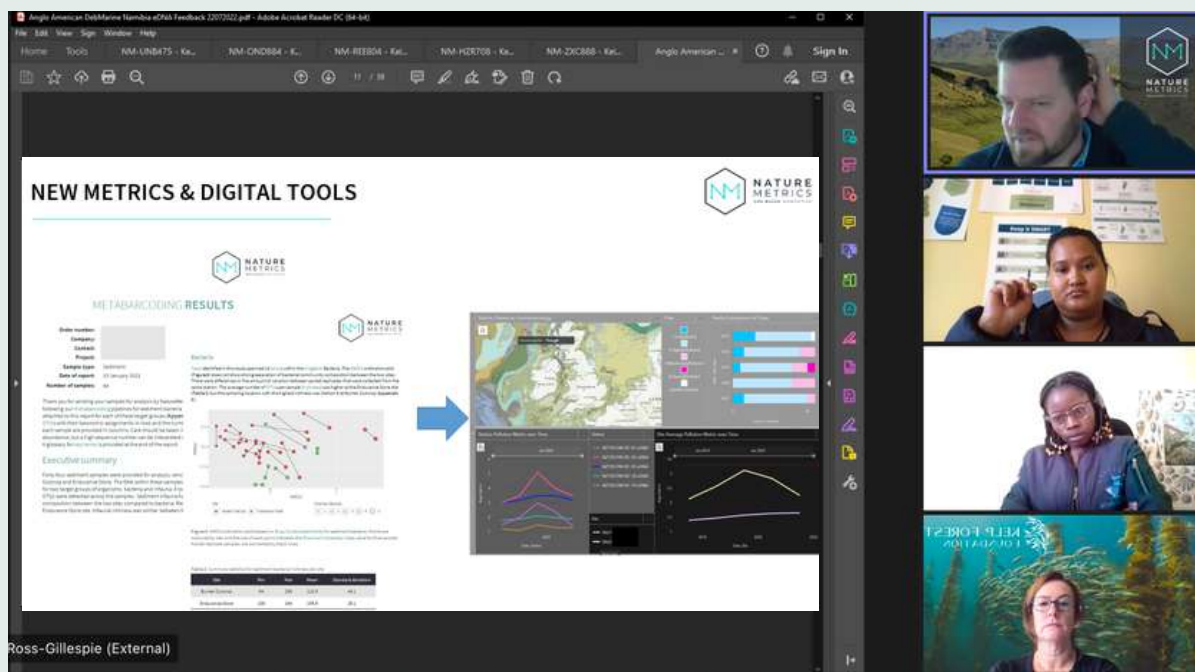
Clockwise: Protasius Mutjida (UNAM), John Taylor and Ke Li (CU), Sarah Paradis (ETH Zurich) Samantha Deane (KFF) and, Chuancheng Fu (KAUST).



Top left : results from the physical/oceanographic model overlaid over the sedimentary depo-centers. The white crosses show the Mirabilis Research Vessel voyage stops where the research team could take sediment cores. Top right: map of existing cores (dots) at ETH Zurich and the two main carbon depo-centres (red areas).



# BIODIVERSITY EXTENDING THE EDNA STUDY



From top to bottom: Dr Vere. Ross-Gillespie (NM), Angelique Dodds (UNAM), Iriya Jona (Kelp Blue) and Samantha Deane (KFF).

Dr Vere Ross-Gillespie, Head of Extractives at NatureMetrics, spoke to us about their up and coming new **metric and data visualisation tools**. Data visualisation is important to us as it allows us to gain insight into our vast amounts of data. It allows us to recognise new patterns and errors in the data. Making sense of these patterns will help us pay attention to areas that indicate red flags or progress.

Angelique and Elizabeth, our MSc Biodiversity students have also added a new area of biodiversity research. It is the nearer shore kelp forest that Kelp Blue is cultivating which is known as Shearwater Bay Pilot (SBP). This site is used for learning and testing. The giant kelp is already growing successfully there and we would like to monitor changes in biodiversity using eDNA while we wait for the offshore pilot to be up and running. Since the SBP showed such promising results Kelp Blue is extending SBP to 1,5 hectares. As the kelp is growing so successfully it is essential to monitor not only the site itself but also the adjacent coastal sites to assess any ecosystem changes and impacts on the environment. All of this is made easier with the use of eDNA and analysis provided by NatureMetrics.





# GEOCHEMISTRY JOINT NUTRIENT STUDY WITH UNIVERSITY OF CAPE TOWN



The Benguela upwelling system, off the southwest Africa coast, is the most productive system of the world's major eastern boundary current regions. Its two subsystems, the northern and southern Benguela upwelling systems (NBUS and SBUS, respectively), are characterised by comparable levels of **primary productivity** even though the upwelling in the NBUS is ten-fold greater than in the SBUS. They do, however, have contrasting **nutrient dynamics** where the SBUS is more **nutrient-rich** than the NBUS.

**Dr Sarah Fawcett** from **University of Cape Town (UCT)**, Oceanography Department, Protasius Mutjida (KFF-sponsored MSc student) and Samantha Deane discussed the possibility of Sarah and Protasius writing a joint paper comparing nutrients between North and South Benguela, whereby the nutrient data collected by Protasius in Luderitz area would be included. From Protasius' preliminary studies the **nutrient levels** in Luderitz are more comparable to those found in the SBUS rather than the NBUS.

The screenshot shows a video conference with three participants: Protasius Mutjida (top right), Sarah Fawcett (middle right), and Samantha Deane (bottom right). The main screen displays a presentation slide from the AGU Journal of Geophysical Research: Oceans, dated 10.1029/2019JC015948. The slide contains two maps of the southern Benguela upwelling system (SBUS) for February (a) and May (b). The maps show latitude (°S) on the y-axis (28 to 34) and longitude (°E) on the x-axis (14 to 20). They illustrate the positions of stations sampled during the IEF cruises (white dots) overlaid on sea surface temperature (SST) contours. A solid gray line indicates the 300-m isobath, and a dashed line indicates the 'half break'. The caption below the maps reads: 'Figure 1. Map of the southern Benguela upwelling system (SBUS) showing the positions of the stations sampled during the IEF cruises (white dots) overlaid on CTD-derived sea surface temperature (SST; colored contours) in (a) February (late summer) and (b) May (early winter) 2017. The solid gray line indicates the position of the 300-m isobath (the "half break"). The fronts occurring in the SBUS at the time of sampling are identified (see section S2 for details on fronts).

From top to bottom: Protasius Mutjida (UNAM), Dr Sarah Fawcett (UCT) and Samantha Deane (KFF).



# KELP COMPOSITION FIRST RESULTS

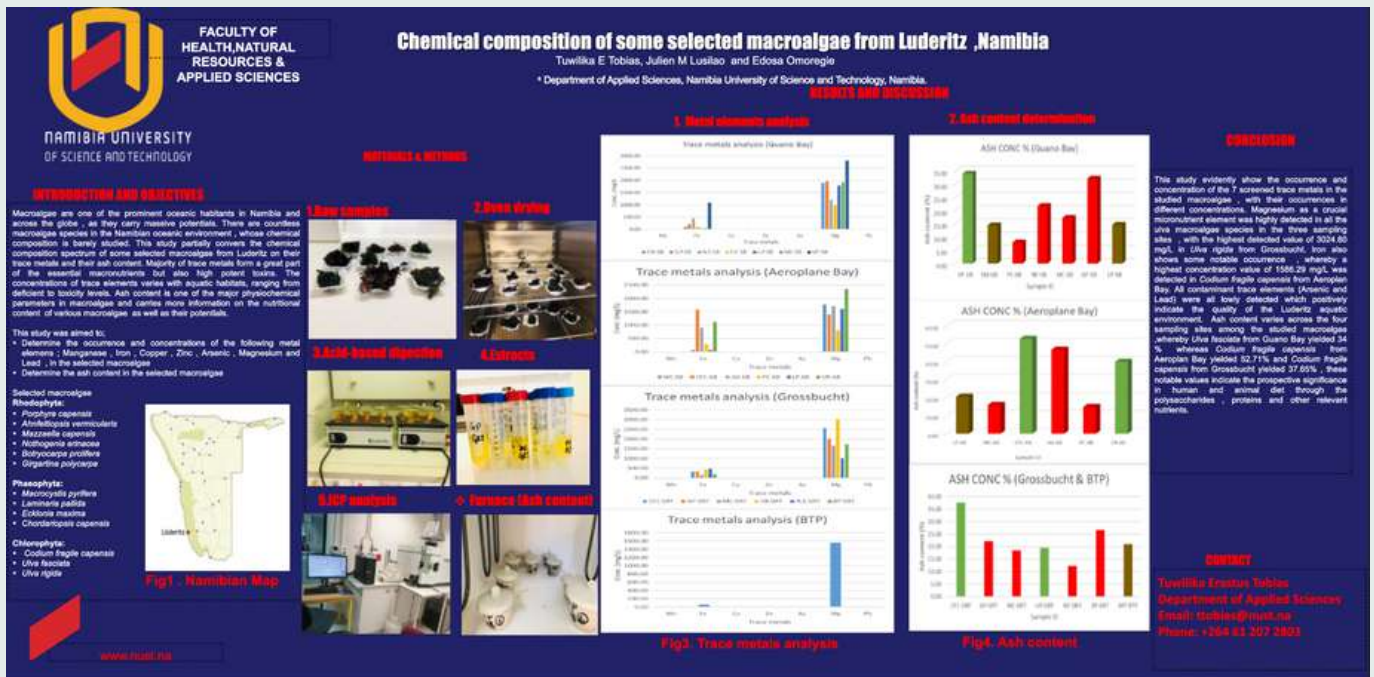
Erastus Tobias, a biotechnologist and student at Namibia University of Science and Technology (NUST), has analysed the first batch of *Macrocystis pyrifera* (giant kelp) and other seaweed samples that has been sent from Luderitz. These samples, collected from the Luderitz coast and near the Kelp Blue pilot site, were analysed for their macronutrients, micronutrients, and trace metals content.



The first results, shown in the image below, indicate that Kelp Blue's giant kelp has low trace metals and ash content. High Magnesium (a crucial micronutrient) content was detected across all seaweed samples.



Right: Erastus Tobias and Erastus carrying the delivered seaweed samples. Below: a summary of the first results.





# WAGENINGEN UNIVERSITY LAB VISIT

The KFF team visited the research facilities of **Wageningen University & Research (WUR)**, voted the best university in the Netherlands and the best agricultural university in the world in 2022. There we met Drs. Christa Testerink & Romyana Karlova from the laboratory of Plant Physiology as well as students Sotiris Filippaios and Francesco Cristofano who are doing further studies under Dr Karlova's supervision. KFF is looking to carry out several research projects with both the plant physiology and the soil department of WUR.



*Top, from left to right: Samantha Deane and Xu Ben Zhang (KFF), dr. Christa Testerink and dr. Romyana Karlova (WUR), Sotiris Filippaios (student WUR)*

*Bottom, clockwise: Xu, Francesco Cristofano (WUR), Sotiris, Valentin Pitiot (Kelp Blue), Romyana, Samantha*



*Left: First tests using giant kelp biostimulant, shown in the climate-controlled room. Right: Samantha in one of WUR's greenhouses*

# WAGENINGEN UNIVERSITY

## NPEC & UNIFARM VISIT



WUR hosts in their premises the **NPEC** - Netherlands Plant Eco-phenotyping Centre. NPEC gives researchers equipment with which they can conduct standardised analyses of plants on a large scale, and build datasets. All with the help of robots, sensors, automation and camera systems. NPEC is a collaboration between WUR and Utrecht University



We were also allowed to visit **UNIFARM**. UNIFARM - facilitates and leads research experiments of the plant- and crop investigations for WUR but also for external principals. This plant research company comprises of 240 hectares of trial plots, 15.000 m<sup>3</sup> of glasshouses and a large number of climate cells (over 100), climate chambers, cool and freeze cells, warehousing and processing space, measurement equipment etc.





An underwater photograph of a fish swimming towards the left, with seaweed visible in the background. The entire image has a teal color overlay.

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# OCEAN LITERACY



# OCEAN LITERACY

## TIDAL POOL DESIGN STAGE

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Luderitz is a harbour town at the Atlantic Coast in Namibia. The combination of high temperatures, a dynamic wave climate, and only very few people that know how to swim, has resulted in a strong need for a safe place to acquire swimming skills. The cooperation between the Kelp Forest Foundation, Kelp Blue, TU Delft and NUST is enabling the building of a tidal swimming pool at Aeroplane Bay which will provide exactly that: a safe and self-sustainable swimming area for the community.

The tidal swimming pool will be a man-made version of the well-known existing rock pools: small pockets of water that occur along rocky areas where ocean meets the land. The tidal pool concept uses the tide as the main mechanism for water replenishment during every high water (both neap and spring tide).

The first stage of the project has been completed. A presentation for the public consultation was held on 15th July 2022 at the Luderitz town council. It was followed by data collection, site selection and planning by the tidal pool team. It concluded with the design of the tidal pool and designs for facilities to help will support and enable the educational and recreational uses of the pool.



*The Tidal Pool team, from left to right: Jeremy Trotereau, Nadine van Westerop, Raja Kambazembi, Noa Elbers, Amenenge Shatilwe, Bernice van der Kooij*



*Daniel Hooft (Kelp Blue) speaking at the public consultation.*

*Bottom: images of the participants during the public consultation.*



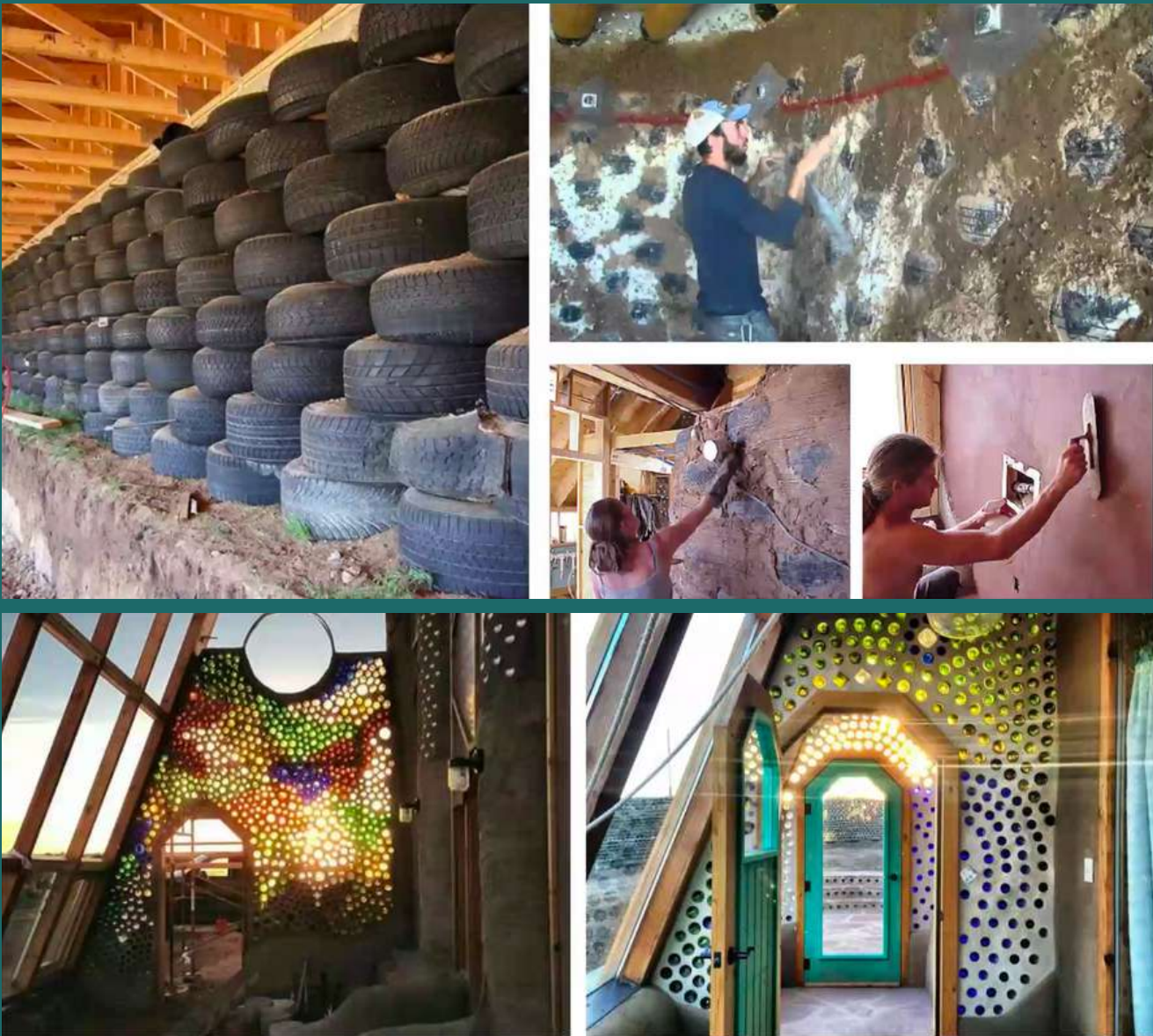


## DESIGNS AND FLOOR PLANS OF THE TIDAL POOL AND COMMUNITY HOUSE

The recreational facility building has been inspired by the "Earthship" concept. Usually built in desert climates, this building typology is mainly made from natural or recycled materials and (mostly) self-sufficient in its own water and energy needs. Our community-led facilities will be mainly built from recycled materials, and the shape adapted to the local landscape. Both the view to the tidal pool and ocean are framed by natural materials such as wood and lime-plaster and are optimally visible from the cafe with its bi-folding doors and flexible floor plan. The cafe will be equipped with a small kitchen area. The outdoor showers are placed between two glass-bottle walls, on which the light can fall directly during early and later hours of the day, when the sun is lower. Behind the showers are the changing rooms and toilets, and the system room which will house an electricity closet, water boiler, and water tank with recycled water caught by the shower drain.

**THE TOTAL BUDGET FOR THE PROJECT IS USD 258,000. KFF HAS FUNDED THE DESIGN PHASE. WE ARE CURRENTLY FUNDRAISING FOR THE OUTSTANDING USD 250,000.**





## ELEMENTS AND INSPIRATION FOR THE DESIGN AND INTERIOR OF THE TIDAL POOL COMMUNITY HOUSE

The main two principles for the design of the on-shore facilities are **sustainability and photogenic attraction**. Since the facilities will be used for educational purposes, sustainability itself can be used as the photogenic attraction. The building can be used to educate visitors about sustainability through the use of recycled materials (old car tyres and coloured glass bottles, as seen above), and passive climate systems. By visiting the building, both local people and tourists can be reminded of the importance of and see an example of recycling in a country still struggling with waste management. We hope they will become inspired to also rethink conventional building practices.





# OCEAN LITERACY TIDAL POOL PROJECT PLAN

The next phase will be the construction of the tidal pool and community house. Once funding is successful, we will start tendering the construction work and select a suitable company to build the project.

At the operational phase, the management of the tidal pool will be handed over to the local community. The aim is for swimming and life saving training to take place at the tidal pool from then on.

## Project timeline



## Benefits for Lüderitz



**Safe swimming environment for kids and adults**  
By providing lifeguards



**Enhance Tourism**  
Constructing a nice, natural looking tidal swimming pool



**Chance to learn how to properly swim**  
Through local swimming instructors



**Location for a swimming club**  
Such as in Windhoek & Swakopmund



**Provide a social place for the community**  
Location to braai, to swim, to sit

# CAPACITY BUILDING

## LIFESAVING LESSONS

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Every year in the coastal town of Luderitz, there are 5-10 unnecessary deaths by drowning, either because the kids/adults involved do not know how to swim or the bystanders have not acquired life saving skills to help the distressed swimmers.

As part of our capacity building and ocean skills programme, we organised swimming and lifesaving lessons for our team. Together with Kelp Blue and Luderitz Blue School, the lessons were held at Prospector's Inn, which has a swimming pool available.

On the right, you see Marlie Lombard, Junias (Tangi) Shihepo (Ocean Youth Ambassador coordinator), Andries (Given) Indongo (OYA), Samora Kambinda (OYA), Felix Matongo (robotics teacher and extra-curricular coordinator) and Manson Marthins (OYA) - doing life saving training. The training was organised by Monarch Lifeguard and Rescue.



*Ronaldo, Rosalia, Fanuel from Kelp Blue doing swim training.*



# CAPACITY BUILDING

## ISO 17025 TRAINING

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We sponsored our MSc students to go on an ISO - International Organization for Standardization ISO/IEC 17025 **Laboratory Management System course** at Spectrum Laboratories & Consultancy Namibia. The course was aimed at increasing their laboratory effectiveness, improving their work processes and for them to have more reliable and efficient lab testing and results. Consistency, cleanliness and competence in a laboratory environment is key to producing high quality scientific research.



From left to right: Angelique Dodds, Hilinganye Andreas, Protasius Mutjida, Leevi Sakeus (trainer), Iriya Jona and Elizabeth Nashidengo.



Left: Angelique's ISO/IEC 17025 certificate of completion.

# OCEAN EDUCATION

## REDUCING POLLUTION CREATIVELY

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In Luderitz with a little creativity - we are helping to **reduce ocean pollution** - and we encourage others in the community to do the same.

With permission from the municipality, we asked a group of young students to unleash their artistic skills on the existing rubbish skips. Adding colourful designs to these rusty skips in beach areas isn't just about aesthetics, it's about litter prevention. Trash receptacles that blend into the environment might go unnoticed and could result in someone deciding to leave their trash behind. Brightly coloured skips stand out as a place where people can dispose of waste.

This art project highlighted to the kids that reducing waste and keeping rubbish out of our waters is important as it prevents our debris from killing marine life and disrupting aquatic life cycles.

Our Ocean Education programme, which is run locally by the Luderitz Blue School, looks to instil a passion for protecting the environment and to create the next generation of ocean lovers.







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**AWARENESS**

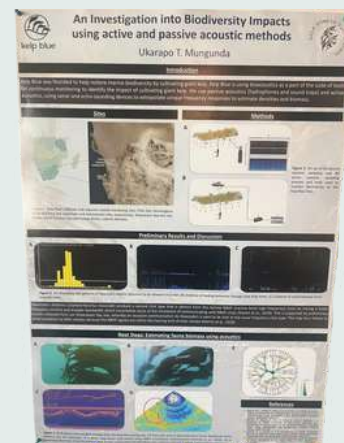
# CONFERENCE

## AFRICAN BIOACOUSTICS COMMUNITY



*Ukarapo Munganda presenting her findings to a conference attendee.*

Ukarapo Munganda, our marine bio-acoustic specialist, was sponsored by KFF to attend the **3rd African Bioacoustics Community (ABC) Conference** held in South Africa. There, she and other experts shared their knowledge and experience in topics such as sound measurement and use of recording equipment. This was a wonderful opportunity for Ukarapo to present her masters thesis titled "Hydro-acoustic discrimination and biomass estimation of jellyfish" as well as the bio-acoustic work she is doing of **investigating biodiversity changes in the kelp farms by using passive and active acoustic methods**. Her MSc thesis entailed adapting an algorithm to detect and discriminate jellyfish from all other organisms in the water column, isolating them and calculating their biomass. This concept she is now using in Luderitz, Namibia, not only to track marine animal behaviour but to calculate changes in kelp biomass.



*Ukarapo's poster presentation.*



*Ukarapo's back scatter analysis of passive acoustic recordings which show different type of dolphin activity in and around the seaweed cultivation site.*

After 40 consecutive days of underwater recording in Luderitz, Ukarapo learned that the pod of visiting **Heaviside's dolphins** are most chirpy, chatty and active between 9:00 and 10:00, but that they do "hang around" the entire morning. We know this because Ukarapo uses bio-acoustic sensing to track marine biodiversity found in and around the seaweed pilot site. By applying deep learning algorithms which are trained to isolate and distinguish one species from the next Ukarapo could quickly identify which animals were emitting the sounds.



# WEBINAR MAYMA AZUL

Samantha was invited to speak alongside Mr Adolfo Alvial, head of the Club Innovación Acuicola of Chile, about their views of the seaweed market in general and the potential for Latin America. The Mayma Azul program focuses on the global blue revolution through the creation of the first blue regenerative ecosystem in Latam by bringing together business models and people in the blue economy. Samantha spoke about the fundamental role algae have in facing the climate crisis and restoring the health of the oceans, as well as ways of valorising their components.

You can view the Zoom webinar (in Spanish) by clicking [this link](#).

**mayma AZUL**

**REVOLUCIÓN AZUL EN LATINOAMÉRICA**  
**¿LAS ALGAS COMO PROTAGONISTAS?**

Evento apertura - Charla abierta  
06/09 ARG 9HS CH 10HS CET 14HS

**Samantha Deane**  
Kelp Forest Foundation

**Adolfo Alvial**  
Club Innovación Acuicola

Moderan: Ana Webb y Dana Cardozo  
Mayma Azul

KELP FOREST FOUNDATION CLUB INNOVACIÓN ACUICOLA

**mayma AZUL**

**Entrenamiento y formación para Acuicultores regenerativos y emprendedores azules**

Postulate en [www.mayma.lat/AZUL](http://www.mayma.lat/AZUL)

Lanzamiento solo apto para AMANTES DEL AGUA

mayma GREEN WAVE KELP FOREST FOUNDATION bofish

**ESQUEMA DE HOY**  
TEMAS A DISCUTIR

1. Quienes somos?
2. Por qué *Macrocystis p.* (giant kelp)?
3. Cómo secuestra carbono?
4. Kelp Blue - la innovación
5. Visión global
6. Conclusión

Samantha Deane

**Ecosistema Azul que nos apoyan**

GREEN WAVE KELP FOREST FOUNDATION bofish

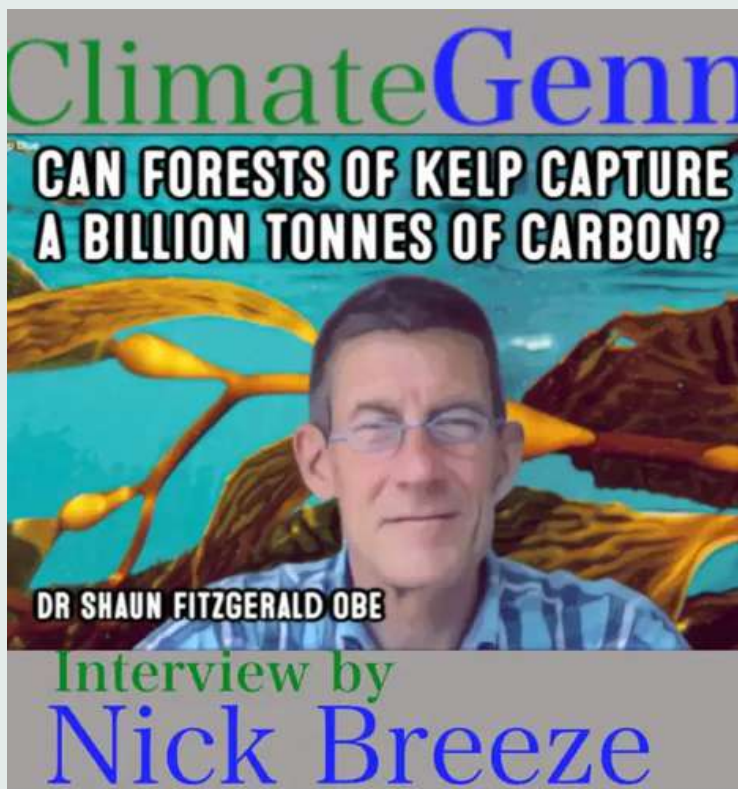
FUNDACIÓN Carrefour altamira Kausana

A González C...

Zoom meeting grid with participants: Laura Ibáñez, Ale Marchena, Mayma - Anty Davis, Charlotte, Ale, iPhone de Javier, Jorge García, Alejandra Mercado, Jerónimo Barista Bacher, Francisco Rozzi, Diana Méndez, Margarita Caride, MICAELA PALOMIQUE, John Barrera, Melias Casen Prieto, Labedo Melisa-Jacki.

# PODCAST CLIMATEGENN

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In the latest episode of the **ClimateGenn** podcast, **Dr. Shaun Fitzgerald OBE**, in conversation with **Nick Breeze**, highlights the important modelling work to assess the carbon sequestration potential of cultivated kelp forests at a global scale. In this episode, he also discusses new research to build resilient and scaleable kelp growing platforms, asking the key question: can kelp forests capture and store a billion tonnes of carbon?

KFF is helping to answer this question by sponsoring (thanks to the **Moore Foundation**) the work of Prof. John Taylor & Dr. Ke Li of the Department of Applied Mathematics and Theoretical Physics at University of Cambridge, to create a **kelp carbon sequestration pathway model**.

Sr Shaun Fitzgerald OBE is the director of the **Centre for Climate Repair at Cambridge University**. As the Centre for Climate Repair forges ahead with its 3 R's strategy of reducing emissions, removing carbon from the atmosphere and repairing essential climate systems such as the Arctic, Shaun has high hopes for large scale ocean sequestration but does not stop short of stating the need for urgent research into engineering methods for reflecting sunlight away from the Earth.

Listen to the podcast by clicking [this link](#)



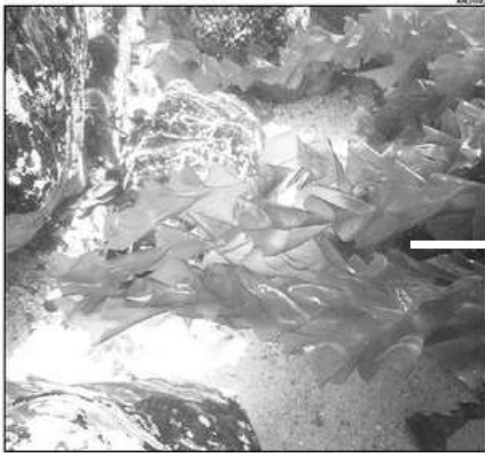


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## Pymes

RECURSO. BRINDA SERVICIOS ECOSISTÉMICOS Y NUEVAS FUENTES DE INGRESO

### Mayma Azul apuesta al desarrollo de startups que cultivan algas marinas



TRIPLE IMPACTO. Una actividad sostenible con gran posibilidad de desarrollo en el país.

La actividad tiene posibilidades de expansión en Chile, Argentina, Estados Unidos, Canadá, Nueva Zelanda, Australia y Sudáfrica

El cultivo de algas marinas es una de las soluciones biológicas más prometedoras y escalables para la lucha contra el cambio climático. Para apoyar la industria del cultivo de algas son claves inversiones en desarrollo de productos de tecnología oceánica, así como en técnicas de monitoreo, e incrementar la investigación científica para valorizar los servicios ecosistémicos.

Por ello, Mayma Azul apuesta a la "revolución azul" mundial mediante la creación del "primer ecosistema regenerativo azul" de Latinoamérica. Se trata de impulsar una comunidad de negocios con efectos sociales, ambientales y económicos, en la que se potencien sus negocios por medio de la realización de talleres, asesorías, mentorías, acceso a opciones de financiamiento y espacios de generación de alianzas, con grandes actores, empresas y gobiernos.

Mayma Azul es un programa de formación teórica y práctica 100% virtual, de una duración de 16 semanas intensas de trabajo y con disertantes que dirigen proyectos interesantes en Latinoamérica, España y Estados Unidos.

Está diseñado para entrenar a acuicultores regenerativos y "emprendedores azules" y brindar facultad técnica, comercial y económica a sus proyectos y negocios.

Las principales aplicaciones de las startups de algas marinas están dedicadas al rubro alimentación, bioplásticos, alimentación para animales, nutracéuticos, cuidado personal, bioestimulantes, fertilizantes, farmacéuticos, textiles, secuestro de carbono y energía.

En Mayma actualmente trabajan 3.300 emprendedores acompañados para repensar sus modelos de negocios con el eje en el propósito socioambiental. Más de 300 mentores guían a emprendedores para lograr sus objetivos. Están presentes en seis países: Argentina, Chile, Colombia, México, Uruguay y Venezuela.

El objetivo de esta organización es transformar la economía hacia una regenerativa, inclusiva y colaborativa, potenciando negocios de triple impacto en Latinoamérica.

#### Revolución azul

Cabe señalar que las algas son protagonistas de la revolución azul y son responsables de sostener la vida en el planeta. "Aproximadamente 50% de la fotosíntesis en la Tierra ocurre en las algas y algas microscópicas que flotan en los océanos, que contribuyen a la absorción de dióxido de carbono y la liberación de oxígeno", detallaron en Mayma.

Es tal su magia, que el manifiesto de la Naciones Unidas las asocia directamente a la respuesta para alcanzar seis de los 17 Objetivos de Desarrollo Sostenible (ODS): el 2, hambre cero; el 3, salud y bienestar; el 8, trabajo decente y crecimiento económico; el 10, reducción de las desigualdades; el 12, producción y consumo responsables; el 13, acción por el clima, y el 14, vida marina. La producción basada en el agua de forma ética es urgente, y es posible apoyar a los agricultores marinos regenerativos en la era de la crisis climática azul-vital.

Samantha Deane es directora de la Kelp Forest Foundation y una de las disertantes del evento de Mayma Azul. Ella creció en Argentina y luego estudió derecho y economía en la universidad de Durham, Inglaterra. Su carrera comenzó en el piso de operaciones del Banco Merrill Lynch en Londres y luego continuó en el mundo del diseño en Medio Oriente, donde vivió más de 10 años. Ahora, basada en Países Bajos, junto con Kelp Blue fundó la fundación de Kelp Forest para buscar incrementar la ciencia, la tecnología y la conciencia que ayudarían a restaurar la salud de los océanos y de la atmósfera, inicialmente alrededor de la repoblación y cultivo de bosques de kelp y compartir estos conocimientos abiertamente.

Los interrogantes centrales de la Kelp Forest Foundation están referidos a conocer cuál es el efecto de los bosques marinos cultivados sobre la flora y fauna existente; cómo afectan los bosques de algas cultivados las aguas en donde crecen; cuánto carbono secuestran los bosques de algas marinas en el fondo del océano, y cuántas emisiones se evitan al usar productos hechos a base de algas marinas cultivadas.

Existen diferentes tipos de algas, micro y macro, que son las algas marrones y marinas macroalgas. Las características principales de las algas macrocystis pyrifera son que crecen 50 centímetros por día (en condiciones óptimas), hasta 65 metros de altura. Ellas forman densos bosques marinos, sustentan más de 800 especies y contienen compuestos de alto valor.

Los servicios ecosistémicos de bosques de kelp forests son captura de carbono. Por hectárea, éstos pueden absorber 20 veces más CO2 que los bosques terrestres. Además, contribuyen a incrementar la biodiversidad porque crean refugio y zonas de desove y alimentación para cientos de especies. Ayudan, asimismo, en los procesos de filtración de agua porque filtran el exceso de nutrientes inorgánicos, a la vez que oxigenan las aguas y contribuyen a la reducción de la acidificación porque elevan su PH y reducen la acidificación de los océanos.

Following Samantha's presentation with Mayma Azul, the newspaper Comercio y Justicia Argentina presented the conversation and the information she had during the conversation.





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# MACROCYSTIS SPORE BANKS



# INTERNSHIP

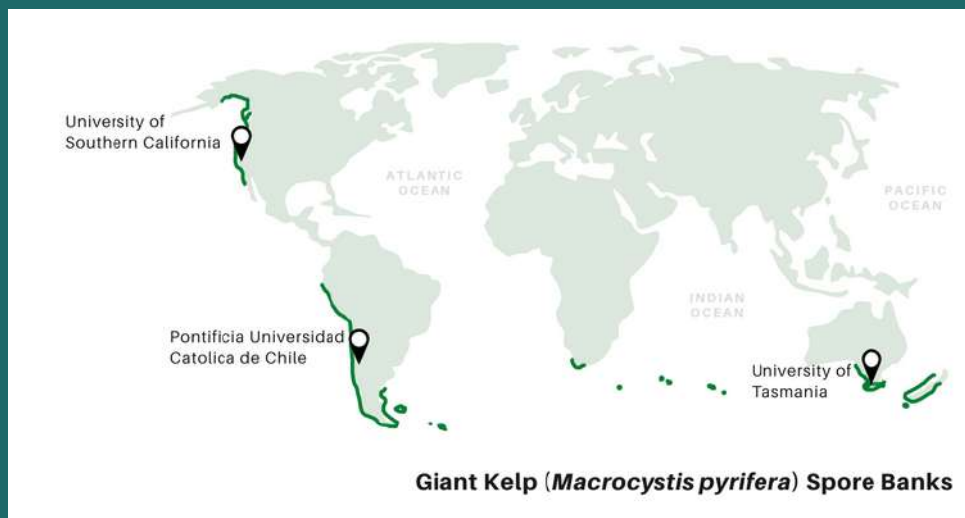
## MAPPING GLOBAL SPORE BANKS

Many kelp forests, such as those off the coast of Australia and California, are disappearing mainly due to warming waters. Giant kelp species prefer cool temperatures, and researchers are worried that the losses could accelerate in the coming years as climate change continues. Kelp spore banks are an important tool to help us during restoration efforts. By keeping a genetically diverse set of wild giant kelp spores, we can: identify warm-tolerant kelp stocks; restore beds that are wiped out due to more localised disasters, such as oil spills by replanting the beds with previously collected propagules from the original local stocks; preserve genetic diversity for future generations and provide the much-needed starting material for future kelp farmers.



*Diana DiMarco*

Diana DiMarco, biostatistician and marine ecologist, has started an internship with KFF during which she will create an overview of the giant kelp depositories and spore banks around the world, with the goal to map the status of the global seaweed seed banks, identify opportunities for collaborations and sharing, and understand which gaps need to be filled. We are also looking to align our own approach with other institutions to enhance fair sharing. Diana will focus on creating a digital inventory of the associated knowledge centres, universities, research institutions, and companies that are safekeeping spores and researching giant kelp.



*First data collection visualised in global map showing identified repositories.*





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# OTHER NEWS



# EARLY BIRD TROPHY

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Kelp Forest Foundation received the **Early Bird Trophy** after being the first to hand in our quarterly report to the **COMON Foundation**.



**TNO** innovation  
for life

## NEW PARTNER: TNO

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KFF has signed a Memorandum of Understanding with **TNO**. TNO (Netherlands Organisation for Applied Scientific Research) is an independent research organisation in The Netherlands that focuses on a wide range of topics. One of their projects is to convert seaweed into bio-based fuels and raw materials. Our partnership will focus on sharing seaweed-related knowledge.

# ULT FREEZER

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We have purchased a freezer that is essential for storing samples and material for research to be conducted. This purchase was made possible by a generous donation from the **Great Island Foundation** towards the kelp carbon **Sediment Baseline Study**. The freezer is essential to preserve the eDNA components of the organic carbon within sediments.



**-86°C ULT Freezer**  
DW-86W420J

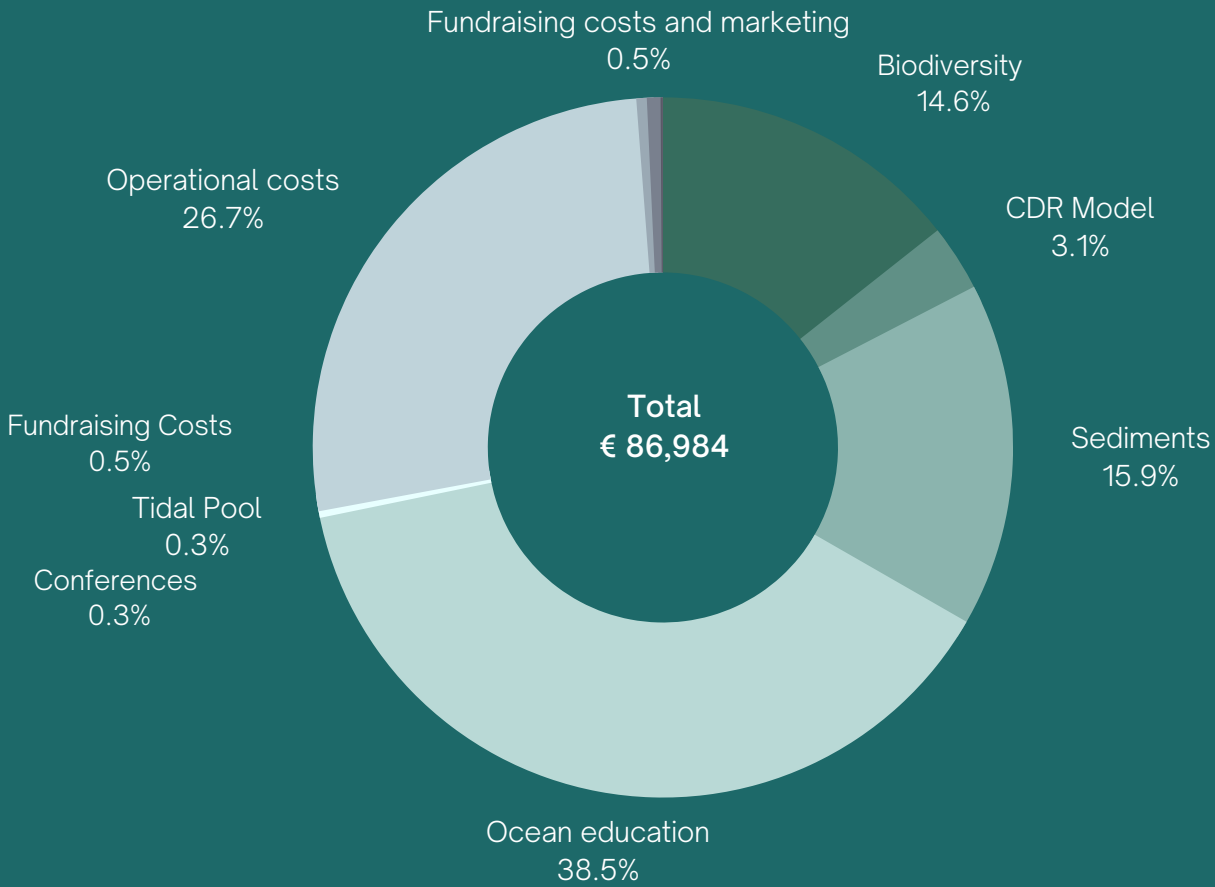


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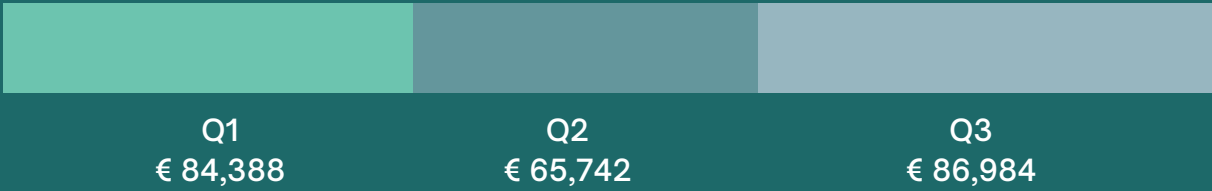
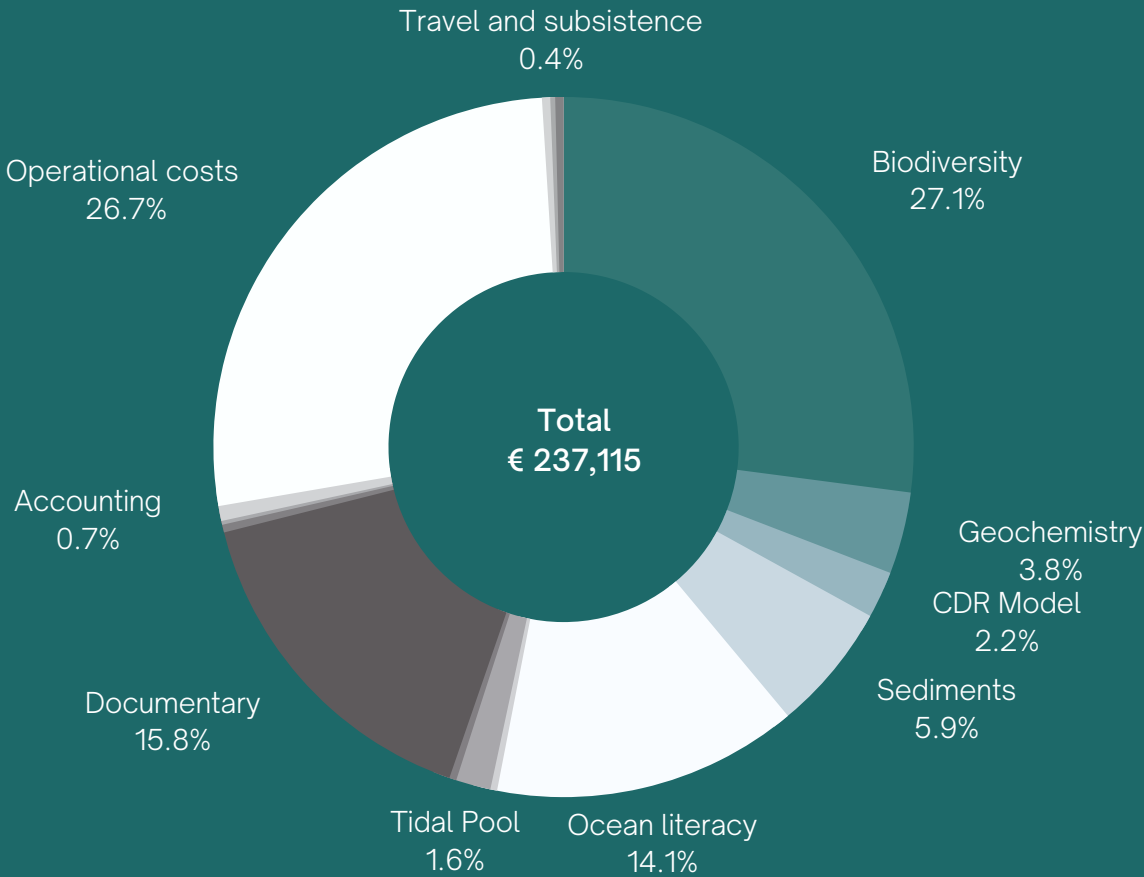
# FINANCIALS



# Q3 EXPENSES



# 2022 EXPENSES - YTD







# KELP FOREST FOUNDATION

[INFO@KELPFORESTFOUNDATION.ORG](mailto:INFO@KELPFORESTFOUNDATION.ORG)