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FISHERIES RESEARCH &  
DEVELOPMENT CORPORATION

FINAL

# **Shared science and Indigenous knowledge to support fisheries capacity building in Torres Strait**

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## Shared science and Indigenous knowledge to support fisheries capacity building in Torres Strait 2019-124

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In submitting this report, the researcher has agreed to FRDC publishing this material in its edited form.

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# Executive Summary

This report presents the results of a collaborative science capacity building project involving CSIRO researchers and Torres Strait Islander Fishing Industry Representatives. Project participants worked together in the development and delivery of science capacity building programs tailored to each of the individual Torres Strait participants. The program was explicitly about Indigenous knowledge and perspectives around fisheries management from western science, where scientists also had the opportunity to learn and discuss ways forward in combining these two knowledge systems. Torres Strait Islander Industry representatives had the opportunity to co-write conference abstracts and present at international fisheries conferences, State and Indigenous fora and attend formal training in aquaculture.

## Background

Traditional inhabitants from Torres Strait partly or fully own fisheries in the region. Some individuals are also occasionally involved in research and play a key role in sustainably managing marine living resources, with several serving as members of Resource Assessment Groups (RAGs), Working Groups (WGs), or in reviewing scientific research proposals submitted to the Torres Strait Scientific Advisory Committee (TSSAC). It is therefore important to ensure representative industry members are up to date with recent science developments and latest information about fisheries from around the world and are prepared to participate, actively contribute, and present their work and discuss concerns in both domestic and international fora.

In August 2019, on request from the Hand Collectables Working Group (HCWG), Dr Éva Plagányi (CSIRO) provided details about upcoming conferences that could be of interest to members of the HCWG to share recently developed bêche-de-mer (sea cucumber) harvest strategy. Dr Plagányi suggested that at least one participant from the HCWG could attend and present at one of the conferences and also offered the opportunity to collaborate with members of the HCWG in research to be presented at the identified conferences. Soon after the announcement two members of the HCWG started collaborating with CSIRO scientists, but the COVID-19 pandemic resulted in postponement of conferences and project activities worldwide.

## Aims/objectives

The objective of the project was to build capacity in the Torres Strait Fisheries Industry through the active engagement of industry members and CSIRO scientists transferring and sharing knowledge to collaboratively prepare and deliver scientific talks at international or local fisheries-related conferences and other fora, and to attend formal aquaculture training.

## Methodology

Opportunities for participation of Torres Strait Islanders in the project were announced at Torres Strait Tropical Rock Lobster and Hand Collectables Resource Assessment Groups (RAGs) in December 2020, March 2021, October 2021, and December 2022. The project also engaged with the Australian Fisheries Management Authority (AFMA) to advertise the opportunity in the Torres Strait region.

Candidates were selected based on the following selection criteria: a) Expressed interest to attend or present at conferences, b) Nomination from relevant Traditional Owner representative body, Research Advisory or Working Group, c) Submission of conference abstract to relevant conferences and willingness to commit time to prepare abstracts and presentations, as well as post-conference communication activities.

The CSIRO scientists prepared a capacity building program tailored to each participant's needs. The program included the following topics: a) Traditional Owner perspectives on Torres Strait Fisheries local knowledge and management arrangements, b) Development and implementation of new harvest strategies for rock lobsters and bêche-de-mer, c) Climate change and potential impacts on ecosystems

and species, d) Data used to inform management decisions: surveys and stock assessments, e) Re-seeding and stock enhancement techniques, and f) Lessons and future opportunities in integrating Indigenous knowledge and aspirations with western science. The capacity building program also included training on scientific writing and presentation skills. The program was delivered using a mix of virtual meetings, pre-determined writing and presentation tasks, and face-to-face meetings at the CSIRO office in St Lucia (Brisbane, QLD) for practical science and presentation activities.

A post-activity follow-up plan was part of the project extension strategy and included debrief sessions involving the project leader and each individual participant, who provided their views on: a) General feedback on structure and program of the conference, b) Pressing topics identified in the conference and potential application for Torres Strait fisheries, c) Potential future research directions, and d) Any other lessons learnt by attending the conference. There were substantial delays of project activities due to the COVID19 pandemic, which caused considerable disruptions to conferences and associated travel worldwide.

## Results

The following Torres Strait Islander fishery representatives who participated in the project, their affiliations, and capacity building activity are provided below:

- **Mr Frank Loban:** Zenedth Kes Fisheries board member, member of the Torres Strait Scientific Advisory Committee (TSSAC). Presented at the **World Fisheries Congress (Adelaide), in September 2021, virtual meeting**
- **Mr Rocky Stephens:** Torres Strait Islander (member of Torres Strait Finfish Working Group, Councillor for Ugar (TSIRC), Torres Strait Regional Authority (TSRA) member for Ugar, Zenedth Kes Fisheries member, business owner. Attended formal training on **Sandfish seed production, nursery and management** in May 2023 at the Southeast Asia Fisheries Development Centre (SEAFDEC) in the Philippines. Presented sea cucumber hatchery/sea ranching project he is leading at State and Indigenous fora.
- **Mr Patrick Mooka:** Guda Maluilgal Representative at TSRA, member of the Torres Strait Tropical Rock Lobster (TRL) Research Advisory Group and TRL Working Group, member of Zenedth Kes Fisheries. Presented at the **12th International Conference and Workshop on Lobster Biology & Management** (Fremantle) in October 2023

The Torres Strait Island Industry Representatives identified the following research priorities after attending the capacity building activities:

- Native title and consistent legal framework with regards to recognition of resource ownership to Traditional Owners and regulation of access to resources across Australia.
- Science communication: How to provide Torres Strait fishers the science information and knowledge needed so they can identify new fisheries and other livelihood opportunities linked to the sea?
- Emerging opportunities around sea cucumber aquaculture in Torres Strait, including the development or adjustment of new technologies (e.g. happa frames) to rear juveniles, research on habitats and integration of small-scale aquaculture with ecosystems to use resources already available in the region (e.g. carrying capacity), and broodstock selection.
- Further research on ecological restoration, ecosystem services, integrative, multi-species aquaculture as opportunity to link with emerging initiatives that could contribute to income (e.g. blue carbon, biodiversity credits and other credit/finance emerging opportunities).
- Explore other aquaculture opportunities in Torres Strait
- Impacts of climate change on lobster migration (timing, settlement) and understanding how future changes in temperature and currents will affect the supply of larvae in Torres Strait and how they settle and grow, also considering habitats and food-chains.

- Need to improve research coverage in Torres Strait. For example, via extending ranges of current program on seagrass monitoring because of important links between seagrass, dugongs, and turtles.
- Need for more research about climate change impacts on ecosystems and species. More environmental data to understand and support research about climate change.

### **Implications for relevant stakeholders**

Mr Loban's presentation at the World Fisheries Congress was used by AFMA to build awareness within AFMA of Indigenous fishing interests and rights, including in the Torres Strait. The presentation was also shared with Torres Strait Hand Collectables Resource Assessment and Working Groups and inspired ongoing collaborations. Mr Loban also presented to international research and management staff from the Seychelles Fishing Authority (SFA) and the Kenya Marine & Fisheries Research Institute (KMFRI) at a CSIRO workshop held in Brisbane in August 2023, providing valuable insights about process and time needed to develop harvest strategies, the need to build trust among stakeholders, capacity issues and considerations to work in remote areas in Australia.

Mr Stephen's formal training on Sandfish seed production, nursery and management gave him the confidence and knowledge to continue to pursue his community aspiration to establish a sea cucumber hatchery and sea ranching project in Ugar Island. He has presented the project to Commonwealth, State and Local government, and Indigenous agencies, Traditional Land Owners, processors and buyers to seek support and approval, to understand requirements and identify challenges and opportunities for his community.

Mr Mooka's presentation at the 12th International Conference and Workshop on Lobster Biology & Management has led to discussions with researchers at the conference about how to adequately engage with communities in Torres Strait, research needs to support the fishery and awareness about research undertaken by the Research ARC Hub for sustainable onshore aquaculture lobster aquaculture, and challenges and potential opportunities in the Torres Strait region.

The project also provided an excellent opportunity to build cultural capacity of CSIRO scientists who interacted with Torres Strait Island participants. The two-way flow of traditional and western science knowledge between project participants has certainly enriched the perspectives of all involved, who are now able to better understand each other's perspectives and collaborate to better support the region.

### **Recommendations**

We recommend ongoing support of Indigenous science capacity programs, to build cultural capacity of scientists and facilitate practical two-way exchange of knowledge. It is also recommended to consider the research needs identified by Torres Strait islander Industry Representatives in future FRDC, AFMA and other calls for research proposals. We also recommend a broader discussion about aquaculture potential in the region, considering previous research conducted in the area and links with fisheries. There is also potential to investigate suitability and viability of emerging opportunities that could potentially be used to support livelihoods and generate local income. For example, integrated and multi-trophic aquaculture, environmental restoration and finance instruments, such as carbon and biodiversity credits, as well as aquaculture risks and opportunities. There is an opportunity for innovation and incorporation of Indigenous knowledge and aspirations in the development of future opportunities in Torres Strait.

### **Keywords**

**Fishers, capacity building, Indigenous knowledge, science capacity**



# Introduction

## Project background

Over the past decade, CSIRO fisheries researchers working on Torres Strait fisheries have been engaged in strengthening two-way information sharing with Torres Strait Islanders and building science capacity, such as through industry participation of Traditional Owners in research and science capacity workshops held in Brisbane and Thursday Island in 2013, 2015 and 2018. Building on this, our team have discussed the benefits of having TOs attend scientific conferences to provide broader perspectives and networking opportunities with other industry attendees, scientists and managers.

In August 2019, on request from the Hand Collectables Working Group (HCWG), Dr Éva Plagányi (CSIRO) provided details about upcoming conferences that could be of interest to TO members of the WG, to share outcomes for the recently developed bêche-de-mer harvest strategy. The minutes of the Dec 2019 TRLRAG meeting states the following:

*The CSIRO scientific member provided a brief update on the Food and Agriculture Organisation (FAO) International Fisheries Symposium held in Rome from 18 – 21 November 2019 where Dr Éva Plagányi presented on Adapting fisheries management for proactive, climate-ready dependent societies and economies, featuring some of the work she undertakes in the Torres Strait.*

*Dr Plagányi added that it would be beneficial to have some Traditional Inhabitant members attend an upcoming conference, noting that there is the World Fisheries Congress in Adelaide, 11-15 October 2020 followed by the International Lobster Symposium in Perth, 18-23 October 2020. The RAG noted that CSIRO are seeking funding to support the attendance of at least one Traditional Inhabitant member from the Torres Strait to attend either conference.*

*The RAG also noted and congratulated Traditional Inhabitant member Mr Rocky Stephen who has been accepted to present a scientific abstract on his collaborative work on sea cucumber stock enhancement at the Marine Socio-Ecological Systems (MSEAS) Symposium in Japan, May 2020.*

Dr Plagányi also offered the opportunity to collaborate with TO members from the HCWG in research to be presented at the identified conferences. The next step was to seek the funds to develop and implement a science capacity program to give TO industry representatives the knowledge and confidence to attend and present at the conferences and ensure financial support for conference fees and travel, and to extend the opportunity to other Torres Strait RAGs. The FRDC 2019 Competitive Round call for Expression of Interests was timely and provided an excellent opportunity to make this project happen.

Two TO members of the HCWG nominated themselves to join the project in 2019 and started collaborating with CSIRO scientists in abstracts for identified conferences, which were submitted and accepted. Due to the COVID-19 outbreak, travel and face-to-face interaction were banned in 2019 and 2020. Therefore, the conferences identified at the proposal stage were postponed. This caused significant delays to the project and led to revision of deliverables. For example, the third Torres Strait TO Industry Representative was only nominated after announcement of the opportunity at the 2022 Torres Strait Tropical Rock Lobster RAG. FRDC and CSIRO responded efficiently, and the final project milestone has been successfully delivered and reported here.

This proposal addresses the need to facilitate the sharing of traditional and western science ideas and build capacity to support fisheries management in Torres Strait.

## **Need**

Traditional Inhabitants from Torres Strait partly or fully own fisheries in the region. Some individuals are also occasionally involved in research and play a key role in sustainably managing their local living resources, with several serving as members on Resource Assessment Groups (RAGs), Working Groups, or in reviewing scientific research proposals as part of the Torres Strait Scientific Advisory Committee (TSSAC). It is therefore important to ensure representative Traditional Inhabitant industry members are up to date with recent science developments and updated information about fisheries from around the world and are prepared to participate and present their work and concerns in both domestic and international fora.

# Objectives

The contractual objective of this project was to:

*Provide opportunities to Torres Strait Industry Representatives to learn about latest developments in fisheries research and management and build capacity through co-authoring talks with CSIRO researchers and attending international fisheries conferences.*

Due to COVID-19 travel disruptions worldwide one of the selected conferences was postponed to June 2024, the original objective was revised and approved by FRDC to include formal sea cucumber aquaculture training, in addition to attendance and presentations at international conferences.

# Method

The funds requested for the project were used to cover the following activities:

- 1) Costs for one Torres Strait (TS) Islander representative to attend the World Fisheries Congress in Adelaide (September 2021)
- 2) Costs for one TS Islander representative to attend a formal training on *Sandfish seed production, nursery and management* in May 2023 at the Southeast Asia Fisheries Development Centre in the Philippines (SEAFDEC) – this was a variation from original proposal agreed with FRDC. Initial proposal included cost for a TS Islander representative to attend the Marine Socio-Ecological Systems Symposium (MSEAS, Japan) in 2020, which has been postponed to 2024.
- 3) Costs for one TS Islander representative to attend the 12th International Conference and Workshop on Lobster Biology & Management (Fremantle) in October 2023
- 4) Costs for TS Islanders to visit CSIRO Brisbane lab to work with researchers on preparation and delivery of talks for the conferences and other activities.

## Selection criteria for candidates

Opportunities for participation of Torres Strait Islanders in the project were announced at Torres Strait Tropical Rock Lobster and Hand Collectables Resource Assessment Groups (RAGs) in December 2020, March 2021, October 2021, and December 2022. These fora had Traditional Inhabitants representatives and also representatives from the Torres Strait Regional Authority (TSRA). The project also engaged with the Australian Fisheries Management Authority (AFMA) to more broadly advertise the opportunity in the Torres Strait region.

Candidates were selected based on the following selection criteria:

- 1) Expressed interest to attend or present at conferences;
- 2) Nomination from relevant Traditional Owner representative body, Research Advisory or Working Group;
- 3) Submission of conference abstract to relevant conferences and willingness to commit to the process of preparation, as well as post-conference communication activities.

The broad topics of fisheries science and fisheries management knowledge covered in the capacity building program were:

- Traditional Owner perspectives on Torres Strait Fisheries local knowledge and management arrangements;
- Development and implementation of new harvest strategies for tropical rock lobster and bêche-de-mer;
- Climate change and potential impacts on ecosystems and species;
- Data used to inform management decisions: species surveys and stock assessments;
- Re-seeding and stock enhancement techniques for species;
- Lessons learnt and future opportunities for integrating Indigenous knowledge and aspirations with western science.

## **Two-way exchange of knowledge**

At the start of the project the project team (CSIRO scientists and Traditional Inhabitant Industry representatives) outlined the capacity building program and established the rules of engagement, which included how and when to engage.

The program included:

- scientific writing;
- presentation skills;
- delivery of fisheries science and fisheries management topics;
- consideration of topics through the lens of traditional knowledge;
- participants perspectives around fisheries in Torres Strait.

The way the above was delivered included a mix of virtual meetings, pre-determined writing and presentation tasks, and face-to-face meetings at CSIRO office in St Lucia (Brisbane, QLD) for practical science and presentation activities.

## **Post conference follow-up**

A post conference follow-up plan was part of the project extension strategy. Within 1 month after attendance at conferences or training, each participant discussed the following topics with the project leader:

- General feedback on structure and program of the conference;
- Pressing topics identified in the conference and potential application for Torres Strait fisheries;
- Potential future research directions;
- Any other lessons learnt by attending the conference.

# Results

## Project participants

The following Torres Strait Islander representatives participated in the project:

- **Mr Frank Loban:** Torres Strait Islander (Zenedth Kes Fisheries board member, member of the Torres Strait Scientific Advisory Committee (TSSAC). Co-authored abstract and presented at the **World Fisheries Congress (Adelaide) in September 2021 (virtual meeting)**.
- **Mr Rocky Stephens:** Torres Strait Islander (member of Torres Strait Finfish Working Group, Councillor for Ugar (TSIRC), Torres Strait Regional Authority (TSRA) member for Ugar, Zenedth Kes Fisheries member, business owner. Attended formal training on **Sandfish seed production, nursery and management** in May 2023 at the Southeast Asia Fisheries Development Centre (SEAFDEC) in the Philippines.
- **Mr Patrick Mooka:** Guda Maluilgal Representative at TSRA, member of the Torres Strait Tropical Rock Lobster (TRL) Research Advisory Group and TRL Working Group, member of Zenedth Kes Fisheries. Presented at the **12th International Conference and Workshop on Lobster Biology & Management** (Fremantle) in October 2023.

## Summary of activities

### Mr Frank Loban, World Fisheries Congress (WFC, Adelaide, September 2021)

The 2021 event was the 8th edition of the WFC, held every 4 years, and the “largest gathering of research, industry and management sectors to discuss the latest advances in fisheries world-wide”. The WFC aims to foster cooperation and engagement in commercial, recreational and Indigenous fisheries and provide opportunities to engage and discuss research and management developments and needs to ensure fisheries sustainability in the long term.

**Title of abstract:** Adoption of a new community-endorsed harvest strategy for the Torres Strait bêche de mer fishery

**Authors:** Frank Loban (presenter), Éva Plagányi, Nicole Murphy and Leo X.C. Dutra

**Abstract:** The Australian Torres Strait bêche de mer (sea cucumber) fishery is fully Indigenous owned. This talk will be presented by a Torres Strait Islander community representative to share perspectives on the recent successful adoption of a new harvest strategy that was developed in close consultation with stakeholders. There has been an expressed desire for improved management and economic returns from the fishery to be balanced with the maintenance of customary practices, utilisation of traditional ecological knowledge and maintenance of lifestyle, autonomy and livelihoods of traditional inhabitants. Models and methods for managing this fishery have been tailored to the unique regional requirements, limited data availability and need for mapping a pathway towards increasingly meeting multiple objectives. This talk will provide a summary of the processes and methods used to integrate the above considerations into a new harvest strategy.

The WFC was planned to be a face-to-face event, but COVID19 developments and lock downs in various parts of Australia just prior to the conference, forced organisers to quickly move to online delivery mode. The online conference required a pre-recording of a video presentation to be submitted to the conference. After discussion with Mr Loban, the project team decided that the best option would be for Mr Loban to join the CSIRO team in Brisbane to both deliver the capacity building program and record the video presentation for the congress.

## Delivery of capacity building program and extension

Mr Loban spent the week of 6-10 September 2021 with the CSIRO team at the Queensland Biosciences Precinct in Brisbane. The following topics were delivered, via presentations and workshop sessions, where CSIRO scientists (Leo Dutra, Eva Plaganyi and Nicole Murphy) and Mr Loban had the opportunity to exchange knowledge and learn from each other. During the trip, Mr Loban worked with the CSIRO team in the planning and delivery of his video presentation (unfortunately the WFC delivery changed to online mode due to COVID-19 outbreak in the weeks before the conference). The capacity building program delivered involved the following topics:

- Bêche-de-mer Harvest Strategy.
- Integration of knowledge systems.
- Climate change and impacts on Torres Strait Fisheries.
- Presentation skills for video presentation.

The presentation delivered by Mr Loban was also used by:

- AFMA as part of their Reconciliation Action Plan to build awareness within AFMA of Indigenous fishing interests and rights, including in the Torres Strait.
- Torres Strait Hand Collectables Resource Assessment and Working Groups to provide feedback and inspire ongoing collaborations.
- We also provided a copy of Mr Loban's presentation to Chris Bourke, CSIRO's deputy director of Indigenous science and engagement, as an example of a successful collaboration.
- In August 2023 Mr Loban was invited to talk about the development of the Torres Strait *bêche-de-mer* harvest strategies to research and management staff from the Seychelles Fishing Authority (SFA) and the Kenya Marine & Fisheries Research Institute (KMFRI) who attended a workshop in Brisbane to exchange lessons and share experiences in the development of harvest strategies for fisheries. The group praised Mr Loban for the talk, which provides valuable insights to them about the process and time needed to develop harvest strategies, the need to build trust among TO stakeholders, capacity issues and considerations to work in remote areas.



*Figure 1. Mr Frank Loban (right) and CSIRO researchers Leo Dutra (left) and Éva Plagányi (centre) at the CSIRO laboratory in St Lucia (QLD) during preparation of video presentation for World Fisheries Congress in September 2021.*

## **Mr Rocky Stephens: formal training on Sandfish seed production, nursery and management in May 2023**

Since 2018, community representative Mr Rocky Stephen has been working with CSIRO in the development of a sea cucumber aquaculture project in Ugar Island in the Torres Strait. Early in the project (2019), Mr Stephen submitted an abstract to the Marine Socio-Ecological Systems (MSEAS) Symposium, originally planned for May 2020 in Yokohama, Japan. However, the MSEAS was postponed due to COVID19 and the conference has since been confirmed for June 2024. After discussion and agreement with FRDC and Mr Stephen, it was decided that instead of attending MSEAS Mr Stephen would attend formal training on Sandfish seed production, nursery and management delivered by the Southeast Asia Fisheries Development Centre in the Philippines (SEAFDEC). The training course was delivered in May 2023.

SEAFDEC is an autonomous inter-governmental body established in 1967. The mission of SEAFDEC considered and adopted by the Special Meeting of the SEAFDEC Council 2017 is “To promote and facilitate concerted actions among the Member Countries to ensure the sustainability of fisheries and aquaculture in Southeast Asia.” SEAFDEC has been running formal training on sandfish aquaculture for years, training researchers, industry and management officers from across the Pacific facilitated by the Pacific Community (SPC). The 2-week course in the Philippines included lectures and practical sessions on biology and ecology of sandfish, broodstock preparation for spawning, larval rearing and production of natural food organism, among others.

Mr Stephen was impressed with the organisation and practical application of the contents taught and commended the training providers and SEAFDEC team. Mr Stephen now has the wisdom, knowledge and the understanding needed to establish and operate a sea cucumber aquaculture facility. He is now adapting his technical skills from the learnings he gained on the course, to the unique conditions of his home Island, Ugar in the Torres Strait. He is now working with CSIRO on the research and development needed to minimise risks and ensure the aquaculture venture is sustainable and economically viable in the long-run. The course also provided an excellent opportunity to make connections with the SEAFDEC team, and develop networks.

### ***Delivery of capacity building program***

The delivery of the program was practical in nature because of the need to prepare Mr Stephen to present at MSEAS (in the early days of the project) and the need to prepare documentation and presentations for the following meetings:

- April 2021: QLD State Assessment and Referral Agency (SARA) in April 2021 for formal advice on permits, licences (and associated fees) and other compliance requirements to establish a sea cucumber hatchery and sea ranching project in Ugar Island. Mr Stephen is the community representative for the initiative.
- February 2022: Presentation to industry members of Kemer Kemer Meriam and Kulkalgal at discussions for trial opening of the Black Teatfish fishery in Mer Island
- October and December 2022: held meetings online and in Thursday Island to develop the scope of the project and apply for CSIRO Indigenous engagement program funding opportunity.
- October 2023: presentation of the project at a meeting with the Traditional Land Owner of the land proposed to be used in the initiative and the Ugar Registered Native Title Bodies Corporate (RNTBC).
- November 2023: (a further) presentation of the project to the Ugar RNTBC board to put forward recommendation to support and approval to access areas in the home reef, hold



consultations with the community and conduct ecological survey in Ugar to identify areas for use in the project.

- December 2023: presentation of the project at the QLD State Department of Treaty, Aboriginal and Torres Strait Islander Partnerships, Communities and the Arts and met with the CEO of the Torres Strait Island Regional Council to discuss the project.

Mr Stephen had the opportunity to engage directly with CSIRO scientists Leo Dutra, Eva Plaganyi, Nicole Murphy and Simon Irvin, in the preparation and delivery of material to support the above-mentioned engagements.

### **Capacity building topics**

- Bêche-de-mer fisheries science.
- Bêche-de-mer Torres Strait Harvest Strategy.
- Climate change and impacts on Torres Strait Fisheries.
- Regulatory needs to establish aquaculture in Queensland.
- Sea cucumber aquaculture to re-stock and enhance stocks.
- Sea ranching.
- Topics covered during training on Sandfish seed production, nursery and management at SEAFDEC:
  - Sandfish broodstock management
  - Spawning
  - Larval rearing
  - Nursery culture
- Scientific writing and presentation skills.
- Integration of Indigenous knowledge and western science to support aquaculture and fisheries management.



*Figure 2. Mr Rocky Stephen (right) receiving his Sandfish seed production, nursery and management certificate from SEAFDEC trainer Dr Jon Altamirano (SEAFDEC) (right). May 2023*

## **Mr Patrick Mooka: 12th International Conference and Workshop on Lobster Biology & Management (ICWL, Fremantle) in October 2023**

The ICWL was initially planned for October 2021, but due to the COVID19 pandemic the conference was postponed to October 2023. The theme of the 12th ICWL was 'ecosystem-based fisheries management (EBFM)'. EBFM is a holistic approach to fisheries management that recognises all the interactions within an ecosystem, rather than considering a single species or issue in isolation. This represents best practice for fisheries management and reflects that fisheries research and management focus is now broader than just sustainability. Therefore, in addition to presentations that focused on lobster (and crab) biology and stock assessment, the conference organisers also welcomed presentations that examined other aspects of EBFM, such as ecosystem effects of fishing, economic assessments, social issues, governance, and compliance with management regulations.

**Title of abstract:** Indigenous perspectives on the integration of traditional and western science knowledge systems to support the Torres Strait Tropical Rock Lobster Fishery

**Authors:** Patrick Mooka, Leo X.C. Dutra, Eva E. Plaganyi

**Abstract:** The tropical rock lobster (TRL, *Panulirus ornatus*) fishery is the most important economically in the Torres Strait supporting Traditional Inhabitants in a region with limited alternatives. The fishery is also culturally and socially important supporting traditional lifestyles and autonomy of traditional inhabitants. The Torres Strait TRL fishery also supports a commercial non-Indigenous sector and is managed jointly under the jurisdiction of Australia and Papua New Guinea (PNG) and a treaty between these two countries was established to manage the shared resources. The treaty explicitly acknowledges and protects traditional lifestyles and livelihoods of Traditional Inhabitants, including traditional fishing practices. This presentation will be delivered by a Torres Strait Islander official fisheries representative –who will share his perspectives about traditional knowledge and customary practices and their integration with western science to support the management of the TRL fishery. The aim is to ensure future generations of Traditional Inhabitants will continue to enjoy the socio-cultural and economic benefits from a well-managed fishery.



Figure 3. Mr Patrick Mooka visit to CSIRO in Brisbane (top left) with co-author and project leader Dr Leo Dutra (bottom left) and presenting at the 12th International Conference and Workshop on Lobster Biology & Management in Fremantle (top right), and with CSIRO scientist and co-author Dr Eva Plaganyi (bottom right).

## Delivery of capacity building program

Mr Mooka visited the CSIRO St Lucia site in Brisbane (QLD) during the week of 16-20 October 2023. This allowed for engagement and two-way learnings between Mr Mooka and CSIRO scientists (Leo Dutra, Laura Blamey, Denham Parker, Eva Plaganyi). Mr Mooka also attended an online meeting with the Director of the ARC Research Hub for Sustainable Onshore Lobster Aquaculture (Professor Gregory Smith). The capacity building program delivered involved the following topics:

- Presentation skills for scientific audience.
- Tropical Rock lobster Harvest Strategy.
- Traditional knowledge and Integration with western science to support fisheries management.
- Tropical Rock Lobster annual survey and use of data to inform management.
- Overview and key elements of stock assessments.

- New project on climate change and impacts on Torres Strait Fisheries.
- Lobster Aquaculture overview – ARC Research hub for sustainable onshore lobsteraquaculture: <https://onshorelobsteraquaculture.com.au> (Professor Gregory Smith, Director - ARC Research Hub for Sustainable Onshore Lobster Aquaculture).

## Post-activity feedback

### General feedback on structure and program of conferences and training

- In general, face-to-face attendance at international conferences and training is preferred as it gives participants an improved opportunity to interact with presenters, trainers, technicians and other researchers to discuss approaches, research findings and to network. Virtual conferences and training are still valuable, but opportunities to interact with other participants are limited, normally allowing a one-way flow only of information (presenter to audience), which restricts learning and networking opportunities.
- For both the WFC and ICWL, there were great opportunities to learn about the development of commercial fisheries and the promotion of Indigenous engagement in fisheries, where Indigenous people are driving these developments. This is an aspiration in Torres Strait which requires a combination of capacity building in both research and business, and awareness about novel market opportunities. Torres Strait TO Representatives would like to see Islanders drive the development of new fisheries and other initiatives in the region. Often, Torres Strait Islanders don't (yet) know what to do. For example, people understand the need to develop novel and niche markets, but communities still don't know how to develop such markets.
- Practical training in the Philippines was well organised and delivered. Face-to-face training was an excellent opportunity to learn, make connections and develop networks.
- In the ICWL, it was important to see all the science and research that is used to help the (lobster) industry and the environment.

### Pressing topics identified at the conferences and training session at SEAFDEC and potential application for Torres Strait fisheries

- Improving autonomy of Torres Strait Islanders involves raising local capacity and demonstrating how to do this to be empowered. At the moment there are several species that are not yet commercially exploited but with potential for niche markets, but people don't really know how to link market needs to the resources available in Torres Strait. It would be important to have someone from communities trained who could identify species and buyers and develop supply chains, but at the moment others do this.
- It was important to see in the conference talks the science around environmental changes and impacts on ecosystems and species and the importance of these links to the whole fishing industry.
- Effects of climate change on habitats and how species respond to these changes.
- Aquaculture (lobster, sea cucumbers, potential for other species) – this is an important consideration for climate change. Important to consider the Torres Strait environment and develop initiatives that can work under the conditions of the region, as some of the techniques (e.g. Puerulus traps) were tested in the past and did not work in Torres Strait (D. Dennis, pers. comm. February 2024). Important to use natural habitats in the context of aquaculture and the need for small-scale niche businesses versus extensive developments – land availability is also an issue for several islands in Torres Strait.

- How climate change affects the distribution of fishery species, seagrass and kelp dieback. Lobster translocation as part of lobster stock recovery in Tasmania – is there anything that can be learned and applied in Torres Strait in response to climate change?
- Emerging opportunities around sea cucumber aquaculture in Torres Strait, including the development or adjustment of new technologies (e.g. happa frames) to rear juveniles, research on habitats and integration of small-scale aquaculture with ecosystems to use resources already available in the region (e.g. carrying capacity), and broodstock selection.
- Further research on ecological restoration, ecosystem services, integrative, multi-species aquaculture as opportunity to link with emerging initiatives that could contribute to income (e.g. blue carbon, biodiversity credits and other credit/finance emerging opportunities).
- Explore other aquaculture opportunities in Torres Strait

## **Capacity needs and future research directions**

### ***Capacity needs***

The CSIRO can play an important role in building science capacity via offering Torres Strait Islanders hands-on opportunities through:

- Graduate and cadetship programs.
- PhD opportunities for Torres Strait Islanders.

Other important capacity building areas for the region are:

- Fishery science, management and business opportunities:
  - Providing Torres Strait fishers the science information and knowledge needed so they can identify new fisheries and other livelihood opportunities linked to the sea.
  - Help development of business capacity of fisheries, so people can better understand markets, identify opportunities, and develop adequate supply chains.

### ***Future research directions include:***

- Native title and legal framework for recognition of resource ownership of Traditional Owners (TO) and regulation of access to these resources across Australia:
  - Why different TO groups have different access rights and different management rights and some groups don't have access rights in some States?
  - What does ownership of fisheries look like for Indigenous people because of legislative decisions? Tension between western fisheries management approaches for the greater good of the country versus Traditional resource ownership because of native title recognition.
  - Different interpretations of Native Title rights at the State level. For example, NT is different from WA and Torres Strait and VIC have different legislative situations. The NT recognise exclusive rights of TOs to regulate access in the intertidal zone, but these rights are not recognised in VIC or NSW. In Torres Strait there is recognition of commercial rights with a non-exclusive right. The Native Title Act recognises that TOs have (automatic) access to the commercial sector but still TO fishers require a licence. In Torres Strait, Traditional Owners are not recognised as owners but have commercial native title right in the commercial sector. In NT resource owners (TOs)

regulate access to the resource. They issue licences, regulate TAC but in Torres Strait it is the government who does this (AFMA).

- How to develop science to support the development of novel and niche markets of Torres Strait products?
- How to provide Torres Strait fishers the science information and knowledge needed so they can identify new fisheries and other livelihood opportunities linked to the sea?
- Sea cucumber aquaculture in Torres Strait:
  - Opportunity to start an Indigenous-led initiative, acknowledging Indigenous aspirations and supported by science and traditional knowledge.
  - Opportunity to trial and develop new technologies (e.g. happa frames) in Torres Strait to rear juveniles.
  - Research on habitats (science surveys) to understand how to better integrate small-scale aquaculture and ecosystems to use available resources (e.g. suitable habitat for juveniles and adults, carrying capacity).
  - Further research on restorative, integrative, multi-species aquaculture as opportunity to link with new science initiatives (e.g. blue carbon, biodiversity and other credit/finance emerging opportunities).
  - Research on the most adequate size of broodstock required for Torres Strait.
- Impacts of climate change on tropical rock lobster migration (timing) and how currents may change and the potential impacts on the supply of larvae to Torres Strait, and the growth of juveniles and adults.
- Need for research in more remote areas of Torres Strait, such as in the Guda Maluilgal area (Dauan and Boigu). For example, via extending ranges of current program on seagrass monitoring, to investigate the important link between seagrass dugong, and turtles.
- Need for more research about climate change impacts on ecosystems and species. More environmental data are required to understand and support research about climate change.

### **Any other lessons learnt by attending the conference and training session?**

- It is important to consider new opportunities that will open up opportunities for Indigenous people to stay their country. Novel fisheries and markets are important but there are also other opportunities around ecosystem restoration, carbon management, sequestration and storage, biodiversity credits and their potential to generate income to communities, and small-scale aquaculture. Such initiatives can be discussed and further developed with Torres Strait communities to understand their potential and how to develop such activities in line with local aspirations and needs. These initiatives have potential to improve income and also provide indirect benefits via habitat improvement and increase in fish productivity, coastal protection and other ecosystem services. Indigenous methodologies will be critical in merging western science and traditional knowledge, for the benefit of Torres Strait and its people.
- For sea cucumber aquaculture it is important to look into how infrastructure used elsewhere can be used for the conditions in Torres Strait and how to develop suitable infrastructure to address the unique environmental conditions of Torres Strait.

# Conclusion

The project has built science capacity of three Torres Strait Islander Industry Representatives and, at the same time it has also built Indigenous cultural awareness of scientists involved in the project. The project facilitated a two-way knowledge exchange (western science and Indigenous knowledge), which generated valuable insights to all involved. CSIRO scientists provided training on scientific writing and presentation, which guided the preparation of abstracts and presentations led by Torres Strait Islanders, delivered at:

- Science conferences (World Fisheries Congress in 2021 and the 12th International Conference and Workshop on Lobster Biology & Management in 2023).
- Management agencies (QLD state agencies, including Department of Treaty, Aboriginal and Torres Strait Islander Partnerships, Communities and the Arts, Department of Agriculture and Fisheries, Department of Environment and Science).
- Indigenous fora (meetings with Traditional Land Owners, Ugar Registered Native Title Bodies Corporation (RNTBC)).

Although it is probably too early to fully evaluate the impacts of the presentations delivered by Torres Strait Traditional Inhabitants across a range of scientific, management and indigenous fora, there are already important outcomes from the project. These are:

- Request from AFMA to use the video-presentation delivered by Mr Frank Loban at the World Fisheries Congress (2021) as part of AFMA's Reconciliation Action Plan to build awareness within AFMA of Indigenous fishing interests and rights, including in the Torres Strait.
- Awareness of Commonwealth (AFMA), QLD state and Local government (Torres Strait Regional Council) agencies about challenges involved in establishing an Indigenous-led aquaculture initiative in Torres Strait and the agreement from Ugar Traditional Land Owners to use land for the project and associated support from the Ugar RNTBC.
- An improved understanding (including from scientists and managers from overseas; Kenya and Seychelles) that engagement is key in supporting fisheries management and adequate time and resources are needed to support engagement with First Nations communities and stakeholders.
- Improved awareness of the importance of social and cultural (in addition to monetary) values of fisheries resources in Torres Strait (e.g. Tropical Rock Lobster) to support fisheries management.

The project has helped to build and strengthen partnerships between scientists and Torres Strait Islander Industry Representatives. The Indigenous representatives involved in the project are better prepared to advise communities, industry and management agencies on science matters and to engage with other Indigenous and non-Indigenous stakeholders on science-related issues. They also provided valuable insights about research needs in the region. The scientists who were directly involved in the project are also better prepared to engage, discuss and consider Indigenous perspectives in research proposal and delivery. Mr Loban also used the experience gained in the project in his own PhD research about fisheries management in Torres Strait.

# Implications

Below is a list of the known impacts of the outcomes on end users after presentations were delivered by Mr Frank Loban, Mr Rocky Stephen and Mr Patrick Mooka:

- Use of Mr Loban presentation by AFMA to build awareness within AFMA of Indigenous fishing interests and rights, including in the Torres Strait.
- Presentation by Mr Loban and Mr Stephen at Torres Strait Hand Collectables Resource Assessment and Working Groups inspired ongoing collaborations.
- Presentation by Mr Loban to research and management staff from the Seychelles Fishing Authority (SFA) and the Kenya Marine & Fisheries Research Institute (KMFRI) provided valuable insights about process and time needed to develop harvest strategies, the need to build trust among stakeholders, capacity issues and considerations to work in remote areas.
- Presentation by Mr Stephen to QLD State Assessment and Referral Agency (SARA) in April 2021 led to formal advice on permits, licences (and associated fees) and other compliance requirements to establish sea cucumber hatchery and sea ranching areas in Torres Strait.
- Mr Stephen presentation of sea cucumber aquaculture project to Ugar island Traditional Land Owner (TLO) in October 2023 has led to approval and agreement to use the proposed land in the sea cucumber hatchery and sea ranching project.
- Mr Stephen presentation to the board of the Ugar Registered Native Title Bodies Corporate (RNTBC) in November 2023 has led to broader Indigenous support for the initiative.
- Presentation delivered by Mr Stephen in December 2023 to the QLD State Department of Treaty, Aboriginal and Torres Strait Islander Partnerships, Communities and the Arts has led to improved awareness of challenges involved in establishing Indigenous-led business initiatives in Torres Strait and support from QLD state.
- Mr Mooka's presentation at the 12th International Conference and Workshop on Lobster Biology & Management has led to important discussions about engagement in Torres Strait and initial discussions with the Research ARC Hub for sustainable onshore aquaculture lobster aquaculture about potential for lobster aquaculture in the region. It is important to consider historical research done in the region.
- At ICWL, Mr Mooka was also invited to join a meeting with Ornatus Pty Ltd CEO Scott Parkinson and Hatchery and Research & Development Manager Jennifer Blair, and they invited Mr Mooka to visit their facility in Townsville also. Another useful outcome from this initiative is that in-person conferences are helpful to facilitate sharing CSIRO researchers' (well established) networks with Islanders. For example, Dr Plagányi introduced Mr Mooka to conference organisers, FRDC folks, other scientists. This was an easier way to start engaging more broadly at the conference than if Mr Mooka was going alone to the ICLW. Our project also highlighted the benefits from attending these events, which may have encouraged TSRA to support travel for an additional 4 Torres Strait Islanders to the ICWL.
- CSIRO Researchers (not involved in the project) attending the ICWL also enjoyed the ongoing conversations with Mr Mooka during the week, sharing impressions from talks.



# Recommendations

The following are the key recommendations from this project:

- Continue to support Indigenous science capacity programs. Improving autonomy of Torres Strait Islanders involves raising local capacity and support agency and reduce reliance on external agencies to achieve the local aspirations for the region.
- While science capacity building is important for Torres Strait Islanders, it is also important to build cultural capacity of scientists and facilitate practical two-way exchange of knowledge. Such an approach could be used, for example, as part of workshops to create new collaborative research proposals involving scientist and Australia First Nations peoples.
- The research needs identified by participants provides valuable directions of further research to support Torres Strait Islander aspirations. These research priorities could be considered in future FRDC, AFMA and other calls for research projects.
- There is strong interest in Torres Strait to develop aquaculture projects in the region. There is interest in learning about aquaculture in Northern Australia<sup>1</sup> and relevant historical research to further inform Torres Strait aquaculture development. It is important that communities are aware of opportunities, but also risks, especially related to environmental and unintended risks. We therefore recommend a broader discussion about aquaculture, local aspirations, opportunities and risks. Participants identified the desire to develop small-scale aquaculture linked to nature-based solutions and emerging opportunities around integrated and multi-trophic aquaculture, restoration, and finance instruments, such as carbon and biodiversity credits. It is important to consider the unique social, economic and ecological characteristics of Torres Strait as well as historical research, local needs and aspirations when developing such novel opportunities.

## Further development

The project identified further research in the following areas:

- Native title and consistent legal framework with regards to recognition of resource ownership to Traditional Owners and regulation of access to resources across Australia.
- Science communication: How to provide Torres Strait TO fishers the science information and knowledge needed so they can identify new fisheries and other livelihood opportunities linked to the sea?
- Emerging opportunities around sea cucumber aquaculture in Torres Strait, including the development or adjustment of new technologies (e.g. happa frames) to rear juveniles, research on habitats and integration of small-scale aquaculture with ecosystems to use resources already available in the region (e.g. carrying capacity), and broodstock selection.
- Research on ecosystems services and benefits to support livelihoods, such as habitat restoration and improvement to improve fisheries, protect the coast, capture carbon and

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<sup>1</sup> Cobcroft, J., R. Bell, J. Fitzgerald, A. Diedrich, and D. Jerry. 2020. Northern Australia aquaculture industry situational analysis. Cairns.

other potential benefits via emerging finance mechanisms (e.g. blue carbon, biodiversity credits).

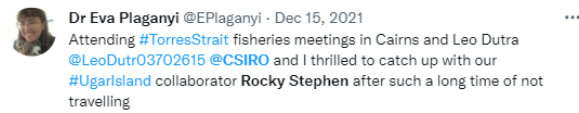
- Further research on restorative, integrative, multi-species aquaculture as opportunities to link with new initiatives (e.g. blue carbon, biodiversity and other credit/finance emerging opportunities).
- Impacts of climate change on tropical rock lobster migration (timing), settlement of larva and growth of juveniles and adults.
- Need to improve research coverage in Torres Strait. For example, extending ranges of current programs on seagrass monitoring due to important links between seagrass dugong, and turtles.
- Need for more research about climate change impacts on ecosystems and species. More environmental data required to understand and support research about climate change.

# Extension and Adoption

Adopted project outputs were listed under session “Implications”. The project was extended and communicated to end-users via:

## X (Ex-twitter)

We have used Twitter to share about our interactions with Mr Loban and Mr Stephen as per below (Figure 4). As a post-project extension the project team will work together in preparation of popular articles and stories to be disseminated in popular media.



## Thank you

We gratefully acknowledge inputs from all Torres Strait Islanders involved in this process



Funding: CSIRO, AFMA  
FRDC via project *Shared science and Indigenous knowledge to support fisheries capacity building in Torres Strait*

Thanks also to Tim Skewes, Mibu Fischer

PZJA Protected Zone Joint Authority  
<https://www.pzja.gov.au/the-fisheries/torres-strait-beche-de-mer-fishery>

Development of a data poor harvest strategy for a sea cucumber fishery  
Eva Plaganyi, Frank Loban, Nicole Murphy, Leo Dutra, Mibu Fischer, Mibu Fischer

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Frank Loban, Eva Plaganyi, Nicole Murphy, Leo Dutra

*Figure 4. X (ex-Twitter) stories about collaboration between Torres Strait Islanders and CSIRO researchers and acknowledgement of support from FRDC at the end of Mr Loban presentation at World Fisheries Congress.*

## **Interviews**

In October 2023, the CSIRO Indigenous Engagement Program conducted interviews with Mr Rocky Stephen and Dr Leo Dutra. The story is currently under preparation and will be released in 2024.

## **Building awareness within AFMA of Indigenous fishing rights and interests**

AFMA requested to use Mr Loban's talk given at World Fisheries Congress to build awareness within AFMA of Indigenous fishing interests and rights, including in the Torres Strait.

## **Linkedin article**

CSIRO prepared a LinkedIn article showcasing Mr Rocky Stephen's formal training supported by FRDC and CSIRO, on Sandfish seed production, nursery and management delivered by the Southeast Asia Fisheries Development Centre in the Philippines (SEAFDEC). The training course was delivered in May 2023. The story can be found at: [https://www.linkedin.com/posts/csiro\\_sea-king-knowledge-to-support-local-communities-activity-7097109682506395648-dyu6?utm\\_source=share&utm\\_medium=member\\_desktop](https://www.linkedin.com/posts/csiro_sea-king-knowledge-to-support-local-communities-activity-7097109682506395648-dyu6?utm_source=share&utm_medium=member_desktop)

## **FRDC Newsletter**

In April 2024 FRDC organised a communications officer to prepare a story about the project with CSIRO and one of the Torre Strait Island collaborators (Mr Rocky Stephen). The story was featured on the FRDC newsletter on the 20<sup>th</sup> of May 2024: [https://www.frdc.com.au/torres-strait-fishers-expand-their-skills-and-vision?\\_cldee=IX10hxiKKiO--G-tCgQDLjgo8EMpgVpffe7t6Ep5mADtm5M\\_W-xPQ7ajpy3xKynP&recipientid=contact-68a00e20f3fbe311940a0050569f5140-1a9ccf7ad7bb43258234e84a678b2ea1&esid=363a9d73-3b16-ef11-b4c6-002248148e6c](https://www.frdc.com.au/torres-strait-fishers-expand-their-skills-and-vision?_cldee=IX10hxiKKiO--G-tCgQDLjgo8EMpgVpffe7t6Ep5mADtm5M_W-xPQ7ajpy3xKynP&recipientid=contact-68a00e20f3fbe311940a0050569f5140-1a9ccf7ad7bb43258234e84a678b2ea1&esid=363a9d73-3b16-ef11-b4c6-002248148e6c).

# Glossary

Optional

# **Appendix 1. List of researchers and project staff (boat skippers, technicians, consultants)**

## **CSIRO**

Dr Leo Dutra (Principal Investigator, CSIRO)

Dr Eva Plaganyi (Co-PI, CSIRO)

Nicole Murphy (project staff, CSIRO)

## **Torres Strait Island Industry Representatives**

Mr Frank Loban: Torres Strait Islander (Zenedth Kes Fisheries board member, member of the Torres Strait Scientific Advisory Committee (TSSAC).

Mr Rocky Stephens: Torres Strait Islander (member of Torres Strait Finfish Working Group, Councillor for Ugar (TSIRC), Torres Strait Regional Authority (TSRA) member for Ugar, Zenedth Kes Fisheries member, business owner.

Mr Patrick Mooka: Guda Maluilgal Representative at TSRA, member of the Torres Strait Tropical Rock Lobster (TRL) Research Advisory Group and TRL Working Group, member of Zenedth Kes Fisheries.

## Appendix 2. References

- Loban, F., É. Plagányi, N. Murphy, and L. X. C. Dutra. 2022. Adoption of a new community-endorsed harvest strategy for the Torres Strait bêche de mer fishery. World Fisheries Congress 2021, Adelaide.
- Mooka, P., L. X. C. Dutra, and E. Plaganyi. 2023. Indigenous perspectives on the integration of traditional and western science knowledge systems to support the Torres Strait Tropical Rock Lobster Fishery. *in* The International Conference & Workshop on Lobster (and Crab) Biology and Management 2023, Freemantle.

# FRDC FINAL REPORT CHECKLIST

The final report checklist can now be filled in when submitting your final report deliverable in [FishNet](#).