

Performance stories

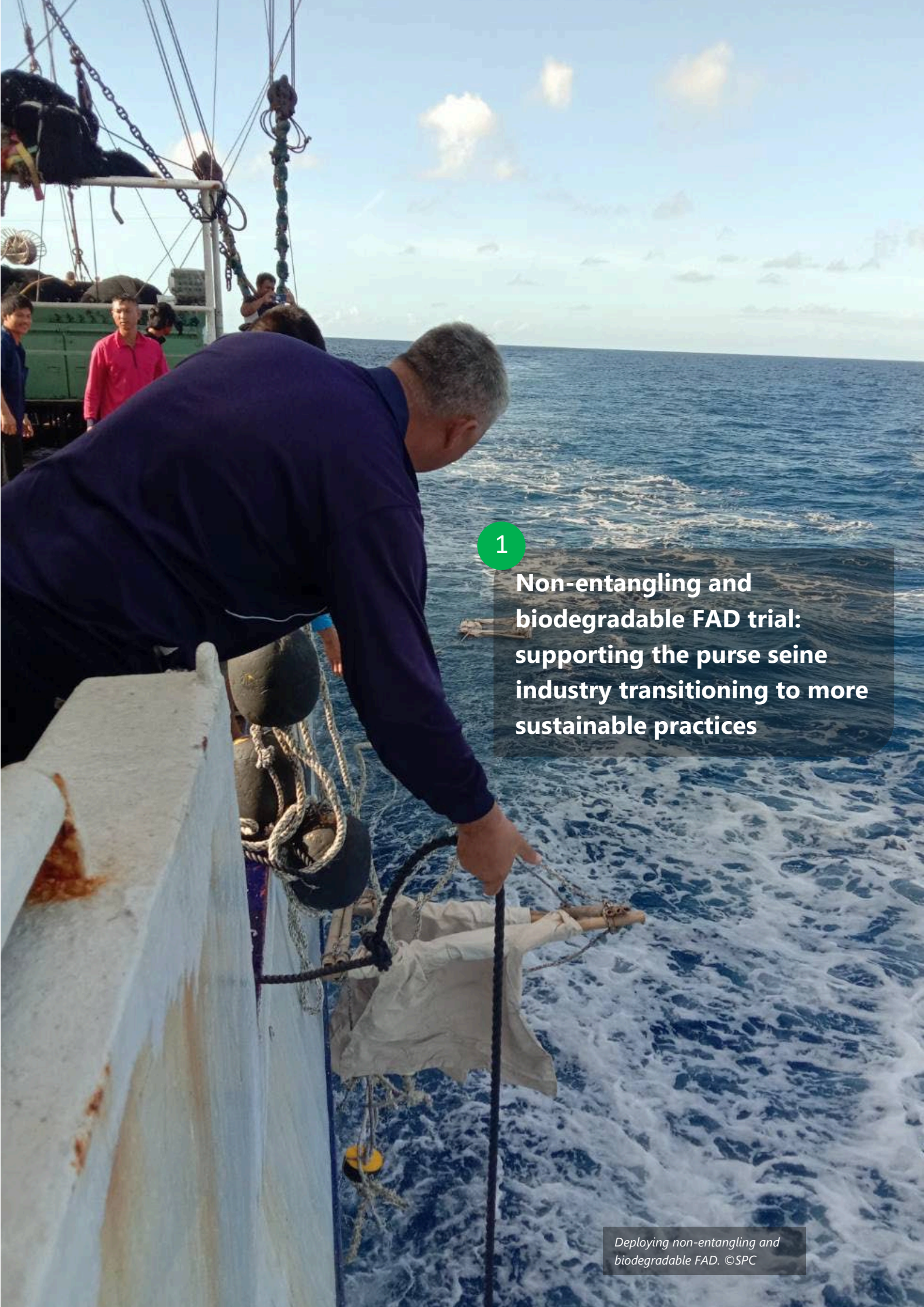


Pacific
Community
Communauté
du Pacifique

2023 Results reporting: Annex 1

Fisheries, Aquaculture and Marine Ecosystem (FAME) Division





1

Non-entangling and biodegradable FAD trial: supporting the purse seine industry transitioning to more sustainable practices



Context

Tuna fisheries in the western and central Pacific Ocean (WCPO) are the largest and most productive in the world, accounting for over half of the global tuna catch. The use of drifting fish aggregating devices (dFADs) within the purse-seine fishery, however, has raised concerns about the entanglement of non-target marine species, marine pollution, and damages to sensitive coastal habitats. With the deployment of 23,000–40,000 dFADs in the region's waters each year, around only 7% retrieved, and their construction still based on netting and plastic materials, the need to reduce the environmental impacts is critical.



Figure 1: dFAD landed on beach. Photo: New Caledonia stranded FAD database

Change process.

To support the purse seine industry to transition to non-entangling and biodegradable dFADs, SPC, as science service provider to the Western and Central Pacific Ocean Fisheries Commission (WCPFC), is leading the research on non-entangling and biodegradable dFAD WCPO, in close collaboration with the International Sustainable Seafood Foundation (ISSF) and purse seine fishing companies from Federated States of Micronesia (FSM), Taiwan, Korea and the United States (US).

As part of the trial, a new type of dFAD has been tested: the Jelly-FAD, developed by the ISSF and oceanographers from the Insitute de Ciències del Mar in Spain. The newly-developed "jelly-FADs" – so called because they drift neutrally in the water column like jellyfish – are made with natural materials such as bamboo canes, cotton canvas and ropes. Sand or clay blocks are used as ballast and dissolve slowly, while bamboo canes and canvas become saturated with seawater, making the structure neutrally buoyant. This reduces structural stress from wind, waves and currents, thus giving the biodegradable jelly-FAD a longer lifespan. This is a key design feature because biodegradable materials are not as robust as synthetic materials.

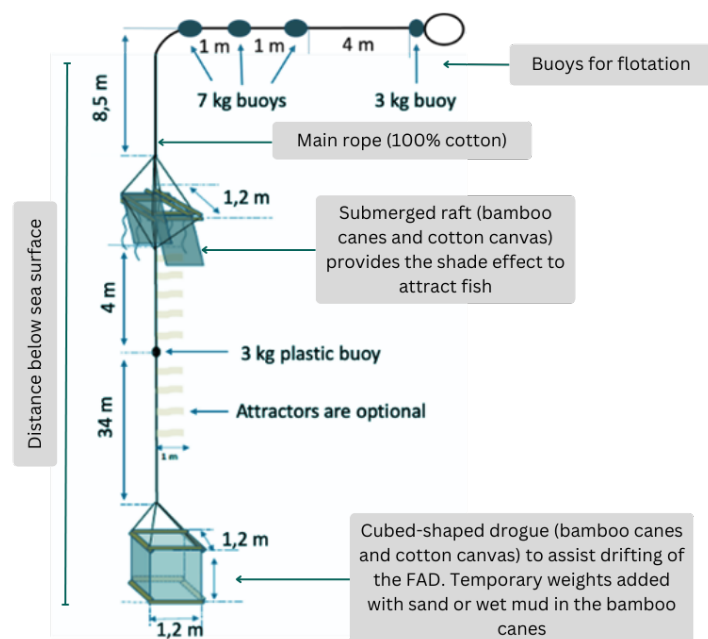


Figure 2: Illustration of a Jelly-FAD trialled in FSM and designed by ISSF

The materials of the jelly-FAD will, ideally, degrade slowly after 9–12 months of use, and leave little in the way of a residual environmental footprint.

Non-entangling and biodegradable dFADs, such as the jelly-FAD, are the future for environmentally conscious dFAD fishing at an industrial level. They should aggregate similar levels of tuna biomass to conventional dFADs and will reduce the number of entanglements of non-target species such as turtles and sharks, as well as the impacts caused by lost and abandoned dFAD.

Results and impact

Three companies have now been trained on how to build the jelly-FADs, in FSM, American Samoa and Ecuador, as base ports for the construction on non-entangling and biodegradable dFADs for the trial and beyond. SPC, ISSF and partner fishing companies, constructed the 430 jelly-FADs to be tested as part of the project, with 200 deployed in 2023. Each jelly-FAD is deployed jointly with a conventional synthetic dFAD to compare their performance and longevity and left to drift for up to one year. Each dFAD is deployed with a satellite buoy with echosounder attached to provide crucial scientific information for the trial. Information from the buoys, alongside a data form filled out by the skippers and additional information from fisheries observers, will allow us to evaluate how effective jelly-FADs are at aggregating tuna, how well they drift in the open ocean, and how long they last.

This project is the first large scale non-entangling and biodegradable dFAD trial in the WCPO, with results being eagerly awaited to guide the management and implementation of dFADs in the region. Non-entangling dFADs will be mandatory from January 2024 and a transition to biodegradable FADs is regularly discussed at WCPFC meetings.

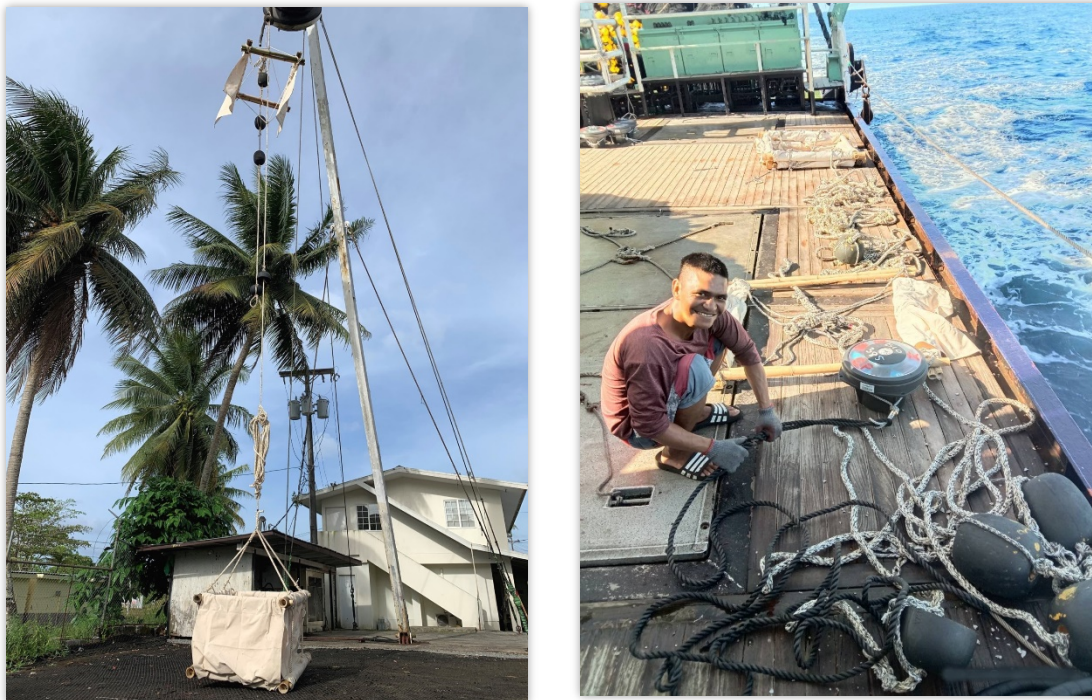


Figure 3: Jelly-FAD construction and deployment at sea. Photos: SPC and FCF Co. LTD

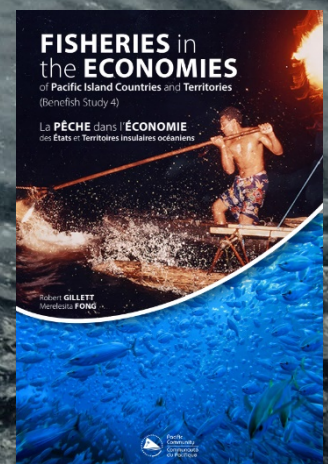
Lessons learned.

This first initiative has led to several lessons:

1. Working alongside the fishing industry is essential to get their feedback and general buy-in before future management regulations.
2. Constructing non-entangling and biodegradable dFADs in country is beneficial for local economies, supporting local businesses and labour, while supporting capacity building for the private sector, industry, and national fisheries managers.
3. Some challenges arise from constructing and storing biodegradable materials in tropical and humid environments. Project staff had to be innovative and adapt (e.g. soaking bamboos in salt water, buying materials locally, minimise storage time), to deliver the jelly-FADs in good condition to the industry.
4. So far only 15% of the jelly-FADs deployed have been visited, highlighting the need for a high number of trial deployments to acquire robust scientific data. A second project phase is under development to build on the experience and momentum gained in this first project.

2

Fisheries in the Economies of Pacific Island Countries and Territories





Context

Fisheries and aquaculture form the lifeblood of Pacific Island countries and territories (PICTs), serving as a vital pillar for food security, employment, and export revenue. These sectors are more than just industries; they are the very fabric of island communities, underpinning their social and economic well-being. Their substantial contributions are deeply woven into the economies of PICTs, representing a significant portion of their gross domestic product (GDP). For many islanders, the health and sustainability of these aquatic resources are the lifeblood of their livelihoods, highlighting the crucial role fisheries and aquaculture play in sustaining the cultural heritage and future prosperity of Pacific Island nations.

A critical gap in knowledge is undermining the sustainable management of fisheries and aquaculture in the PICTs. Essential to food security, livelihoods, and economic expansion, these sectors suffer from a lack of up-to-date economic data, which obstructs informed policymaking and effective management. Policymakers, without the necessary data, cannot draft policies that would ensure the sustainability of these sectors. Similarly, stakeholders are unable to accurately gauge the value and impact of the sectors, impeding investments and development. Local communities, too, are missing the insights needed for meaningful involvement in resource management.

Change process

The Benefish studies are a series of assessments of the economic and social contributions of fisheries to Pacific Island countries and territories (PICTs). The studies are conducted by the Pacific Community (SPC) in collaboration with partner organisations. The first Benefish study was conducted in 2001, followed by a second study in 2007, a third in 2016, and a fourth in 2023.

The 2023 Benefish study conducted a thorough analysis of the economic and social contributions of fisheries to the Pacific Island countries and territories (PICTs). It delved into various aspects, including fisheries and aquaculture production, the sector's contributions to the Gross Domestic Product (GDP), exports, government revenue, employment opportunities, and the role of fisheries and aquaculture in providing food supplies. This comprehensive assessment aimed to quantify the value of fisheries, highlighting their vital role in the sustenance and economic health of PICTs.

The Benefish studies offered in-depth assessment of fish production and the economic impact stemming from six distinct types of fisheries. These are: coastal commercial fisheries, which focus on harvesting seafood near the shores for commercial sales; coastal subsistence fisheries, aimed at local consumption without commercial intent; offshore locally based fisheries, conducted in deeper waters by vessels registered in PICTs; offshore foreign-based fisheries, operated by international vessels in distant waters; freshwater fisheries, located in inland water bodies like lakes, rivers, and streams; and

aquaculture, involving the cultivation of fish and other marine life. Each category contributes uniquely to the economy and sustenance of the Pacific Island communities.

Results

Benefish 4 highlights three major findings: (i) the necessity for enhanced dialogue between national fisheries agencies and national statistics offices; (ii) a significant rise in access fees for foreign fishing from 2007 to 2021; and (iii) a notable decrease in per capita fish supply from coastal fisheries during the same period. The study highlights unique challenges faced by each PICT, which can be used by countries to drive evidence-based decision-making and implement targeted interventions that promote sustainable development of fisheries. It also provides recommendations on improving measurement of the types of fisheries benefits covered as well as what information PICTs should collect and how.

Co-authored by a University of the South Pacific (USP) marine science graduate, the study also highlights SPC's efforts to build Pacific capacity to prepare the next study in five years' time.

Key highlights from the study

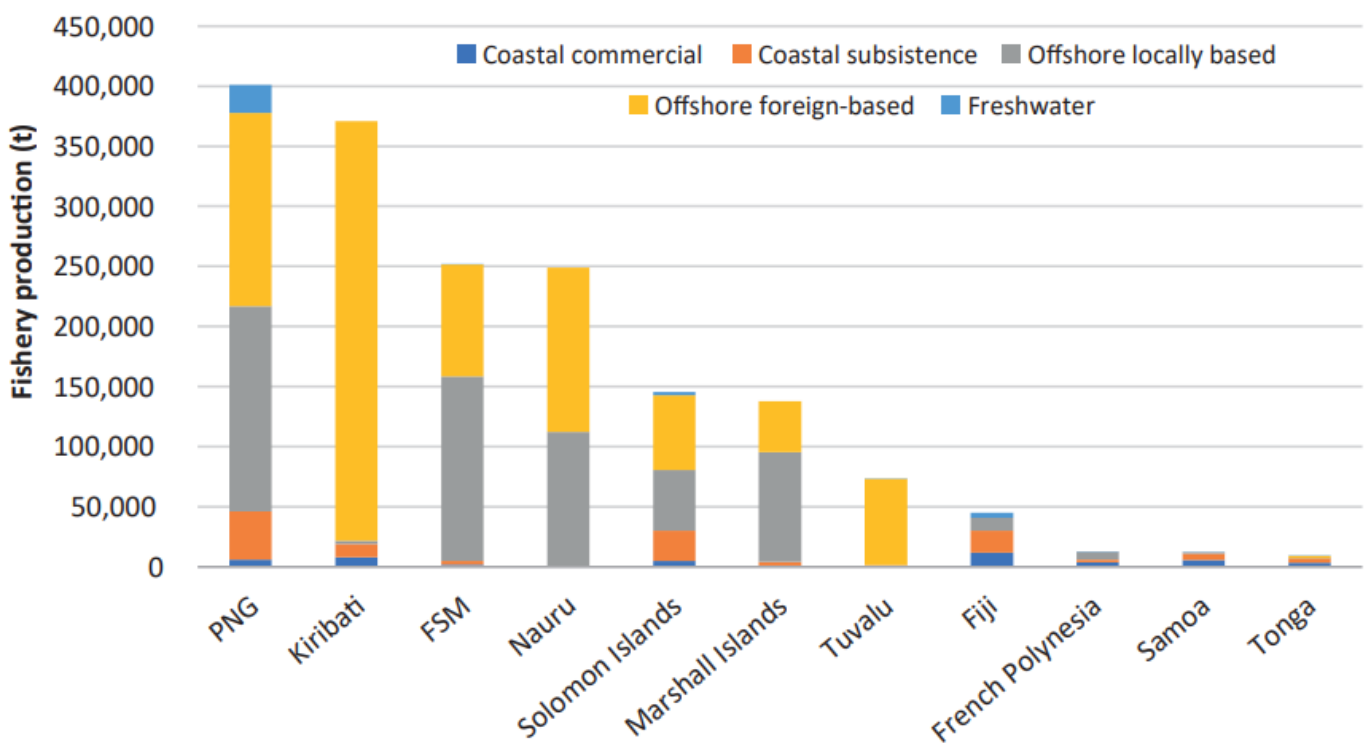


Figure 4: Volume of fishery production by category in the higher-producing countries and territories in 2021 (t).

Key findings:

1. Fisheries are of major significance to the people and economies of PICTs. The total fishery and aquaculture production of the zones of the 22 PICTs in 2021 was estimated to be worth about **USD 2.5 billion**. The total volume of fisheries production in the region in 2021 was estimated to be 1.56 million tonnes and the aquaculture production was **7573 tonnes** and **8,825,931 pieces**.

- Coastal fisheries provide the vast majority of fish from the region for consumption by PICT residents as almost all offshore fisheries production is shipped out of the region. This annual supply of coastal fish, which was **13.8 kg per capita in 2021**, is crucially important for nutrition and food security.
- In 2021 the total production by volume from offshore fisheries of the region was almost nine times that of coastal commercial and coastal subsistence fisheries. By value, it is only about **50% greater** due to the high unit value of coastal fishery production.
- The volume of coastal subsistence fisheries production (i.e., coastal fish that is not sold) is almost **2.5 times** greater than that of coastal commercial fisheries production.

	Coastal commercial	Coastal subsistence	Offshore locally based	Offshore foreign based	Freshwater	Total
2007	44,789	109,933	401,096	864,685	23,858	1,446,368
2014	53,753	110,183	420,550	1,445,984	26,245	2,058,729
2021	49,963	123,961	603,888	932,398	29,723	1,739,933

Table 1: Changes in fisheries production: Regional totals in each fishery category since 2007 (t)

- The offshore fishing contribution to GDP across the region is 30% of all fishing contribution to GDP, while coastal fishing (both coastal commercial and coastal subsistence) is responsible for 57%

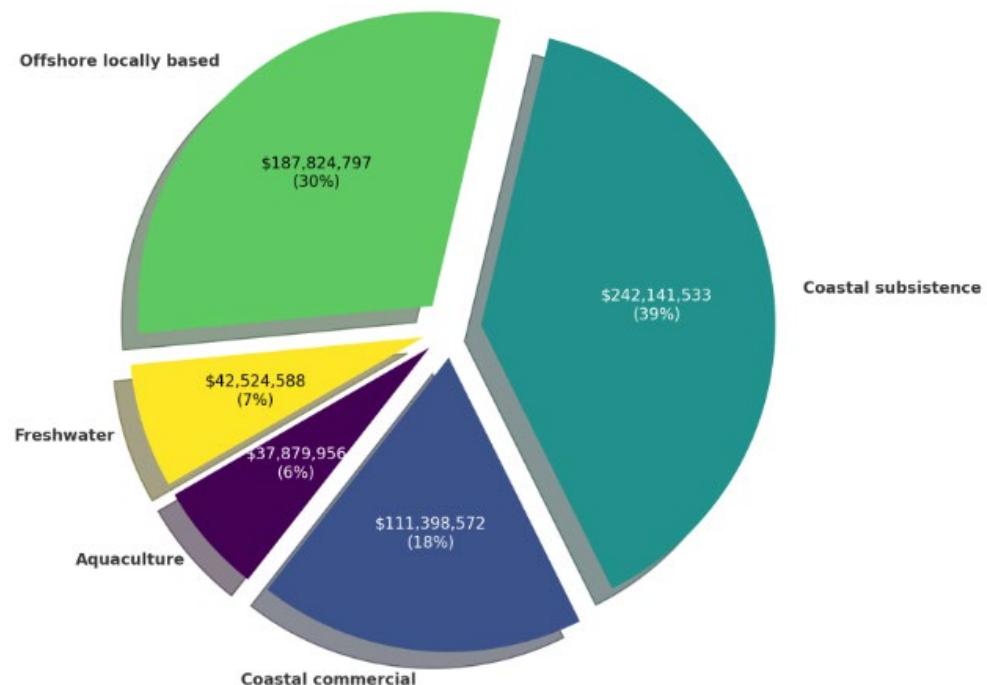


Figure 5: Fishing contribution to GDP across the Pacific Island region (USD).

Lessons learned

A comprehensive cost assessment and using the same consultant to produce the study was critical for undertaking the *Benefish 4* study efficiently and consistently. It was also imperative to build trust with PICTs to support the collection and sharing of data.



Context

The western and central Pacific Ocean (WCPO) region hosts the world's largest tuna fisheries industry, which contributes significantly to the economy and the livelihoods of Pacific Island countries and territories (PICTs). Despite its vital significance, the existing management systems employed in the tuna fisheries appear to be reactive, and with short-term objectives, which jeopardises the sustainable management of such a large-scale industry.

Recognising the deficiencies of the current management systems, there is a pressing need for a structured system that can provide clear guidelines and focus on long-term objectives encompassing all stakeholders. Responding to this urgent need, the western and central Pacific Fisheries Commission (WCPFC) has introduced a harvest strategy approach to better manage the tuna stocks in the region. Harvest strategy is a formalised and pre-agreed framework for guiding decisions on the management of a fishery. It aims to shift from short-term, ad-hoc decision making to a longer-term proactive approach to achieve defined management objectives. This shift in approach is crucial to effectively address the challenges posed by the scale and complexity of the industry, ensuring sustainable practices and equitable benefits for all involved parties in the WCPO region.

Change process

SPC facilitates capacity building workshops in harvest strategies by organising 2–3-day national workshops, offering participants a comprehensive overview of the harvest strategy approach. The objective of these workshops is to equip participants with needed knowledge for effective decision-making throughout the process. Additionally, they serve as a valuable platform for stakeholder communication.

Since 2018, 18 workshops on harvest strategies have been conducted by SPC. At least 400 participants have been trained during these workshops coming from 12 PICTs (Cook Islands, FSM, Fiji, French Polynesia, Kiribati, Marshall Islands, Palau, PNG, Samoa, Solomon Islands, Tokelau, and Tonga). Some of the trainings have been done in collaboration with the Pacific Islands Forum Fisheries Agency (FFA), delivered in both national and regional levels. In addition, SPC FAME has also facilitated three informal two-hour on-line workshops on national-specific topics with French Polynesia, New Caledonia, and China in 2023.



Results and impact

In 2023, the SPC carried out a tracer survey to evaluate the understanding of harvest strategies among participants and the obstacles encountered in applying this fisheries management technique. The survey engaged 44 distinct individuals from four training sessions conducted in 2022 and 2023. These sessions were held in Brisbane, Kiribati, Samoa (face-to-face), and online for attendees from French Polynesia. A mixed-methods strategy was employed, with 82% of the participants completing a self-administered survey, while the remaining 18% participated in the survey through assisted or guided calls.

The initial analysis was concentrated on data gathered from post-training surveys, which are customarily distributed immediately following the sessions. These surveys aimed to collect feedback on the attendees' initial reactions to the training, including their impressions of the content, any increase in knowledge they perceived, its relevance, and their overall satisfaction. The cumulative response rate stood at 48%. Typically, the immediate feedback was overwhelmingly positive. The training content received an average score of 4.6 out of 5. Every respondent considered the training pertinent to their professional duties, and 95% reported acquiring new knowledge.



Figure 6: Response rates for post-training survey questions measuring reactions/satisfaction levels immediately after the trainings.

The initial feedback starkly contrasts with the actual outcomes captured six months or more after the training, as revealed by the results of the tracer survey. SPC garnered 16 responses to the harvest strategy tracer survey, which corresponds to a 36% response rate from the total number of participants in the selected trainings targeted for assessment. Of these respondents, only **31% reported having applied the harvest strategies concepts in their work**. This percentage signifies a considerable decrease from the immediate post-training reports of increased knowledge.

The participants were questioned about the obstacles they encountered in applying their knowledge of harvest strategies. The challenges they identified included:

- The absence of policies and regulations necessary to facilitate the application of this knowledge within the national fisheries sectors,
- The trade-offs confronted by decision-makers,
- The requirement for the development of long-term objectives,
- A general lack of understanding regarding the significance of sustainable management practices, and
- Issues with specific aspects of the strategy, such as model complexity, validation, generalisation, and uncertainty.

“Lack of awareness and understanding about the importance of sustainable harvesting practices can lead to unsustainable resource use. Public education and outreach are crucial components of effective harvest management” Female participant from Kiribati.

Despite participants reporting an increase in the understanding of the harvest strategies, the responses relating to the challenges seem to indicate that this is not always shared. Within the contexts of the respondents' workplaces, it appears that decision-makers and other stakeholders may not always possess the same level of understanding or give the subject equal priority. This disparity in knowledge impacts the trainings' ability to effect meaningful change at the application level following the workshops.

"I believe it's educational [the training] for all existing and new recruits of fisheries officials and to better provide technical advice for decision makers, because without understanding the science behind the fisheries, I don't think you can provide better advice and it will go against our overall long-term objectives of the ministry" Female participant in the harvest strategy training in Samoa.

Furthermore, **almost three quarters of respondents (73%) reported facing learning difficulties during the trainings**, most of them linked to the technical terminology and concepts, the background preparation needed and the length of the training.

The facilitators provided supplementary materials after the completion of the trainings. However, less than half of respondents (40%) reported that they had consulted them. Addressing the reported learning difficulties in future trainings can be done by making a thorough review of the materials to be used before, during and after the trainings. Ahead of the training, the facilitators could liaise with the participants to get a general idea of their profiles so they can tailor the level and contents of the trainings accordingly.

Lessons learned.

The capacity building experience and the post-training survey have provided valuable lessons. The key lessons, summarised by thematic area, are:

- A. Preparations and delivering trainings.
 - a. Keep combining the regional with the national level trainings.
 - b. The one-on-one country specific conversations have proven useful to grasp more of the current situation and context of each PICT that enhances the provision of support around harvest strategy.
 - c. Maximise the advantages of building strong advocates and influencers during the workshop.
 - d. Follow-up is essential for sustaining PICT engagement.
- B. Conducting post training feedback surveys
 - a. The terminology, participant profiles, training duration and timing, and agenda, are items of the training preparation to be reviewed by the team based on the feedback collected.
 - b. Need to potentially review the context and setting in which the decision-makers on harvest strategy and teams operate to address it further in the training planning.
 - c. Less than half of the participants consulted the supplementary materials. These could be improved by making them more practical, user friendly and dynamic and using them as a reference for follow-up with participants.
- C. Deploying tracer studies
 - a. The training facilitators and the monitoring, evaluation, and learning (MEL) teams must work closer together to enhance data completion and accuracy.

- b. During the training, it is important to inform participants about SPC's interest in assessing the lasting impact of the trainings to enhance contact information and responsiveness to surveys.
- c. Tracer surveys should be co-designed with facilitator teams to tailor the application of knowledge questions to the context of the training subjects.



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