FINAL REPORT

Regional report: Feasibility of scaling-up National Fish Aggregating Device (FAD) Programmes in all 14 participating countries

(RFP22-3866 – Study 3)

Under contract No CS22-4392 with 31 August 2023 amendment for regional component

Prepared by

Lindsay Chapman

Lindsay Chapman Consulting Pty Ltd

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Abbreviations

aFAD(s)	Artisanal fish aggregating device(s)
ADB	Asian Development Bank
AUD	Australian dollar
C	Centigrade
CK	Cook Islands
cm	Centimetre
EEZ(s)	Exclusive economic zone(s)
ENSO	El Nino Southern Oscillation
FAD(s)	Fish aggregating device(s)
FAO	Food and Agriculture Organization (of the United Nations)
FAME	Fisheries, Aquaculture and Marine Ecosystems
FFA	Forum Fisheries Agency
FJ	Fiji Islands
FJD	Fijian dollar
FM / FSM	Federated States of Micronesia
FRDP	Framework for Resilient Development in the Pacific (2017-2030)
GCF	Green Climate Fund
GHG	Greenhouse gases
IKM	Information and Knowledge Management
kg	Kilogram
KI	Kiribati
km	Kilometre
km^2	Square kilometres
m	Metre
MH	Marshall Islands
mt	Metric ton (or tonne)
NGO	Non-Government Organisation
nm	Nautical mile
NR	Nauru
NU	Niue
NZD	New Zealand dollar
PG / PNG	Papua New Guinea
PGK	Papua New Guinea Kina
PICs	Pacific Island countries
PICTs	Pacific Island countries and territories
PIFP	Pacific Island Fisheries Professional
PMU	Project Management Unit

PNA	Parties to the Nauru Agreement
PROP	Pacific Islands Regional Oceanscape Programme
PROPER	Phase-2 of PROP programme
PW	Palau
RFP	Request for proposals
RFQ	Request for quotations
SB	Solomon Islands
SBD	Solomon Islands dollar
SPC	Pacific Community
SST	Sea surface temperature
TO	Tonga
TOP	Tongan Pa'anga
TV	Tuvalu
USD	United States dollar
VU	Vanuatu
VUV	Vanuatu Vatu
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	Western and Central Pacific Ocean
WS	Samoa
WST	Samoan Tala

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Executive summary

Introduction: The Pacific Community (SPC) advertised a series of studies to support a funding submission to the Green Climate Fund (GCF) titled: Adapting tuna dependent Pacific Island communities and economies to climate change on 19 May 2022 under RFP22-3866. Study 3: "Feasibility of scaling-up National Fish Aggregating Device (FAD) Programmes in all 14 participating countries" was contracted to Lindsay Chapman Consulting Pty Ltd on 8 September 2022 (SPC contract No CS22-4392), with the delivery date of the final report being 30 September 2023. On 31 August 2023 the contract (CS22-4392) was amended to include the regional component of the FAD Project and the delivery date for the final report extended to 31 December 2023. (Para to be deleted once report is accepted).

Purpose: The purpose of this study is to improve the food security of rapidly growing coastal communities in the Pacific Islands region through upscaling the use of nearshore artisanal FADs (aFADs) to increase the supply of tuna and other coastal pelagic species by small scale fishers for local consumption. Increasing the supply of these species will assist in supplementing food security through the provision of additional fish from sources other than reef fisheries. Productivity from reef fisheries is expected to decline in locations close to urban populations due to increasing fishing pressure on these habitats and more broadly throughout coastal areas within the region as a result of coral reef degradation due to ocean warming and acidification.

Strategic Investment: Nearshore (aFADs) have been deployed in all 14 countries in an *ad hoc* approach to create additional fishing opportunities for artisanal fishers over the last 35 years. The lack of formalising aFADs within whole of government policy as infrastructure to support enterprises and livelihoods, achieve food security and contribute to meeting health and wellbeing needs of rural and urban communities has meant that aFAD Programmes have been project-based without ongoing government and community support. Learning from the past, the proposed Programme will be transformative by integrating aFADs into whole of government infrastructure by ensuring that:

- aFAD infrastructure design is consultative across government authorities, stakeholders and communities;
- Legal and policy reform is applied at whole of government culminating in endorsed National aFAD Management Plans that are supported by appropriate legislation and regulations;
- Implementation is local community focused as a collaboration with the fisheries and other agencies agencies;
- Information and Knowledge Management is applied at all levels of participation;
- Capability at all levels of participation is provided;
- Regional support is provided across the sector and across all aspects of aFAD Programmes and is not restricted to aFAD design, deployment and fishing support;
- New data systems are used (TAILS and IKASAVEA applications) for data collection, storage and analysis that are web-based and user friendly; and
- Monitoring of aFAD Programmes transitions from the optimal design and placement of aFADs (to maximise catch per unit effort) to include measurement of the community benefit (e.g., number of additional fish meals provided by locally-sourced pelagic fish; improvement in body mass index, infant/early child health, etc).

Methodology and process for national component: The method for undertaking the study at the national level involved several stages. First a standard questionnaire was developed so an audit of the aFAD Programmes in all 14 participating countries could be undertaken (Annex B). The questionnaire was based on the SPC "matrix for assessing progress towards a sustainable national

FAD Programme"[1]. An additional section was added to the questionnaire to audit the status of national programmes concerned with sea safety for small craft under 12 m in length. Secondly, staff from the fisheries department involved with the aFAD Programme were interviewed during a virtual meeting and the questionnaire completed with each country ranking or scoring themselves against each of the criteria in the questionnaire. Thirdly, an analysis of the completed questionnaire was undertaken to identify any gaps and develop an activity plan and associated budget designed to fill the identified gaps in each country.

Running parallel to the above process was the collection of background information on the aFAD Programme in each country. This included the review of information on the most vulnerable areas to the effects of climate change in each country, plus any climate-change focused risk assessments covering the marine environment and resources that had been developed by country. This information was used to develop a country profile for each of the 14 participating countries. The profiles include the results of the audit, an assessment of the gaps, the vulnerability of candidate project sites to the impacts of climate change, and an activity plan and budget in local currency to address the identified gaps. The country profile, activity plan and budget were agreed with each country. All 14 country profiles are annexed to this report.

Results for climate change projections: National and regional climate change projected impacts on coastal marine resources and habitat[2], and potential responses, are consistent with the findings presented in the accompanying profiles:

- Increase in coral bleaching as a result of both rising air temperature and rising sea surface temperature leading to coral reef ecosystem degradation.
- Higher projected rainfall will increase the amount of erosion in catchments, and turbidity and sedimentation in lagoon areas, resulting in reduced photosynthesis by corals and sea grasses, and smothering of both habitats.
- Increasing ocean acidification will reduce the availability of dissolved carbonate required by many calcifying organisms, including corals, to build their shells or skeletons.
- Increased storm surge which will cause damage to coastal marine environments.
- Stronger although less frequent cyclones causing damage to coral reefs, coastal barrier zones and the marine environment in general.
- Loss of coastal and lagoon fish and invertebrate habitat and nurseries through rising sea surface temperature, sea level rise and increased sedimentation.
- Declines in coastal fisheries productivity and possibly changes in species composition due to both the direct effects of increased sea surface temperature and indirect effects of changes to, and loss of, fish habitats.
- Assessment of adaptation options to improve sustainable access to marine resources indicate that strengthening aFAD Programmes in each of the 14 participating countries so that fishers have access to aFADs to provide fresh fish for home consumption and for sale locally is likely to be necessary.

Results of national aFAD Programme audit gap analysis and areas to be addressed: The results from the audit demonstrate that all countries have gaps that impact the sustainability of their aFAD

[1] Policy Brief 31/2017 – Matrix for assessing progress towards a sustainable national FAD Programme, download from: https://purl.org/spc/digilib/doc/t3ume

[2] Bell, JD., Johnson, JE., and Hobday AJ. 2011: Vulnerability of tropical Pacific fisheries and aquaculture to climate change, Website: https://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Bell_11_Vulnerability_Pacific_Fisheries_to_Climate_Change.pdf

Programme, some more than others. The main points are presented here with the number of countries in brackets that need assistance:

- A lack of staff with the necessary skills for aFAD rigging and deployment (13).
- A lack of suitable equipment for deploying aFADs successfully (13).
- Governance structure lacking around legislation and regulations to support the aFAD Programme (12). Only one country has a comprehensive national aFAD Management Plan that is approved by the government for implementation. Future aFAD Management Plans need to include:
    - Mechanisms for retaining staff with aFAD skills (14);
    - Guidance around aFAD registry and aFAD-related information to be recorded (10);
    - Effective feedback mechanism to strengthen communication between fishers and national fisheries administrations (12);
    - Conflict resolution protocols for aFAD fishers (13); and
    - aFADs being equipped with flags and flagpoles for daytime marker plus light and radar reflector for nighttime marker (14).
- A lack of suitable monitoring and data collection system for aFADs and for aFAD catches (13).
- A need for awareness-raising about aFADs and the national aFAD Programme (12).
- A requirement for a training programme for fishers in FAD-fishing methods (12).
- National funding for aFAD materials and supporting programmes is limited and insufficient to run an effective national aFAD Programme (14).
- A lack of partnerships to allow cost sharing for some aFAD deployments (14).

To address these gaps a 2-phased approach is proposed for each of the 14 participating countries:

- ***Phase I***: Strengthen or develop the governance structure necessary to support a national aFAD Management Plan to address gaps identified in the national aFAD Programme audit. This will be developed with broad stakeholder consultation. The aFAD Management Plan needs to describe the structured or sequenced approach for implementing the aFAD Programme within an appropriate legal framework. The aFAD Management Plan will need endorsement from government and resources to support its implementation.
- ***Phase II***: Implementing the aFAD Management Plan. This includes the purchase of aFAD materials and other required equipment, training and capacity development, and strengthening data collection.

The aFADs will be deployed in all 14 countries over the seven-years of the project. The number of deployments in each country (initial and replacement) range from 18 to 60. The total number of nutritious fish meals to be provided by aFADs installed by the Programme across the region is 6-13 million per year[3]). Deployments depend on the size of the country or, in larger countries, the areas proposed for the GCF Programme to target (refer Table 14 for number of FADs per country and depths for deployment). In addition to the aFADs, lights, radar reflectors and spare floats, shackles and swivels for maintenance work will be provided. The legislation and regulations to support the aFAD Programme will also be reviewed and updated in the 12 countries that require this.

The aFAD designs proposed are based on the SPC recommended Indo-Pacific, subsurface or "lizard" design, but noting that these designs continue to evolve. The eventual designs will be agreed between SPC and each country prior to procurement and shipping of the required materials. Surface

[3] See Annex T: Method for measuring the contribution of strengthened national aFAD Programmes to domestic food security.

aFADs will be assessed for fitting with electronic equipment to provide data on position, currents, water temperature, and wave height to aid the delivery of improved and localised reporting on location, sea safety and meteorological conditions. Sonar buoys will also be trialled for measuring fish biomass aggregated under and around selected surface aFADs by each country to assist fishers with their operational decision-making.

Results of national sea safety audit gap analysis and areas to be addressed: The results from the sea safety audit have identified all countries have gaps that impact the sustainability of their national sea safety programme. The issues arising with the number of countries that need assistance identified in brackets, include:

- Governance structure lacking around sea safety legislation and regulations including certifications or qualifications for small craft (<12 m) operators and the sea safety equipment required to maintain certifications (9).
- Lack of sea safety training facilities and trainers (11).
- Lack of the local availability of some sea safety equipment for purchase (12).
- Lack of legislation and regulations around small craft minimum construction specifications to ensure seaworthiness (12). Many countries considered this to be a low priority because there are no local boat building facilities/services.
- Need to develop and/or strengthen awareness-raising around sea safety (11), including carrying an auxiliary outboard (12) and carrying paddles and/or sail rig (10) when fishing outside the reef.

Sea safety interventions, particularly those regarding awareness-raising are linked to the aFAD interventions. Clear messaging that incorporates a sea safety component into aFAD fishing skills trainings is required with sea safety grab bags provided for training purposes. Seven countries require sea safety legislation and regulations to be reviewed and updated and four countries require the review and update of current small craft minimum construction specifications to ensure seaworthiness.

Funding for national component: Based on the results of the audit of aFAD Programmes and sea safety requirements in each of the 14 participating countries, an activity plan and budget was developed for each country. The budgets were developed in local currency, agreed with each country and then converted to USD (refer to Table 16 for individual country budget amounts) for inclusion in the overall national project budget (refer Table 17). The budgets range from USD $431,542 in the smaller countries up to USD $1,011,167 in larger countries (where activity would be focussed on one or two provinces or states).

Beneficiaries from national interventions: The number of beneficiaries[4] varied from the entire population of a country to a percentage of people living in the states or provinces where the project will be implemented. Overall, the range of people expected to benefit in 2030 was from the full population of Niue (1,393 people) to 20 percent of the population in the two provinces of Papua New Guinea (91,834 people) where the project would be implemented (refer Table 19 for a breakdown by country).

Regional component: The regional component has been designed and will provide support to the 14 participating countries in the implementation of their national aFAD Programmes in a structured 2-phase approach including strengthening sea safety awareness. The regional component includes a

[4] The estimated number of people that will have direct access (catching) or indirect access (receive or purchase) pelagic fish as a result of this intervention.

range of other activities to complement the aFAD work. These include post-harvest activities, economic assessments and data collection, social/gender/human rights assessments, communications and information and knowledge management (IKM), support services, and capacity development through the Pacific Island Fisheries Professionals (PIFP) initiative. Ten (10) staff are required to deliver the regional component. Co-locating all staff in a single location (e.g., an office in Suva Fiji) to form a Project Team, with options for short-term placement of aFAD Specialist in the North Pacific is preferable. The regional component should include eight one-year PIFP capacity development positions over the life of the project.

Implementation of the regional aspect of the project will follow the same 2-phased approach as proposed for the national component. Firstly, the governance structures will be strengthened in each country through the review of legislation and regulations by suitable consultants as outlined in the individual country profiles. Each country will have its specific bespoke requirements in this regard. Developing, revising and/or updating aFAD Management Plans for each country will be a primary activity under the first phase of the work for the Project Coordinator, two aFAD Specialists and consultants. This is a prerequisite for the second phase of the programme. Phase two is the operationalisation of the aFAD Management Plan including the purchase of all equipment and arranging for its shipment to each country. Training and capacity development is a main task under the second phase, together with aFAD deployment, data collection, post-harvest assessment and assistance, economic and social/gender studies and research with communities on the benefits from aFADs and fishing around them, the production of IKM products across the different work areas, among a range of other activities.

An essential early task will be the collection of catch and effort data from at least three aFADs in each country to develop a system for the collection of reliable annual catch data, and to provide the baseline for measuring the benefits of Component A of the GCF Regional Tuna Programme. The project will hire one or two data collectors in each country to undertake the data collection over a two-to-three-year period under the guidance of the Project Economist. This may include the collection and analysis of data from fishing activities associated with aFADs that already exist in some countries.

Annual regional meeting: An annual regional meeting will be held for five-days with three representatives per country attending for two main purposes. Firstly, to serve as a Steering Committee for the Project for two-way information exchange between the national and regional components on activities undertaken and allow planning of activities for the following year. It will also aid in documenting progress in each country for reporting back to the Executing Entity. Secondly, the meeting will allow the countries to learn from each other as they exchange and share information and experiences from the activities being undertaken in their country. This sharing of information at the national level is crucial to allow countries to learn from each other, to encourage ownership and commitment to the Project and assist with supporting efforts to sustain their aFAD Programmes and related activities.

Funding for the regional component: An activity plan and associated budget was developed for the regional component to support the implementation of national aFAD Programmes and sea safety activities. The activity plan and budget include staffing for complementary activities such as post-harvest assistance and economic assessment, as well as for support services. The total budget for the regional component is USD $22,190,831. This includes a five percent contingency and the 15 percent for project management (refer Table 21 for a breakdown of the budget by activity and sub-activity).

Overall budget: The total budget comprising the budget to support national activities in the 14 countries (USD $13,191,050) and the regional budget (USD $22,190,831) (refer Table 22 for a breakdown by activity) is USD $35,381,881 (inclusive of a five percent contingency and the 15 percent for related project management).

Conclusions: Based on the overall assessment undertaken across the 14 participating countries, strengthening the national aFAD Programme seems the most effective approach to support domestic food security in these countries. However, there is a great diversity of needs related to strengthening aFAD Programmes across the 14 participating countries, given differences in their population sizes, previous experiences with aFADs, abundance of tuna in their waters, etc.

It is essential to develop and/or strengthen the governance structure to fully support a national aFAD Programme including legislation and regulations and a comprehensive national aFAD Management Plan that has been developed with all stakeholders. Once the national aFAD Management Plan is approved and endorsed by government, it provides the guidance and approach for implementing the aFAD programme as a collaboration between the fisheries agency, other relevant government departments and all stakeholders.

The aFADs will make a significant contribution to food security in the small countries, both in terms of the number of beneficiaries (Table 19) and the relatively high number of fish meals to be delivered per person per month (see Table 1 in Annex T).

The key benefit for the larger countries should not be measured in terms of the proportion of the total population supplied with more tuna – it is simply not possible for one programme to have a significant impact given the large national population. Rather, the main benefit is that the *ad hoc* nature of previous aFAD deployments will be transformed through establishment of a well-structured national aFAD Programme, following the guidelines in SPC Policy Brief 31/2017. This will lay the foundation for these countries to progressively extend a well-maintained aFAD network to additional provinces or states to enlarge the national infrastructure for food security. This can be done using a combination of national funding and resources available from other donors, e.g., the World Bank PROPER, ADB, etc.

1. Introduction and Background

The Pacific Islands region (Figure 1) is made up of 22 Pacific Island countries and territories (PICTs) that rely heavily on the marine resources within their Exclusive Economic Zone (EEZ) for both food security and for economic development. Of these, 14 are independent Pacific Island countries[5] (PICs) and the focus of the proposed activities presented in this study report.

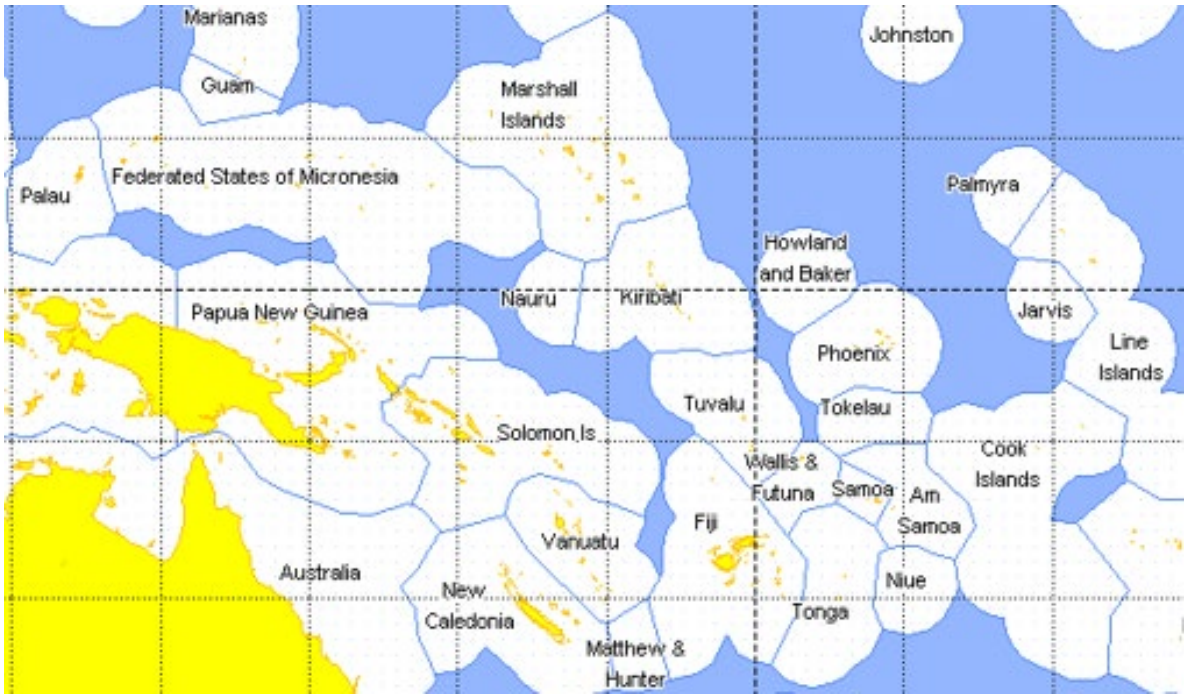

Figure 1: Pacific map showing the 14 participating countries.

The western and central Pacific Ocean (WCPO) has historically been divided into three regions, Melanesia, Micronesia and Polynesia (Table 1), based on the physical nature of the islands and atolls, biogeography, and ethnic and cultural factors[6]. The largest and healthiest tuna resource in the world is located in the WCPO and the Pacific countries rely on this for both food and for economic development. Management of the tuna resource comes under the Western and Central Pacific Fisheries Commission (WCPFC). In 2022 the tuna catch from the WCPFC Convention Area was 2,701,239 mt, which was 54 percent of the global tuna catch[7]. Purse-seining accounted for 70 percent of the catch, with longlining 8.5 percent, pole-and-line 6.2 percent, trolling <1 percent, with other gears contributing 15 percent[7]. The other category includes the catch from artisanal or small-scale tuna fishers in PICs including the catch taken around artisanal fish aggregating devices (aFADs) that are moored to the seafloor in depths from 100-2,500 m.

Table 1 provides a breakdown of the main demographics for the 14 PICs by region that are participating in this Project. The four Melanesian countries support the largest population, land area,

[5] The 14 PICs are: Cook Islands (CK), Federated States of Micronesia (FM or FSM), Fiji Islands (FJ), Kiribati (KI), Marshall Islands (MH), Nauru (NR), Niue (NU), Palau (PW), Papua New Guinea (PG or PNG), Samoa (WS), Solomon Islands (SB), Tonga (TO), Tuvalu (TV), and Vanuatu (VU).

[6] Bell, JD., Johnson, JE., and Hobday AJ. 2011. Vulnerability of Tropical Pacific Fisheries and Aquaculture to Climate Change. Secretariat of the Pacific Community, Noumea, New Caledonia.

[7] Williams, P. and Ruaia, T. 2023. Overview of tuna fisheries in the Western and Central Pacific Ocean including economic conditions – 2022. Western and Central Pacific Fisheries Commission, Scientific Committee, Nineteenth Regular Session, Koror, Palau, 16 –24 August 2023. WCPFC-SC19-2023/GN WP-1. 65 pages.

and coastline length. The five Micronesian countries have the least land area resulting in the entire population living within 5 km of the coast (and most within 1 km of the coast), however, they have the largest Exclusive Economic Zones (EEZs). In addition, the Micronesian and Polynesian countries with their limited land area for agriculture, rely heavily on fishing the coastal and lagoon resources for their daily protein source and the people have some of the highest per capita fish consumption in the world (Table 2). The Pacific region with the many low-lying atolls is particularly vulnerable to the effects of climate change, which is a great concern to the population of the Pacific Island countries.

Table 1: Pacific Island countries by region with population, land area, area of EEZ, coastline length and the percentage of the population living within 1 km and 5 km of the coast.[8]

Country and region	Population (mid-2022 estimate)	Land area (km^2)	EEZ area (km^2)	Coastline length (km)	Percentage of population living within 1 km of coast	Percentage of population living within 5 km of coast
Total	**11,894,867**	**528,047**	**17,628,364**	**24,326**		
Melanesia	**11,265,825**	**521,684**	**4,956,561**	**14,122**		
Fiji Islands	901,603	18,333	1,255,290	1,129	27.2	76.4
Papua New Guinea	9,311,874	462,840	1,558,660	5,152	8.0	21.1
Solomon Islands	744,407	28,230	1,547,600	5,313	65.1	91.4
Vanuatu	307,941	12,281	595,011	2,528	64.1	94.3
Micronesia	**301,044**	**2,158**	**8,906,382**	**9,174**		
Federated States of Micronesia	105,987	701	2,907,950	6,112	88.5	100
Kiribati	122,735	811	3,333,170	1,143	100	
Marshall Islands	42,418	181	1,774,280	370	100	
Nauru	11,928	21	309,044	30	92.6	100
Palau	17,976	444	581,938	1,519	93.5	100
Polynesia	**327,998**	**4,205**	**3,765,421**	**1,030**		
Cook Islands	15,406	237	1,969,960	120	90.7	100
Niue	1,532	259	317,787	64	24.7	83.0
Samoa	200,999	2,934	123,278	403	61.1	97.2
Tonga	99,283	749	628,614	419	84.3	100
Tuvalu	10,778	26	725,782	24	100	

[8] SPC Statistics for Development Division, Website: https://sdd.spc.int/ ; SPC Geoscience, Energy and Maritime Division – Maritime Boundaries Dashboard https://pacificdata.org/dashboard/maritime-boundaries ; and coastline lengths from website: https://www.citypopulation.de/en/world/bymap/coastlines/

Table 2: Per capita fish consumption patterns for Pacific Island countries.[9]

Country and region	Per capita fish consumption (kg)		
	National average	Rural average	Urban average
Melanesia			
Fiji Islands	21	25	15
Papua New Guinea	20	10	28
Solomon Islands	33	31	45
Vanuatu	20	21	19
Micronesia			
Federated States of Micronesia	69	77	67
Kiribati	67	58	67
Marshall Islands	39	39	39
Nauru	56	56	56
Palau	33	43	28
Polynesia			
Cook Islands	35	61	25
Niue	79	79	79
Samoa	87	98	46
Tonga	20	20	20
Tuvalu	110	147	69

Increasing populations and decreasing availability of reef fish and invertebrate resources due to over harvesting and changes to the marine habitat, particularly close to urban centres, is resulting in a gap in domestic fish supply in most PICs[10]. This decline in reef fish resources will be exacerbated by the degradation of coral reefs resulting from increasing sea surface temperatures and ocean acidification. The decline in reef fish availability is also expected to reduce the current per capita consumption levels (Table 2) with low-value fatty imported foods being used as a substitute, leading to potential increases in the prevalence of non-communicable diseases.

Rather than be reliant on imported food to fill the food-security gap, an alternative is increasing the access to, and local consumption of, tuna. To fill the food-security gap, tuna will need to provide 25 percent of all fish required by 2035 across the region. The use of nearshore aFADs is one of the few practical technologies for increasing the availability of tuna for small-scale fishers in most PICs. As a consequence, national governments need to consider nearshore aFADs as basic infrastructure for food security, i.e., to support small-scale fishers to catch tuna more efficiently to help fill the gap in domestic fish supply.

The locations of the additional aFADs to be deployed needs careful consideration - in some countries, a significant percentage of the aFADs will need to be close enough to shore to be

[9] Bell, J.D., Reid, C., Batty, M.J., Allison, E.H., Lehodey, P. *et al*. 2011. Implications of climate change for contributions by fisheries and aquaculture to Pacific Island economies and communities. In: Bell, J.D., Johnson, J.E. and Hobday, A.J. (Eds.). *Vulnerability of Tropical Pacific Fisheries and Aquaculture to Climate Change*. Secretariat of the Pacific Community, Noumea, pp. 733–801.

[10] Bell, J.D., Albert, J., Andréfouët, S., Andrew, N.L., Blanc, M., Bright, P., Brogan, D., Campbell, B., Govan, H., Hampton, J. and Hanich, Q. 2015. Optimising the use of nearshore fish aggregating devices for food security in the Pacific Islands. *Marine Policy*, *56*, pp.98-105.

accessible by fishers in paddling canoes. Other aFADs for use by fishers with power boats, can be placed further offshore where the catch rates of tuna are likely to be higher. The split between the number of aFADs needed for the two types of locations will vary by country and regions within a country, but generally, aFADs should be deployed in depths greater than 150 m to avoid aggregating reef-associated species. Communities and fishers should be consulted for local or traditional knowledge to assist in identifying suitable locations for aFAD deployments. Given the lack of fine resolution bathymetric information for most PICs, it is essential that selected sites are surveyed using GPS for position and echo sounder for depth, so a contour map can be drawn of the surveyed area. This will allow the most appropriate location to be identified within the surveyed area where the ocean floor gradient is not too steep and suitable for the aFAD anchor to secure and hold.

The current approach for implementing national aFAD Programmes is *ad hoc* across the region with little to no governance structure and limited government financial support. In the larger countries some provinces or states have aFADs based on the availability of funding, mainly through donor project funding. The estimated total number of nearshore aFADs across the region in late 2022 (~240) was comprised of varying numbers per country, from two in Niue to 46 in some provinces in Solomon Islands[11]. However, these estimates did not confirm the number of active aFADs in the water, so the actual number is very likely to be lower. Overall, the 333 aFADs to be initially installed and maintained during the Programme (refer Table 14) will significantly increase the supply of tuna and other pelagic fish for domestic food security. By the end of the Programme in 2030, it is estimated that FADs could provide up to an additional 13,320,000 fish meals of 150 g per year for the benefit of ~560,000 people.[12]

The purpose of this study is to support an initiative to improve the food security of rapidly-growing coastal communities in the Pacific Islands region through upscaling the use of nearshore aFADs to increase the supply of tuna and coastal pelagic fish caught by small-scale fishers for local consumption.

Increasing the supply of these species will assist in supplementing food security through the provision of additional fish from sources other than reef fisheries. Productivity from reef fisheries is expected to decline in locations close to urban populations due to increasing fishing pressure on these habitats and more broadly throughout coastal areas within the region as a result of coral reef degradation due to ocean warming and acidification.

The structure of this report follows the requirements of the terms of reference for this study and covers both the national and regional components (Annex A). The introduction and background (section 1) provide demographics for the 14 participating PICs and a snapshot of aFAD deployments in these countries in the early 1980s, 2003 and again in 2022. This also includes some context around the use of nearshore aFADs to increase the catch of tunas and other pelagic species in support of food security given the projected decline in domestic reef fish and invertebrate production. The process (section 2) undertaken for the study is then presented, followed by a section (3) covering the projected climate change effects and possible adaptation approaches that can be employed.

The results of the aFAD Programme audit in all 14 PICs are presented (section 4) covering aFAD staff capacity, the management and governance structure including data collection, end-user

[11] Numbers based on the audit undertaken for this study.
[12] Annex T: Method for measuring the contribution of strengthened national aFAD Programmes to domestic food security.

engagement and partnerships, and funding sources for national aFAD Programmes. This analysis provides the baseline of the aFAD Programme in each country. The audit results for national sea safety support are also provided including governance structure and capacity, training and awareness-raising. A synthesis of the audit results is then presented (section 5). It includes the current gaps with recommendations to fill the identified gaps. This covers the number of aFADs to be deployed to scale-up the national aFAD Programme, national staffing needs and the location or provinces to be targeted. An activity plan with budget is then provided to cover all national aFAD Programme activities to be undertaken by the Project. A risk assessment, a summary of the locations where the intervention will be implemented and estimates of beneficiaries in each country provide the basis for the final part of section 5.

The regional component is then presented (section 6) with an introduction and background for the proposed activities and staffing needs. Activities cover both specific regional activities and linkages to national activities to assist PICs to implement their activities and provides training and other technical support, including the procurement of all materials and equipment for shipping to PICs. An activity plan and budget for the regional component is also presented. The overall activity plan and budget for both national and regional components is then presented (section 7) by activity. Finally, there are a series of annexes including individual country profiles for each of the 14 participating countries (Annexes F to S).

1.1 Fish aggregating device (FAD) Programmes in the Pacific Island countries

FADs have been used in the PICTs since the late 1970s/early 1980s. A summary of the deployment situation in the early 1980s is presented in Table 3.[13]

Table 3: Summary by country of FADs deployed, reported or presumed lost, and planned, with estimated average cost/unit from 1979 to March 1983.

COUNTRY	FADs			
	Deployed	Lost	Planned	Approx. Cost/ Unit US$
American Samoa	22	20	4	5000
Australia	10	4	N/A	various
Cook Islands	6	4	20	3000
Fiji	208	182	175	1000–1500
French Polynesia	11	8	19	5500
Guam	10	9	–	4500
Hawaii	59	4	39	4500
Kiribati	5	3	N/A	600
Northern Marianas	5	5	–	N/A
New Caledonia	6	N/A	N/A	N/A
Niue	5	0	N/A	3000
Palau	6	6	6	3600
P.N.G.	76	76	N/A	N/A
Solomon Islands	132	88	20	2000
Tokelau	1	1	N/A	N/A
Tonga	2	2	2	3000
Tuvalu	–	–	2	N/A
Vanuatu	3	–	N/A	N/A
Western Samoa	37	22	Replacement Only	3000
TOTAL	604	434	287	3000

[13] Boy, RL and Smith, BR. (1984). Design improvements to FAD mooring systems in general use in Pacific Island countries and territories. South Pacific Commission (SPC) Handbook No. 24 (1984).

The FAD designs varied across the different countries. A feature of this experience was that there were many losses as indicated in Table 3, with approximately 80 percent of losses occurring within 12 months. The large number of deployments in Fiji, Solomon Islands and PNG (around 70 percent) were associated with industrial tuna fishing activities, primarily pole-and-line operations with some purse seining. In 1980, SPC started to provide assistance to the PICTs with aFAD design using a combination of negatively buoyant nylon rope for the upper mooring, spliced onto positively buoyant polypropylene rope for the lower mooring line, with a catenary curve forming at the connection of the two rope types[13]. SPC also promoted two surface float designs or arrangements, the spar buoy and the SPC modified Indian Ocean aFAD raft (Figure 2).

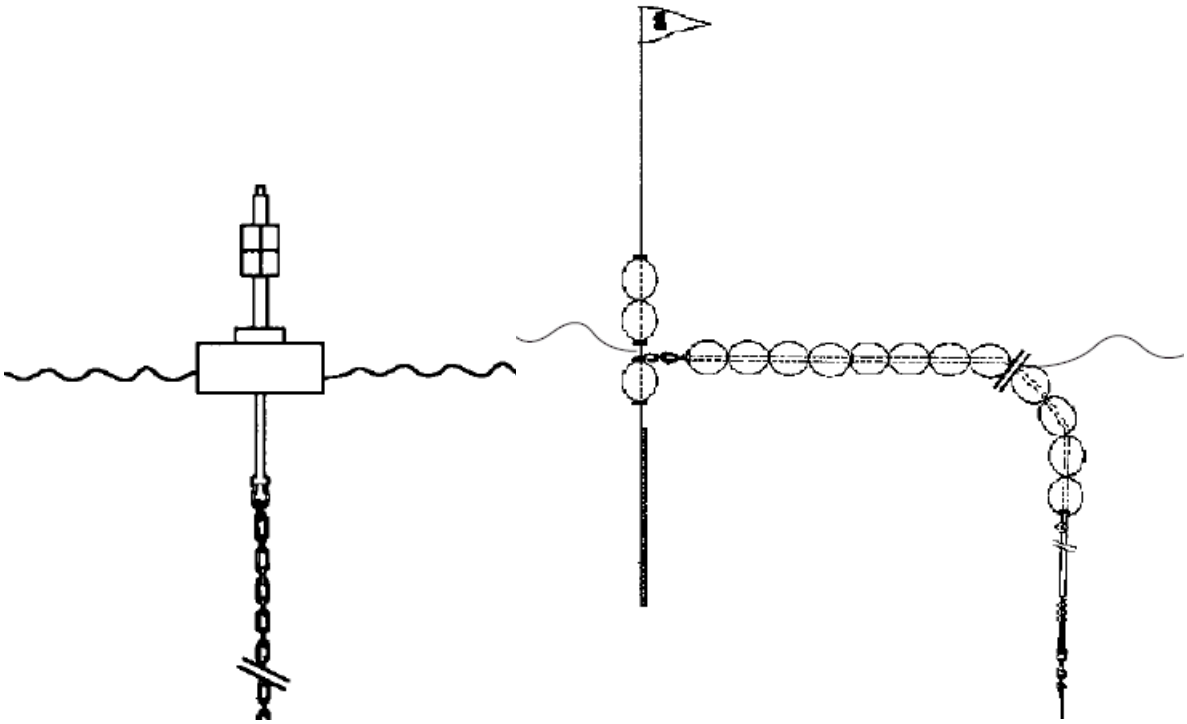

Figure 2: SPC recommended aFAD surface float arrangements with spar buoy (left) and SPC Indian Ocean aFAD raft (right) designs. [14]

PICTs continued with their aFAD activities, with many adopting the SPC recommended mooring and surface float designs. It soon became apparent that the construction of spar buoys was too expensive, so the main buoy system used was the SPC Indian Ocean raft system. Some design faults were corrected in the late 1980s and early 1990s, and by the end of the 1990s, pressure floats were being added to the string of surface floats, alternating with the purse seine floats, and the design evolved into the Indo-Pacific aFAD float system or design. Unfortunately, countries did not keep good records on the designs they used or when they were lost. Also, countries did not collect information on the number of fishers using the aFAD or the catch and effort from the fishers. Some countries continued with aFAD Programmes for their small-scale tuna fishers and others did not.

In 2003/2004, SPC undertook another review of the FAD Programmes across the PICTs and provided a snapshot of the number of FAD Programmes and the number of active FADs in the water in

[14] Gates, P., Cusack, P. and Watt, P. (1996). SPC FAD manual volume II: Rigging deep-water FAD moorings. SPC, Noumea, New Caledonia. 43pp.

September and October 2003.[15] Table 4 summarises the state of FAD Programmes in PICTs in 2003 including planned FAD activities for the next 6-12 months at the time. Of the approximate 882 FAD in the water at the time at least 750 were for industrial fishing operations in PNG and Solomon Islands and not specifically for artisanal fishers.

Table 4: Summary of FAD Programmes and the status of active FADs in the water in September-October 2003 plus planned deployments.

Country/Territory	FAD Programme in place including maintenance.	Number of FADs in the water (at Sept-Oct 2023)	Planned deployments in next 6 months
American Samoa	Ongoing programme	4	1 deep and 7 shallow
Cook Islands	Ongoing programme	17	2 in outer islands + replacements.
Federated States of Micronesia	No active programme	0	2 States with materials and will deploy soon.
Fiji Islands	Ongoing, mainly off Suva	Unspecified	Some deep-water FADs
French Polynesia	Ongoing programme	21	25 planned deployments.
Guam	Ongoing programme	16	Replacement within 2 weeks
Kiribati	Ad hoc/as needs basis	Several	None - no materials
Marshall Islands	No ongoing programme	1	None - no materials
Nauru	Re-activated in 2003 but not maintenance	3	None planned
New Caledonia	Ongoing programme	5	Possibly in early 2004.
Niue	Ongoing programme	14	3 planned + replacements
Northern Mariana Islands	Ongoing programme	3	4 in early 2004
Palau	Separate government and 2 company programmes	24	Companies replace for industrial operations.
Papua New Guinea	No government programme just purse seine companies	600-700	Purse-seine companies maintain FAD numbers
Pitcairn	No programme at all	0	Nothing planned
Samoa	Re-activated in 2002	3	5 in early 2004
Solomon Islands	No government programme just pole-and-line companies	Around 100	Companies replace when needed.
Tokelau	No ongoing programme	0	6 planned for early 2004
Tonga	Re-activated in 2022	18	several planned + replace
Tuvalu	No active programme	0	None - no materials/funding
Vanuatu	Ad hoc programme to change in 2004	2	14 planned with new funding available
Wallis and Futuna	No active programme	1	New funding in 2004
TOTAL	12 active/ongoing	882	69 + replacements

After 2003, SPC continued to refine the aFAD designs to support PICTs with their aFAD Programmes. SPC also undertook some research in Niue and the Cook Islands on different aFAD mooring line systems with some modification made to the SPC recommended designs and published a new aFAD

[15] Chapman, L. 2004. Nearshore domestic fisheries development in Pacific Island countries and territories. Information Paper 8, 4th Heads of Fisheries Meeting, Pacific Community, Noumea, New Caledonia.

manual in support of this.[16] PICTs continued to develop their aFAD Programmes, but this was mainly *ad hoc* when countries had access to donor funding to purchase the necessary materials.

Countries had not implemented a structured approach to their aFAD Programmes at that time. A governance structure and data and information collection systems and processes, as would be described in a formal aFAD Management Plan, were lacking. This resulted in a lack of data on the numbers of aFADs deployed since the 2003 snapshot report and no catch and effort data for artisanal fisheries operating in association with aFADs. This situation was highlighted during the audit of the aFAD Programmes in the 14 PICs completed during this Study (Table 5).[17]

Table 5: The number of active aFADs in PICs, the governance structure or status of aFAD Management Plans or policies, and associated maintenance schedules reported during this Study.

Country	aFAD Programme with Management Plan or policy in place.	Number of aFADs in the water late 2022/early 2023	Planned maintenance
Melanesia			
Fiji Islands	Draft aFAD plan underway, but early stages.	22	No regular maintenance
Papua New Guinea	Starting work on an inshore aFAD policy but early stages.	Around 40	Maintenance is ad hoc with the communities.
Solomon Islands	Have a policy in place but needs review and updating.	46	Do maintenance after 6-months.
Vanuatu	Have draft aFAD Strategy which is being finalised.	25	Monthly maintenance by fisheries officers.
Micronesia			
Federated States of Micronesia	aFAD Programme in Pohnpei but no plan/policy in FSM	2 in Pohnpei and 8 in Chuuk lagoon	1-2 months when there are aFADs.
Kiribati	aFAD Programme with draft plan that needs reviewing.	Around 35	Maintenance 3-monthly where fisheries staff located
Marshall Islands	Have draft aFAD Management Plan that needs updating.	9	Ad hoc with fishers reporting any damage.
Nauru	Draft Nauru National FAD Strategic Development Plan	2	Monthly checking of aFADs
Palau	Internal management plan in place but not formalised.	7	Every 3 months.
Polynesia			
Cook Islands	aFAD Programme with draft policy action plan.	28	1-2 months for maintenance based on location
Niue	Ad hoc, nothing drafted.	10	Every 3 months.
Samoa	Have an aFAD Management Plan but this needs revising.	5	2-3 times per year with limited funds.
Tonga	Have an aFAD Policy and developing an aFAD plan.	17	Monitor and maintain on a quarterly basis.

[16] Chapman, L., Pasisi, B., Bertram, I., Beverly, S., and Sokimi, W. (2005). Manual on FADs: Low-cost moorings and programme management. SPC, Noumea, New Caledonia. 49pp.
[17] Data collected during the audit of FAD Programmes in late 2022 through early 2023 as part of the work being presented in this report.

Tuvalu	Draft plan available and needs finalisation.	5	Once per year.

In 2022, the Food and Agriculture Organisation (FAO) of the United Nations funded an aFAD effectiveness study for some PICTs and the operation of small-scale tuna fishers.[18] There was no climate change focus in this study, however, some of the findings still apply in general to implementing an effective aFAD Programme in a Pacific Island country, especially those that are vulnerable to climate change effects. The relevant findings were:

- ***aFADs***: A general conclusion from many years of experience in fisheries development efforts throughout the Pacific Islands is that aFADs are one of the few innovations that support small-scale fishers to economically take advantage of the region's large tuna resources. Although there is a consensus that aFADs are effective, quantitative evidence of this effectiveness has not been compiled.
- ***Relationship between aFAD Programme institutionalization and aFAD effectiveness*:** It is now generally accepted that national aFAD activities are most effective where there is a national aFAD Programme that is integrated into the government fisheries agency – rather than a project that comes/goes with the availability of funding, pressure from fishers, or the availability of external aFAD services. In addition, an ongoing aFAD Programme within a fisheries agency allows for greater continuity of aFAD work, in-house training, successful technology transfer to staff, and a mechanism for interaction with stakeholders. By being an established unit inside a fisheries department (rather than a project with no permanent staff), there is likely to be greater stability of funding. Without institutionalization, the process of learning from past aFAD-related mistakes is more difficult.
- ***Stakeholder input***: Several studies[19] indicate that formal input of aFAD users is important for aFAD effectiveness, with the general situation being summed up as "Involving local fishers in the site selection process is important. This local knowledge can also increase the effectiveness of aFAD through deployment at productive fishing grounds. The community engagement process also requires mechanisms to support conflict and dispute resolution."
- ***Institutionalization of aFAD activities***: The important aspects of institutionalization that relate to aFAD effectiveness studies are; a) there may be less need for aFAD effectiveness studies after institutionalization of aFAD activities into a government fishery agency, and b) of the factors that influence aFAD effectiveness, several (greater continuity of aFAD work, more retention of aFAD skills, better skills for teaching aFAD fishing, and a mechanism for interaction with stakeholders) require aFAD institutionalization, or are enhanced with institutionalization.
- ***Other messages***: aFAD fishing skills are important for almost all the dimensions ofa FAD effectiveness; and fisher inputs into aFAD Programme design are also important for many dimensions of aFAD effectiveness.

There are no regional policies, plans or strategies that cover artisanal aFAD Programmes for small scale fishers because this is a national issue. SPC provides technical assistance, information and

[18] Gillet, R. 2023. Fish aggregating devices for small-scale fishers - The report of a study of FAD effectiveness in Pacific Islands countries. FAO. Apia.

[19] a) SPC. 2017. Sustainable National Artisanal FAD Programmes: what to aim for. Pacific Community. b) Gillett, R., M, Blanc., I, Cartwright., M, Batty., M, Savins., J, Albert., M, Tanetoa., N, Idechong., T, Emberson., and W, Sokimi. 2018. Forty Years of Small-Scale Tuna Fishery Development in the Pacific Islands: Lessons Learned. Fisheries Newsletter Number 157 (September–December 2018), Pacific Community, pages 60-68. c) Albert, J., and Sokimi, W. 2016. Sharing Pacific Nearshore FAD Expertise. SPC Fisheries Newsletter #150 - May–August 2016, Pacific Community.

training to support national aFAD Programmes and SPC has assisted with the drafting of several national aFAD Management Plans, but most remain in a draft form.

2. Process

The Pacific Community (SPC) advertised a series of Technical Studies to support the preparation of a Funding Proposal for submission to the Green Climate Fund (GCF) titled: Adapting tuna dependent Pacific Island communities and economies to climate change on 19 May 2022 under RFP22-3866. The closing date for bids was 16 June 2022. Study 3: "Feasibility of scaling-up National Fish Aggregating Device (FAD) Programmes in all 14 participating countries" was contracted to Lindsay Chapman Consulting Pty Ltd on 8 September 2022 (SPC contract No CS22-4392), with the delivery date of the final report being 30 September 2023. On 31 August 2023 the contract (CS22-4392) was amended to include the regional component of the FAD Project and the delivery date for the final report was extended to 31 December 2023. The terms of reference for this consultancy are at Annex A.

A workshop was held in Noumea on 27 and 28 September 2022 to bring all lead consultants for the different studies together to outline their work and planned approach. This allowed good discussion around the different studies and how they link together. Under Technical Study 3, a travel budget was agreed to allow up to seven countries to be visited for information gathering and discussion to develop an activity plan and budget for activities that would be incorporated in the GCF Funding Proposal.

Research was then undertaken to identify the climate change risks for each of the 14 participating countries and where aFADs could help communities and governments adapt to the expected climate change effects in terms of increasing access to tuna and other pelagic fish species to improve the food security of rapidly growing coastal communities in the Pacific Island region. The scope of research ranged from entire atoll countries like Tuvalu to provinces or states in the larger countries like PNG and FSM.

Collaboration with SPC staff responsible for aFAD assistance to SPC member countries resulted in a review of the SPC checklist for a sustainable aFAD Programme[20] to include sea safety and related areas. The agreed questionnaire (Annex B) was then used to audit the aFAD Programmes across the 14 participating countries by interviewing key FAD personnel in each country via a virtual Zoom meeting and completing the questionnaire together. At the same time, an audit was completed on sea safety legislation and requirements in each country using a standard questionnaire. A list of people consulted in each country is provided at Annex C.

An analysis of the completed questionnaires identified gaps and areas for improvement to national aFAD and sea safety Programmes in each of the 14 countries. The analysis provided the basis for developing activity plans and associated budget for each of the 14 countries, where implementing or strengthening aFAD Programme and sea safety activities would assist participating communities to adapt to identified climate change risks and vulnerabilities. This information was compiled with background demographics, past aFAD activity information, projected climate change impacts and vulnerabilities, and proposed aFAD designs, into individual country profiles with an accompanying activity plan and budget (Annexes F to S).

[20] Policy Brief 31/2017 – Matrix for assessing progress towards a sustainable national FAD Programme, download from: https://purl.org/spc/digilib/doc/t3ume

In August 2023, the consultancy was expanded to include a regional component. This component will provide the logistical and technical support for the national and in-country work and expand the capacity development activities. Financial support was included to strengthen the data collection and analysis component and allow for aFAD effectiveness studies to be undertaken to support efforts to address some of the long-standing assumptions around relieving fishing pressure on reef fish resources and transferring this fishing effort to small-scale tuna fishing around aFADs.

3. Climate change effects on coastal fish habitats and coastal fish production

The coastal fisheries sector in Pacific Island countries, which has traditionally been a cornerstone of food security across the region[21], is vulnerable to the direct and indirect effects of global warming. Assessments made within the past decade conclude that rising sea surface temperatures (SST) directly threaten the growth, survival, recruitment and distribution of many fish species associated with coastal habitats, particularly coral reefs[22,23,24,25,26]. The various ways in which continued greenhouse gases (GHG) emissions are damaging these coastal habitats (Table 6) is reducing the shelter and food available for many coastal fish species, indirectly reducing their growth, survival and recruitment. The combined direct and indirect effects of climate change on the productivity of coastal fisheries are exacerbating the reduced access to fish for food security occurring in many coastal and urban communities in the region due to rapid population growth, and impeding the steps being taken to combat the high incidence of non-communicable diseases in many Pacific Island countries through the promotion of healthy diets.

Table 6: Summary of the projected effects and impacts of increased greenhouse gas emissions on coastal fish habitats in the Pacific Island region documented by various previous assessments.

Effect	Impact
Increased coral bleaching due to higher sea surface temperatures	Degradation of coral reef ecosystems
Higher rainfall and runoff	Increased turbidity in coastal waters, 'smothering' corals and sea grasses with sediment and limiting/preventing photosynthesis
Increasing ocean acidification	Reduced availability of carbonate required by corals and other calcifying organisms to build skeletons/shells

[21] SPC (2008). Fish and Food Security. SPC Policy Brief 1/2008. https://pacificdata.org/data/dataset/oai-www-spc-int-ced24e95-7e0a-401a-9f0b-d79316c49cb0

[22] Vulnerability of tropical Pacific fisheries and aquaculture to climate change (Chapter 9), Website: https://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Bell_11_Vulnerability_Pacific_Fisheries_to_Climate_Change.pdf

[23] Barange, M. et al. (2018) Impacts of climate change on fisheries and aquaculture: Synthesis of current knowledge, adaptation and mitigation options. FAO Fisheries and Aquaculture Paper 627. https://www.fao.org/3/i9705en/i9705en.pdf

[24] IPCC (2018) Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)] https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_Low_Res.pdf

[25] Website: https://pdf.usaid.gov/pdf_docs/PA00ZK1R.pdf

[26] Website: https://www.dfat.gov.au/sites/default/files/pacific-risk-profile_pacific-region.pdf

Stronger cyclones and increased storm surge	Greater damage to coral reefs and other coastal fish habitats
Sea-level rise	Loss of mangrove habitats where there is no scope for landward migration, and loss of deeper margins of coral and seagrass habitats due to reduced photosynthesis

3.1 Projected climate change risks and effects on coastal fish production across the 14 PICs

The analyses in Technical Study 1[27] also confirm that coastal fish habitats, and coastal fish stocks, across the region are vulnerable to continued greenhouse gas emissions.

The area of coral reef habitat projected to have a high or very high vulnerability to damage from ocean warming and acidification by 2050 under the SSP5-8.5 emissions scenario ranges from 0-80.8 percent. The areas of seagrass and mangrove habitat in the region expected to have a high or very high vulnerability to damage from the same level of global warming by 2050 range from 0-29.5 percent and 0-28 percent, respectively.

The productivity of costal fisheries is projected to decline in all but one country by up to 82.5 percent by 2050 under SSP5-8.5 due to the direct and indirect effects of climate change, with considerable variation among countries. The reduced availability of coastal fish species for local consumption will create a shortfall in the supply of fish needed to provide Pacific Island communities with 50 percent of their daily protein requirement, as recommended by SPC's Public Health Division (Technical Study 2) or maintain the traditionally higher levels of fish consumption in several PICs. The extent of the shortfall in fish supply varies considerably among countries by 2050 under the SSP5-8.5 emissions scenario.

3.2 Adaptation alternatives

Options for filling the gap in fish supply driven by population growth and degradation of coral reefs and other coastal fish habitats due to climate change are limited. Aquaculture has been developed only to a minor extent in the region, and although small-pond tilapia farming promises to be easy for households and small and medium enterprises, it does not have the potential to go anywhere near filling the gap in fish supply for most PICs[28]. The rich tuna resources of the region are the only fisheries resource with potential for meeting the large demand for fish. As a consequence of rapidly-growing national populations alone, it has been estimated that tuna will need to provide 25 percent of the fish required for domestic food security of coastal and urban communities across the Pacific Island region by 2035.[29] Even higher quantities of tuna will be needed as time goes by due to further population growth and climate-driven reduction in coastal fisheries production. There are three main options for increasing access to tuna.

1. Develop domestic tuna longlining and pole-and-line fishing operations. Pole-and-line operations have operated in several Pacific Island countries over the years; however, none are operational in 2023 and this industrial fishing method is not considered viable in the

[27] Results from Study 1: Assessment of the vulnerability of Pacific Island communities and economies to the effects of climate change on fisheries, Tables 1, 2 and 3.
[28] Vulnerability of tropical Pacific fisheries and aquaculture to climate change (Chapter 11), Website: https://www.spc.int/DigitalLibrary/Doc/FAME/Reports/Bell_11_Vulnerability_Pacific_Fisheries_to_Climate_Change.pdf
[29] Bell, J.D. et al. (2015). Diversifying the use for tuna to improve food security and public health in Pacific Island countries and territories. *Marine Policy*, *51, 584-591.*

current context. Longlining to supply fish for domestic consumption has been trialled in some countries but has generally been assessed to be non-profitable given the relatively high cost of constructing and operating longline fishing vessels, and local prices paid for longline-caught tuna and bycatch compared to the prices that can be obtained by exporting the fish.

2. Use of bycatch from purse-seine fishing. This will be a workable solution for at least six of the participating countries where transshipment of tuna occurs regularly. This is the subject of Technical Study 5 and is not considered further here.

3. Scaling-up the use of aFADs to ensure that they become a permanent part of national infrastructure for food security. This will enable small-scale fishers to progressively transfer more of their coastal fishing effort from reef fish to tuna and other pelagic fish. As explained earlier in this report, aFADs are currently being used in all PICs to varying degrees, but the approach to using this cost-effective technology is *ad hoc* at present and needs to be restructured and strengthened.

Considered against the options available, the most appropriate adaptation for increasing access to fresh fish for the food security of coastal communities across the region, and urban communities in the smaller countries, is to strengthen national aFAD Programmes. Such investments will provide increased opportunities for small-scale fishers to catch tuna and other large pelagic fish in nearshore waters and improve the food security of vulnerable communities.

4. National assessments

4.1 The aFAD Programme assessments based on the SPC matrix

Assessments of aFAD Programmes in all 14 participating PICs were undertaken from October 2022 to March 2023, with one assessment undertaken face-to-face and the others conducted virtually via Zoom meetings. The assessment used the SPC "*Matrix for assessing progress towards a sustainable FAD Programme*" in Policy Brief No. 31/2017.[30] The matrix covers four themes; capacity (technical and operational capacity), management (policy, institutional administrative and managerial support), end-user engagement (partnerships, communication and awareness-raising) and funding (government, donor and possible cost-sharing). The score is a self-assessment by national fishery agency personnel engaged in FAD-related activities in each of the 14 countries. The rankings are: 100 percent = fully sustainable (meaning the national aFAD Programme receives on-going institutional and financial support in these areas); 50 to 99 percent = on the way to sustainability (meaning the national fisheries agency is increasing the personnel and financial resources assigned to the national aFAD Programme but that supplementary support is still required from external sources in these areas); and 0 to 49 percent = activities are *ad hoc* (meaning there is no national established, on-going programme of support for the identified aFAD-related activities, and activities generally only occur on an opportunistic basis).

4.1.1 Capacity for aFAD work

Table 7 summarises the assessment for national capacity for undertaking aFAD work in each of the 14 participating PICs. The individual score by country can be found in Annex D. Most countries

[30] Policy Brief No. 31/2017: Sustainable national artisanal FAD Programmes – what to aim for: Website: https://www.spc.int/DigitalLibrary/Doc/FAME/Brochures/Anon_17_PolicyBrief31_FAD_Programmes.pdf

assessed themselves as working towards being sustainable in some areas, while others felt the in-country capacity remained *ad hoc*/under-developed.

Table 7: Summary of assessment of national capacity to support national aFAD Programmes across 14 PICs (values in table indicate the number of countries in each category)

Matrix for assessing progress towards a sustainable national aFAD Programme - criteria	*Ad hoc* (0-49%)	On the way to sustainability (50-99%)	Sustainable (100%)
1. Capacity			
1.a Country-based experts are available to manage the aFAD Programme including the rigging and deployment of aFADs.	1	12	1
1.b The national fisheries agency owns or has easy access to the infrastructure and equipment required to deploy aFADs (e.g., suitable boat with echo-sounder and GPS).	2	11	1
1.c Depending on the size of the country, one or more recurrent positions at the national fisheries agency are fully or partly dedicated to aFAD work and this is reflected in job descriptions.	2	9	3
1.d A succession training plan is in place to ensure that the country does not lose its aFAD technical capacity when the existing aFAD experts move out or retire.	5	9	0

4.1.2 Management to support aFAD work

Table 8 summarises the assessment of management to support national aFAD Programmes in each of the 14 participating PICs. The individual score by country is presented in Annex D. Half of the countries assessed themselves as being sustainable regarding political support for management of the aFAD Programme and having high-level policies and strategies that reflect this. Overall, most countries were progressing towards sustainability across the management criteria, and many have draft aFAD Management Plans or policies that need to be reviewed and updated. The majority of countries also have some legislation in place to support their aFAD Programme, although many thought this needed to be strengthened. Half of the countries only had *ad hoc* arrangements in place for monitoring aFADs and recording catch and effort from around the aFADs, with only one country ranking themselves as sustainable in this area.

Table 8: Summary of assessment of current management support to national aFAD Programmes across 14 PICs (values in table indicate the number of countries in each category)

Matrix for assessing progress towards a sustainable national aFAD Programme - criteria.	*Ad hoc* (0-49%)	On the way to sustainability (50-99%)	Sustainable (100%)
2. Management			
2.a Political stakeholders understand the contribution of nearshore aFADs to food security and livelihoods.	2	5	7
2.b The national fisheries agency has strategic plans or policies that mention nearshore aFADs and the aFAD Programme.	1	7	6

2.c A registry is used to record aFAD deployments and keep track of lost aFADs that need to be replaced.	1	9	4
2.d Legislation and regulations are in place and enforced to support the national aFAD Programme and to clarify the roles and responsibilities of aFAD users.	4	8	2
2.e The national fisheries agency has a nearshore aFAD Management Plan or policy to guide its aFAD work.	2	12	0
2.f A monitoring framework is in place that captures fishers' use of aFADs and/or catches at representative sites.	7	6	1

4.1.3 End-user engagement

Table 9 summarises the assessment of end-user engagements in the aFAD Programmes in each of the 14 participating PICs. The individual score by country can be found in Annex D. Most countries ranked themselves as on the way to sustainability regarding end-user partnerships, having effective feedback mechanisms in place and awareness-raising and training around aFADs and aFAD fishing skills. Only one country assessed itself as supporting conflict resolution processes including codes of conduct for harmonious use of aFADs by multiple stakeholders that are sustainable.

Table 9: Summary of assessment of end-user engagement in the national aFAD Programmes for 14 PICs (values in table indicate the number of countries in each category).

Matrix for assessing progress towards a sustainable national aFAD Programme - criteria.	*Ad hoc* (0-49%)	On the way to sustainability (50-99%)	Sustainable (100%)
3. End-user engagement			
3.a Partnerships are developed with end-users (e.g., communities, fishers' associations, sports fishing charters, recreational fishers) for the ownership, co-management and potential cost-sharing of aFADs.	3	8	3
3.b An effective feedback mechanism exists between the national fisheries agency and aFAD end-users.	2	10	2
3.c aFAD awareness-raising and training in sustainable FAD fishing methods and safe aFAD-fishing methods are undertaken in communities that are newly exposed to aFADs.	0	12	2
3.d Conflict resolution protocols are in place and effective.	8	5	1

4.1.4 Funding for national aFAD Programmes

Table 10 summarises the assessment of funding that is in place to support the national FAD Programme in each of the 14 participating PICs. The individual score by country can be found in Annex D. No country considered that it had sustainable funding for the aFAD Programme. Most countries advised that they are making progress towards sustainability but three advised that only *ad hoc* financing arrangements apply. Most countries ranked themselves as on the way to sustainability with donor funding supplementing government funding. Some countries reported that an internal budget is available to support the national aFAD Programme although this was assessed

as being inadequate for running a suitable aFAD Programme. Most countries advised that co-financing was *ad hoc* and were interested in exploring co-financing opportunities.

Table 10: Summary of assessment of funding for national aFAD Programmes for 14 PICs (values in table indicate the number of countries in each category).

Matrix for assessing progress towards a sustainable national aFAD Programme - criteria.	*Ad hoc* (0-49%)	On the way to sustainability (50-99%)	Sustainable (100%)
4. Funding			
4.a The government provides the national fisheries agency with a recurrent annual budget for the implementation of its aFAD Programme.	3	11	0
4.b Donors and/or the government provide occasional funding for aFAD projects.	2	10	2
4.c Partnerships with end-users are in place, which include aFAD cost-sharing.	8	6	0

4.2 Assessment of small craft sea safety based on questionnaire

An assessment of the sea safety requirements for small craft and fishers was undertaken at the same time as the aFAD assessment. This was a complimentary task given fishers are being encouraged to fish outside the reef and offshore around aFADs, which raises potential sea safety concerns. The questionnaire used was developed specifically for this task in collaboration with SPC staff. The score is self-assessed by each country with the rankings being 100 percent equal to fully sustainable, 50 to 99 percent on the way to sustainability and 0 to 49 percent indicating activities are *ad hoc*.

4.2.1 Sea safety requirements

Table 11 summarises the assessment of national sea safety requirements for small craft in each of the 14 participating PICs. The individual score by country can be found in Annex E. Five countries ranked themselves as being sustainable regarding national legislation and regulations relating to qualifications for operating small craft (<12 m length) and sea safety requirements, while four considered that an *ad hoc* approach had been taken to meeting sea safety standards. Most countries were either *ad hoc* or on the way to sustainability when it came to training facilities and trainers for small craft sea safety, i.e., required sea safety equipment was available in-country for purchase, and there were suitable facilities and skilled personnel for maintaining sea safety equipment.

Two countries ranked themselves as sustainable regarding small craft minimum specifications for design and construction while seven advised a status of *ad hoc*, with some of these advising that no national provisions existed in this regard. Most countries reported that they are on the way to sustainability regarding a good working relationship between national fisheries and maritime authorities, with three ranking themselves as sustainable. Eight countries ranked themselves as sustainable with the provision of aFAD locations to maritime authorities for updating maritime charts. Half of the countries ranked themselves as sustainable with sea safety search and rescue vessels and operational plans, with the other seven countries reporting they are on the way to sustainability.

Table 11: Summary of self-assessment of sea safety requirements for small craft across the 14 PICs (values in table indicate the number of countries in each category).

Matrix for assessing the status of national sea safety requirements for small craft (<12 m length) - criteria.	*Ad hoc* (0-49%)	On the way to sustainability (50-99%)	Sustainable (100%)
5. Sea Safety Requirements			
5.a Country has regulations in place covering qualifications for small craft (3-8 m in length) operators.	4	5	5
5.b Country has regulations on sea safety equipment that needs to be carried when small craft are heading to sea.	4	5	5
5.c Country has suitable training facility and trainers to provide training in qualifications and sea safety equipment use by small-scale fishers.	5	6	3
5.d Required sea safety equipment is available for purchase locally from public or private sector companies.	5	7	2
5.e Country has suitable facilities and skilled personnel for maintaining all sea safety equipment or has arrangements in place to have this done offshore.	7	6	1
5.f Country has required small craft minimum specifications for design and construction to ensure seaworthiness.	7	5	2
5.g Good working relationship and proper information exchange protocols exists between fisheries and maritime authorities around sea safety.	0	11	3
5.h National fisheries agency provide coordinates for anchored aFADs to Maritime for updating navigation charts for merchant vessels.	2	4	8
5.i Country has aFADs marked for easy location day (flagpole with flag) or night (light and radar reflector).	2	12	0
5.j Country has search and rescue vessels and plans in place when a small-scale vessel is reported missing.	0	7	7

4.2.2 Sea safety for fishers

Table 12 summarises the assessment of sea safety for fishers in each of the 14 participating PICs. The individual score by country can be found in Annex E. Three countries ranked themselves as sustainable regarding the promotion of the use of a sea safety checklist for small craft operators, with another nine countries on the way to sustainability and two *ad hoc*. Six countries ranked themselves as *ad hoc* when encouraging fishers to carry a second outboard. This was reported to be principally due to the cost of a second outboard engine which fishers could not afford and where there is no legal requirement in place to do this. Similarly, five countries ranked themselves as *ad hoc* regarding encouraging fishers to carry paddles and/or sail rig when fishing outside the reef, while four countries ranked themselves as sustainable in this regard.

Table 12: Summary of national fisheries agency self-assessment of sea safety support for small craft fishers across the 14 PICs (values in table indicate the number of countries in each category).

Matrix for assessing the status of national sea safety requirements for small craft (<12 m length) - criteria	*Ad hoc* (0-49%)	On the way to sustainability (50-99%)	Sustainable (100%)
6. Sea Safety for Fishers			
6.a Fisheries agency uses and promotes the SPC sea safety checklist, or some form of checklist, and has this in local language for small-scale fishers.	2	9	3
6.b Fisheries agency encourages fishers to have a second smaller outboard for safety reasons.	6	6	2
6.c Fisheries agency encourages small-scale fishers to carry paddles and/or sail rig when fishing outside the reef.	5	5	4

5. Planned project activities to fill gaps to optimise potential to establish sustainable aFAD Programmes.

5.1 Country aspirations and aFAD numbers

As summarised in Section 4, all PICs have good to strong political support for a national aFAD Programme. In most countries this is confirmed in national development strategies, fisheries sector policies or other high-level documents. Several countries have support for aFADs included in legislation, although in some cases it is focused on drifting or anchored FADs for the offshore industrial tuna fishery and does not cover inshore aFADs for small-scale artisanal fishers. In other countries, the legislation is outdated and needs to be reviewed and updated. Most countries have commenced drafting an aFAD Management Plan or policy. Others have finalised policies or plans although many require review and updating (13 PICs). Only one PIC has not started the development of a national aFAD Management Plan or policy (Table 5).

Many of the draft aFAD Management Plans or policies do not specifically state the number of aFADs the country wishes to maintain. As a consequence, it is difficult to ascertain the aspiration of each country from these documents as they stand. During the audit of the national aFAD Programme for each PIC, some countries stated the number of aFADs they would like to see deployed and maintained. The range of aFADs desired differed significantly by PIC and the size of the country. PICs were focused on nearshore aFADs anchored at depths of 200 to 500 m, or offshore aFADs at depths of 1,000 to 1,500 m. Several countries have also deployed FADs at depths of 2,000 to 2,500 m.

5.2 Recommended aFAD designs

Much research and trialing has gone into aFAD designs over the last four decades, and SPC has been at the forefront of this work in the Pacific. The result is three main designs recommended for deployment in nearshore and offshore waters: the Indo-Pacific (Figure 3 left), the subsurface (Figure 3 right) and the lizard (Figure 4) designs. These three designs are proposed for use in the GCF Programme, recognizing that participating countries may have a preference for one or two of these designs.

The Indo-Pacific design incorporates a string of surface floats attached to negatively buoyant (sinking) nylon multistrand rope connected (spliced) into positively buoyant (floating) polypropylene multistrand rope which is attached to the anchor system. The length of rope used is around 25

percent longer than the depth of water the aFAD will be deployed in, with supplementary buoyancy added to the lower mooring line when aFADs are deployed in less than 1,500 m. A full description of the aFAD design and materials used has been published by SPC.[31]

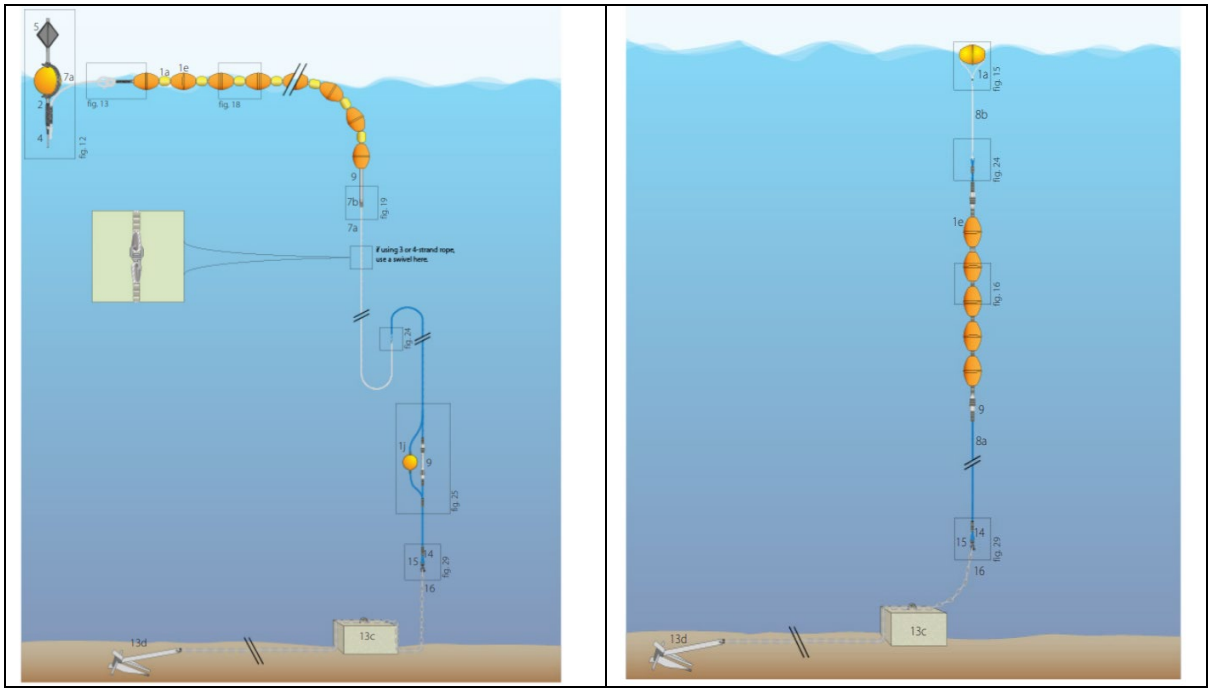

Figure 3: Indo-Pacific aFAD mooring design showing the upper floatation system used in offshore areas (left) and subsurface aFAD mooring design showing the temporary surface marker to aid fishers to locate the aFAD initially (right).[31]

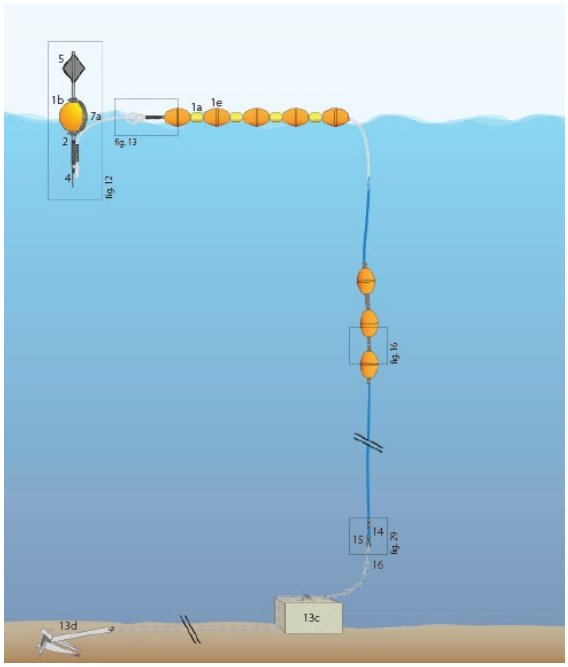

Figure 4: "Lizard" mooring design aFAD that combines features from both the surface Indo-Pacific design and subsurface design.[31]

[31] Sokimi, W., M, Blanc., B, Colas., I, Bertram and J, Albert. 2020. Manual on anchored fish aggregating devices (FADs): An update on FAD gear technology, designs and deployment methods for the Pacific Island region. Pacific Community.

This subsurface design has the string of floats attached to polypropylene rope that is shorter than the depth of water the aFAD is being deployed in and is attached to the bottom by an anchor system. A small surface float is also attached with light nylon rope so that fishers are able to locate the aFAD initially and formulate their own landmarks for locating the aFAD when the surface float is removed.[31]

The lizard design incorporates a string of surface floats on negatively buoyant (sinking) nylon multistrand rope connected (spliced) into positively buoyant (floating) polypropylene multistrand rope which is attached to the anchor system. In addition, several pressure floats are attached to the upper end of the polypropylene rope the same as in the subsurface design. Therefore, if the surface float system is lost, the aFAD continues to operate as a subsurface design.[31]

The three aFAD designs continue to evolve with small changes or refinements to increase their lifespan, to use more environmentally friendly materials and to reduce the costs of materials wherever possible. Therefore, the actual design or designs to be used in each country will be decided between SPC and each country prior to the procurement of materials.

5.3 Addressing the gaps across the participating countries

This section describes a programme to address the gaps identified during the audit of the national aFAD Programmes in all 14 PICs undertaken from October 2022 to March 2023. Any area that was not ranked or scored as "sustainable" (100 percent) is considered a gap to be filled. The lower the ranking or score, the larger the gap to be filled. The 2-phased approach planned for each of the 14 participating countries is:

- ***Phase I***: Establish the institutional means to develop, implement and sustain a national aFAD Programme in a way that is applicable equally to countries which already have a national aFAD Programme, or countries with aspirations to establish one, and engaging broadly with stakeholders. This Phase includes the review and strengthening of relevant supporting national legislation and regulations, institutional resources and capacity, and general governance arrangements. A principal output will be a detailed description of the institutional and governance arrangements for a National aFAD Programme that provides for the development, or strengthening, of an aFAD Management Plan that will require endorsement from government prior its implementation.
- ***Phase II***: Operationalising the national FAD Programme, including implementation of the aFAD Management Plan to address all gaps identified in the 2022/23 audit of the national aFAD Programme. This includes the purchase of FAD materials and required equipment, training and capacity development, support for deployment and strengthening, or establishing new, monitoring/data collection systems.

5.4 Addressing aFAD Programme gaps

Table 13 presents the criteria for effective national aFAD Programmes and the number of countries that scored lower than sustainable (0 to 99 percent) for each area for their aFAD Programme covering capacity, management, end-user engagement and funding following the audits undertaken from October 2022 to March 2023. Suggestions on how to address the gaps, some of which will require financial support, are included. These are covered in the budget section (Table 17) of the report.

Table 13: Criteria for national aFAD Programmes and number of PICs scored at lower than sustainable (0 to 99 percent), with suggestions for addressing the identified gaps in the aFAD Programmes of the 14 PICs.

Criteria	Number of countries ranked at 0 to 99 percent	How to address
Capacity		
1.a Country-based experts are available to manage the aFAD Programme including the rigging and deployment of aFADs.	13	Support needed to strengthen the aFAD rigging and deployment expertise and budget needed.
1.b The national fisheries agency owns or has easy access to the infrastructure and equipment required to deploy aFADs (e.g., suitable boat with echo-sounder and GPS).	13	Need a budget for the purchase of suitable equipment including a deployment barge for some countries, GPS and echo sounder(s).
1.c Depending on the size of the country, one or more recurrent positions at the national fisheries agency are fully or partly dedicated to aFAD work and this is reflected in job descriptions.	11	Review staff job descriptions and ensure aFAD work is included for the appropriate staff. Internal process undertaken by government and no funding required.
1.d A succession training plan is in place to ensure that the country does not lose its aFAD technical capacity when the existing aFAD experts move on or retire.	14	Training programme to ensure aFAD expertise is passed on to other staff. Can also be written into the aFAD Management Plan. Budget needed.
Management		
2.a Political stakeholders understand the contribution of nearshore aFADs to food security and livelihoods.	7	Continue briefing political stakeholders on the importance of aFADs. Internal process.
2.b The national fisheries agency has strategic plans or policies that mention (and support) nearshore aFADs and the aFAD Programme.	8	Review and update strategic plans and policies as and if needed. Internal process.
2.c A registry is used to record aFAD deployments and keep track of lost aFADs that need to be replaced.	10	Review current aFAD registry and strengthen where appropriate. This may include some countries that scored 'sustainable' and will be covered in the national aFAD Management Plan budget.
2.d Legislation and regulations are in place and enforced to support the national aFAD Programme and to clarify the roles and responsibilities of aFAD users.	12	Review legislation and regulations and strengthen where appropriate in support of aFAD Programme. Strengthen enforcement capacity. Budget needed.
2.e The national fisheries agency has a nearshore aFAD Management Plan or policy to guide its aFAD work.	14	Strengthen, review and update current draft aFAD Management Plan or strategy and develop into a full aFAD Management Plan to guide the implementation of the aFAD Programme. Budget needed.
2.f A monitoring framework is in place that captures fishers' use of aFADs and/or catches at representative sites.	13	Work with SPC to strengthen or implement a suitable monitoring framework using SPC's new TAILS and IKASAVEA applications and approaches. Budget needed.
End-user engagement		

3.a Partnerships are developed with end-users (e.g., communities, fishers' associations, sports fishing charters, recreational fishers) for the ownership, co-management and potential cost-sharing of aFADs.	11	Incorporate in the aFAD Management Plan through an aFAD Advisory Committee so stakeholders are consulted and kept informed, so included in aFAD Programme budget.
3.b An effective feedback mechanism exists between the national fisheries agency and aFAD end users.	12	Incorporate in the aFAD Management Plan, including the process for feedback. Part of aFAD Management Plan budget.
3.c aFAD awareness-raising and training in sustainable aFAD fishing methods and safe aFAD-fishing methods for communities that are newly exposed to aFADs.	12	Establish or strengthen a training programme for both aFAD rigging and deployment including maintenance and aFAD fishing skills. Budget needed.
3.d Conflict resolution protocols are in place and effective	13	Incorporate in the aFAD Management Plan, including supporting processes. Part of aFAD Management Plan budget.
Funding		
4.a The government provides the national fisheries agency with a recurrent annual budget for the implementation of its aFAD Programme.	14	Support the sustainable financing mechanisms and assist with supplementary funding support in the short-term. Budget needed.
4.b Donors and/or the government provide occasional funding for aFAD projects.	12	Continue seeking donor support to supplement the sustainable financing mechanism for the national aFAD Programme in the short-term. Internal process.
4.c Partnerships with end users are in place, which include aFAD cost-sharing.	14	Incorporate in the national aFAD Management Plan. Part of the aFAD Management Plan review budget.

5.4.1 Number of aFADs for each country and targets for optimising the potential to establish sustainable aFAD Programmes by end of the Project

The size of the proposed aFAD Programme by country across the 14 PICs will vary. In the smaller countries, it will cover the whole country whereas in the larger countries it will be focused on one or two provinces or states. Where a province or state is to be chosen, discussions were held with the fisheries staff to identify the area's most vulnerable to climate change effects, acknowledging that in most cases the whole country is vulnerable. During national consultations associated with the audit of existing aFAD activities, countries identified the optimal number of aFADs and deployment preferences (such as locations and depths) under a future national aFAD Programme.

Table 14 summarises this information by country. A total of 528 aFADs are proposed for deployment across the 14 PICs. This comprised 333 aFADs for initial deployment, with an additional 195 replacement aFADs over the life of the Programme to maintain the overall addition of 333 aFADs. The deployment depths fell into three ranges; 200-500 m, 800-1,400 m and 1,500-2,500 m.

All countries will also receive additional floats, shackles and swivels for maintaining the aFADs. In addition, 40 aFADs will be stored in cyclone-proof storage, half in Suva, Fiji (15 for 200-500 m and 5 for 800-1,400 m) and the other half in Port Vila, Vanuatu (20 for 800-1,400 m), for use as part of rapid response following a cyclone in those countries. These provisions were incorporated into the budget for each country as part of the country profiles (Annexes F to S). It is also presented in the overall national budget for the Programme in the budget section of this report (Refer Table 17, Activity 2.6).

Table 14: The proposed locations and number of aFADs for the initial deployment and replacements, with the depth range to be deployed. Note: this does not include the 40 aFADs reserved for cyclone storage.

Region and country	Location for Project aFADs	Number of aFADs to be deployed			Number of aFADs by depth		
		Initial deployment	Replacement aFADs	Total	200-500 m	800-1,400 m	1,500-2,500m
Melanesia							
Fiji (Annex F)	Southern Central and Eastern Divisions	40	20	60	43	17	
Papua New Guinea (Annex G)	Manus and AROB (Bougainville) provinces	36	18	54	45	9	
Solomon Islands (Annex H)	Temotu Province and north coast of Guadalcanal	20	13	33	24	9	
Vanuatu (Annex I)	Shefa and Tafea provinces including Port Vila	34	17	51		51	
Micronesia							
Federated States of Micronesia (Annex J)	Pohnpei and Yap States	24	16	40	24	16	
Kiribati (Annex K)	Gilbert Islands Group	38	19	57	27	30	
Marshall Islands (Annex L)	All Marshall Islands except 3 atolls with populations <100.	27	13	40		40	
Nauru (Annex M)	All country	12	6	18	12		6
Palau (Annex N)	All Palau except Sonsorol, and Hatohobei	16	16	32		16	16
Polynesia							
Cook Islands (Annex O)	Southern Cook Islands Group	20	14	34	15	19	
Niue (Annex P)	All country	14	6	20	13	7	
Samoa (Annex Q)	All country	18	15	33		15	18
Tonga (Annex R)	Tongatapu, Eua and Ha'apai Group	20	14	34	17	17	
Tuvalu (Annex S)	All country	14	8	22	16	6	
TOTAL		**333**	**195**	**528**	**236**	**252**	**40**

In addition, to make optimum use of the network of aFADs in each country, different electronic equipment will be attached for positioning, measuring current, water temperature, and wave height to provide additional data for climate change modelling and local meteorological services in the future. Sonar buoys will also be trialled for measuring fish biomass aggregated under and around the aFAD. These trials will be undertaken in collaboration with SPC and will inform decisions by fishers regarding potential harvests of individual aFADs. The costings for the necessary electronic equipment and the aFAD materials are incorporated in the national budget section (Table 17).

5.4.2 Minimising the environmental impact of aFADs

It is important to minimise the environmental impact of aFADs including any interactions with marine life, such as marine mammals, turtles and sea birds. The aFADs will be deployed in locations away from any known whale migratory paths to minimise any chance of interaction. The FADs will also be deployed in depths over 150 m to ensure they attract tuna and other nearshore pelagic species and do not attract any reef-associated fish species.

The aFAD mooring line, consisting of a single rope from the anchor to the floats, will also minimise the chance of interaction or encounters by whales and other marine life. Nothing will be attached to the mooring line that would entangle marine life or sea birds.

Plastics or netting will not be used or attached to the aFADs to act as an aggregator. Instead, local natural materials such as bamboo or coconut fronds that are biodegradable will be used as aggregators attached under the float system, and this will be decided with each country at the time of implementing the Programme.

A survey of the bottom topography using echo sounder and GPS will be undertaken for all sites identified as possible locations for installing an aFAD. Some sites will not be suitable due to the slope being too steep for the anchor blocks to settle and hold. Choosing suitable sites with gentle slope or that are relatively flat will allow the anchor to settle and hold, increasing the lifespan of the aFADs and reducing the chance of premature loss.

Some of the surface aFADs will have electronic meteorological equipment and/or sonar buoys for measuring the biomass of tuna around the aFAD attached to the float system. This equipment has GPS for location, and in the event that the aFAD breaks free, it can be retrieved reducing the risk of the FAD washing ashore or onto the reef. The materials recovered can be reused as part of another aFAD.

5.5 Analysis of the small craft sea safety requirements

Table 15 presents the different criteria for small craft sea safety requirement and the number of countries that scored lower than sustainable (0 to 99 percent) regarding current gaps in sea safety requirements following the audit undertaken from October 2022 to March 2023. Suggestions on how to address the gaps, some of which will require financial support, are included. These are incorporated into the budget section (Table 17) of the report.

Table 15: Criteria for small craft sea safety and number of PICs scored at lower than sustainable (0 to 99 percent), with suggestions for addressing the identified gaps in the current sea safety requirements in the 14 PICs.

Criteria	Number of countries ranked at 0 to 99 percent	How to address
Sea safety requirements		
5.a Country has regulations in place covering qualifications for small craft (3-8 m in length) operators.	9	Review current legislation and regulations and strengthen as appropriate for small craft operators including compliance monitoring. Will need to raise the awareness through a campaign. Budget needed.
5.b Country has regulations on sea safety equipment that needs to be carried when small craft are heading to sea.	9	Review current legislation and regulations and strengthen as appropriate for sea safety requirements and equipment for small craft including compliance monitoring. Will need to raise awareness through a campaign. Budget needed.
5.c Country has suitable training facility and trainers to provide training in qualifications and sea safety equipment use by small-scale fishers	11	Explore options to provide sea safety training and include in aFAD trainings.
5.d Required sea safety equipment is available for purchase locally from public or private sector companies	12	Explore what sea safety equipment items are hard to get and provide sea safety grab bags for training purposes.
5.e Country has suitable facilities and skilled personnel for maintaining all sea safety equipment or has arrangements in place to have this done offshore.	13	Explore options for maintaining sea safety equipment or having this done offshore. Internal process.
5.f Country has required small craft minimum specifications for design and construction to ensure seaworthiness	12	Consultancy to assess current situation and recommend a way forward, and link to other Project activities and the results from Study 12. Some countries do not see this as a priority as no boatbuilding done locally. Budget needed.
5.g Good working relationship and proper information exchange protocols exists between fisheries and maritime authorities around sea safety	11	Review current processes to see where the working relationship can be strengthened. Internal process.
5.h Fisheries provide coordinates for anchored aFADs to Maritime for updating navigation charts for merchant vessels	6	Review the current process where coordinates of aFADs are not provided to marine department and strengthen to ensure this happens. Internal process.
5.i Country has aFADs marked for easy location day (flagpole with flag) or night (light and radar reflector).	14	Cover in aFAD Management Plan and assist with lights etc as part of aFAD Programme budget.
5.j Country has search and rescue vessels and plan in place when a small-scale vessel is reported missing.	7	No action needed as this is a national responsibility and internal process.
Sea safety for fishers		

6.a Fisheries agency uses and promotes the SPC sea safety checklist, or some form of checklist, and has this in local language for small-scale fishers	11	Strengthen awareness-raising around sea safety. Budget needed.
6.b Fisheries agency encourages fishers to have a second smaller outboard for safety reasons.	12	Include in strengthened awareness-raising around sea safety.
6.c Fisheries agency encourages small-scale fishers to carry paddles and/or sail rig when fishing outside the reef.	10	Include in strengthened awareness-raising around sea safety.

As described in the country profiles, the range of services and technical assistance will vary between countries. The types of activities will include consultancies, where needed, for the review of legislation and regulations around marine qualifications and sea safety requirements or equipment, and minimum standards for vessel design etc. Where these are identified as lacking, assistance will be provided to draft appropriate legislation and regulations. Sea safety training will also be incorporated into the aFAD training activities, and a joint awareness-raising campaign developed or strengthened around aFADs, the aFAD Programme and sea safety for small craft in general. Awareness-raising materials for different media platforms will also be developed and disseminated widely and regularly in each country.

5.6 National budgets including activity plan

The budget for each country was developed in the local currency. The cost estimate of activities was based on information provided by each country on the costs for running workshops (venue and catering), indicative staff salary for an aFAD technician or data collector, internal travel costs by air and sea and government daily subsistence allowance rates etc. A standard rate was used for consultancies and for the purchase of equipment such as the echo sounders, GPS units, computers and tablets and containers of aFAD materials including the cost of the container and freight to each country.

Once the draft activity plan and budget was developed for each country, based on the gaps identified during the audit of their aFAD Programme, it was discussed, refined as considered appropriate, and agreed with national officials. The agreed activity plan and budget was converted into USD for inclusion in the master budget for activities across all countries. The local currency budget and activity plan was then incorporated into the country profile for the country and sent for final comment and approval. Table 16 presents the budget amount for each country in both the original local currency amount and the approximate USD equivalent. The overall budget for the national activities is USD $10,924,265 spread across the seven years of the GCF regional programme implementation. Note the contingency and management fee is not included in this Table.

Table 16: Budgets for each national aFAD Programme in local currency and in USD.

Region and country	USD budget amount	Budget in local currency	
		Currency	Budget amount
Melanesia			
Fiji Islands – Annex F	950,351	FJD	2,111,900
Papua New Guinea – Annex G	818,955	PGK	2,729,750
Solomon Islands – Annex H	720,572	SBD	5,542,860
Vanuatu – Annex I	1,011,167	VUV	112,352,350

Micronesia			
Federated States of Micronesia – Annex J	869,700	USD	869,700
Kiribati – Annex K	843,412	AUD	1,204,875
Marshall Islands – Annex L	925,240	USD	925,240
Nauru – Annex M	522,416	AUD	746,310
Palau – Annex N	916,020	USD	916,020
Polynesia			
Cook Islands – Annex O	790,013	NZD	1,215,400
Niue – Annex P	431,542	NZD	663,910
Samoa – Annex Q	717,383	WST	1,938,880
Tonga – Annex R	697,562	TOP	1,550,130
Tuvalu – Annex S	709,932	AUD	1,014,210
TOTAL	**10,924,265**		

Table 17 provides a breakdown of the 2-phased approach for implementing the aFAD and sea safety work across the 14 PICs. Year 1 of the Project will be a half year due to Project setup and the recruiting of staff/consultants. Year 6 of the Project is also budgeted for 9-months and year 7 has no funding allocation and can be used for implementing budgeted activities that may have been delayed during implementation of the activity plan. Table 17 provides the consolidated amount with detailed breakdown by activity including a five percent contingency and 15 percent for project management. The total budget is USD $13,191,050.

Phase I will focus on strengthening the governance structure with legislation to support the national aFAD Programme as well as a reviewed and updated aFAD Management Plan. One or two staff/consultant will be employed to implement much of the work with staff from the fisheries department in each country and other partners. The staff/consultant will transition in years 3 and 4 to be paid half from the Project and half by the respective fisheries department with the fisheries department covering the full staff costs from year 5. Sea safety legislation and regulations for small craft and minimum specifications and designs for small craft will also be reviewed and developed to further strengthen the governance structure in some countries. As the national aFAD Management Plan is developed through stakeholder consultations in each county, procurement of materials and equipment will take place for shipment to each country in year two of the Project.

Phase II focuses on operationalising the national aFAD Management Plan, including using the equipment purchased and shipped to each country. Train-the-trainer workshops involving fisheries agency staff will be undertaken in the areas of aFAD rigging, deployment and undertaking site surveys, and in aFAD-fishing skills including sea safety. Staff from each fisheries agency will then be able to undertake the training of small-scale fishers and communities in these areas, focusing on communities close to where aFADs are or will be deployed. Awareness-raising will also be undertaken around the aFAD Programme and its importance and purpose, and around the need to strengthen sea safety in each country. A range of platforms (print, radio social media etc) will be used to disseminate the awareness-raising information widely. Data collection and analysis using the SPC TAILS and IKASAVEA applications will be a critical component of the Project. It will be important to document aFAD utilisation, aFAD maintenance demands and catch and effort data, including that needed to estimate the total annual catch from representative aFADs (Annex T). Not only will these data inform the Monitoring and Evaluation components of the Project, they will also support future management decisions relating to the national aFAD Programme in each country.

Table 17: Combined activity plan and budget to strengthen national aFAD Programmes and sea safety to minimise projected climate change vulnerability across the 14 participating countries.

Overall national activity plan for in-country work	Overall national budget for in-country work - USD							
Activity	Year 1 (6-months)	Year 2	Year 3	Year 4	Year 5	Year 6 (9-months)	Year 7 for additional time if needed	Total
Total including contingency and project management fee	**265,323**	**5,506,499**	**2,675,274**	**3,361,661**	**1,002,867**	**379,425**	**0**	**13,191,050**
Phase I: Activities to strengthen national governance structure for aFAD Programme and small craft sea safety	**172,225**	**961,104**	**250,416**	**144,250**	**75,053**	**3,866**	**0**	**1,606,914**
Activity 1.1: Recruitment of local staff/consultants for implementing all areas of the national component including data collection and imbedded within the fisheries department. Note for staff, project covers full salary for years 1 and 2, 50% salary years 3 and 4 and government the other half, and government pays full salary year 5 and beyond.	**172,225**	**280,855**	**213,657**	**144,250**	**75,053**	**3,866**	**0**	**889,906**
Recruitment costs for in-country staff/consultants	22,185	0	0	0	0	0	0	22,185
First National staff/consultant - salary and allowances	98,725	197,450	148,837	99,225	49,613	0	0	593,850
Second National staff/consultant - salary and allowances	39,150	78,300	59,475	39,650	19,825	0	0	236,400
Stationary, internet and expendable office supplies.	12,165	5,105	5,345	5,375	5,615	3,866	0	37,471
Activity 1.2: Development or review of aFAD Management Plan or policy for the country in collaboration with the national fisheries agency and SPC.	**0**	**177,771**	**36,759**	**0**	**0**	**0**	**0**	**214,530**
First workshops for stakeholder consultations, venue and catering.	0	41,057	0	0	0	0	0	41,057
Venue costs for first workshop.	0	12,947	0	0	0	0	0	12,947
Catering costs for first workshop.	0	28,110	0	0	0	0	0	28,110
Travel for people to attend the workshops (airfare/boat fare, DSA and incidentals)	0	42,631	0	0	0	0	0	42,631

Transport cost for some participants attending first workshop.	0	22,133	0	0	0	0	0	22,133
DSA for some participants attending first workshop.	0	20,498	0	0	0	0	0	20,498
Second workshops for stakeholder consultations, venue and catering	0	41,057	0	0	0	0	0	41,057
Venue costs for second workshop.	0	12,947	0	0	0	0	0	12,947
Catering costs for second workshop.	0	28,110	0	0	0	0	0	28,110
Travel for people to attend the workshops (airfare/boat fare, DSA and incidentals)	0	42,646	0	0	0	0	0	42,646
Transport cost for some participants attending second workshop.	0	22,138	0	0	0	0	0	22,138
DSA for some participants attending second workshop.	0	20,508	0	0	0	0	0	20,508
Third workshops for stakeholder consultations, venue and catering	0	0	6,852	0	0	0	0	6,852
Venue costs for third workshop.	0	0	3,387	0	0	0	0	3,387
Catering costs for third workshop.	0	0	3,465	0	0	0	0	3,465
Travel for people to attend the workshops (airfare/boat fare, DSA and incidentals)	0	0	6,277	0	0	0	0	6,277
Transport cost for some participants attending third workshop.	0	0	787	0	0	0	0	787
DSA for some participants attending third workshop.	0	0	5,490	0	0	0	0	5,490
Finalisation of the aFAD Management Plan or policy including taking this through internal process for government approval and gazetting, printing and distribution costs.	0	10,380	23,630	0	0	0	0	34,010
Activity 1.3: Arranging international consultants to undertake specific activities, reviews in consultation with the national fisheries agency, other appropriate government departments, and where appropriate, SPC, FFA or FAO.	**0**	**502,478**	**0**	**0**	**0**	**0**	**0**	**502,478**
a) Consultant to review national legislation and regulations for the national aFAD Programme with recommendations for improving these with draft text.	0	273,576	0	0	0	0	0	273,576
Consultancy fee for (a)	0	182,080	0	0	0	0	0	182,080
Travel and DSA for consultant (a) to country for consultations.	0	77,142	0	0	0	0	0	77,142

Workshop for stakeholder consultations, venue and catering.	0	14,354	0	0	0	0	0	14,354
b) Consultant to review national legislation and regulations for small craft (less than 12 m) covering qualifications for operators and sea safety requirements using the FAO-developed draft regulations or template and through national consultation develop specific legislation and regulation text for each country.	0	145,336	0	0	0	0	0	145,336
Consultancy fee for (b)	0	98,040	0	0	0	0	0	98,040
Travel and DSA for consultant (b) to country for consultations.	0	39,982	0	0	0	0	0	39,982
Workshop for stakeholder consultations, venue and catering.	0	7,314	0	0	0	0	0	7,314
c) Consultant to develop or review national legislation and regulations for minimum specifications and design for small craft (less than 12 m) to ensure seaworthiness with recommendations for improving these with draft text.	0	83,566	0	0	0	0	0	83,566
Consultancy fee for (c)	0	56,080	0	0	0	0	0	56,080
Travel and DSA for consultant (c) to country for consultations.	0	22,986	0	0	0	0	0	22,986
Workshop for stakeholder consultations, venue and catering.	0	4,500	0	0	0	0	0	4,500
Phase II: Implementing the aFAD Management Plan and addressing all gaps identified in the audit of the aFAD Programme and small craft sea safety.	**47,504**	**3,599,144**	**1,965,132**	**2,639,734**	**755,479**	**310,358**	**0**	**9,317,351**
Activity 2.1: Procurement of all materials for the aFAD and sea safety component of the project in all 14 countries through a centralised competitive tender process.	**47,504**	**2,814,454**	**512,450**	**1,404,576**	**90,900**	**0**	**0**	**4,869,884**
Purchase of aFAD materials including freight and container costs	0	1,627,800	90,000	992,900	90,900	0	0	2,801,600
Purchase of deep-water echo sounder(s) including freight	0	320,010	0	0	0	0	0	320,010
Purchase of GPS/plotter(s) including freight	0	24,022	0	0	0	0	0	24,022
Purchase of VHF handheld radios for sea safety.	0	17,970	0	0	0	0	0	17,970
Purchase of deployment barges to be made for project including freight.	0	200,000	0	0	0	0	0	200,000
Purchase of weather monitoring electronic equipment (wave buoy, acoustic doppler current profiler, GPS tracker etc) to be installed on some surface aFADs.	0	144,000	12,000	78,000	0	0	0	234,000

Purchase of GPS echo sounder buoys for monitoring aggregated fish biomass under the aFAD (info sent by satellite to fisheries department and SPC).	0	142,142	10,000	128,142	0	0	0	280,284
Purchase of vessel tracking systems for small craft for trailing.	0	6,000	0	0	0	0	0	6,000
Purchase of fishing gear for use and distribution during aFAD fishing skills workshops with fishers and communities.	0	0	127,970	103,000	0	0	0	230,970
Purchase of laptop computers for in-country staff/consultants.	47,504	0	0	42,504	0	0	0	90,008
Purchase of computer tablets for data collection (aFADs and catch and effort) based on the SPC TAILS or IKASAVEA applications.	0	130,060	70,030	60,030	0	0	0	260,120
Purchase of sea safety grab bags for training purposes.	0	202,450	202,450	0	0	0	0	404,900
Activity 2.2: Implementing recommendations or findings from the different consultancies to strengthen the aFAD Programme and sea safety at the national level.	**0**	**0**	**24,158**	**20,053**	**11,799**	**0**	**0**	**56,010**
a) Implement the findings of the national legislation and regulations review for the national aFAD Programme with the fisheries department.	0	0	14,354	14,354	7,544	0	0	36,252
Workshop for stakeholder engagement and awareness, venue and catering.	0	0	14,354	14,354	7,544	0	0	36,252
b) Implement the findings of the national legislation and regulations for small craft (less than 12 m) covering qualifications for operator and sea safety equipment requirements with the fisheries department and maritime department.	0	0	6,279	4,724	4,255	0	0	15,258
Workshop for stakeholder engagement and awareness, venue and catering.	0	0	6,279	4,724	4,255	0	0	15,258
c) Implement the findings of the national legislation and regulations for minimum specifications and design for small craft (less than 12 m) to ensure seaworthiness with the fisheries department and maritime department.	0	0	3,525	975	0	0	0	4,500
Workshop for stakeholder engagement and awareness, venue and catering.	0	0	3,525	975	0	0	0	4,500

Activity 2.3: Implement and operationalise the aFAD Management Plan in the locations identified in each of the 14 countries with the fisheries department staff and local staff/consultants hired under the project once the aFAD materials have arrived in-country.	**0**	**772,105**	**799,043**	**537,292**	**316,804**	**41,988**	**0**	**2,467,232**
Local purchase of materials to make plywood moulds for constructing steel reenforced concrete blocks for aFAD anchors including making the moulds.	0	34,694	4,800	19,230	0	0	0	58,724
Local purchase of steel reenforcing rod, cement, sand and gravel for making concrete anchor blocks in the moulds, including making the blocks.	0	137,436	114,408	100,008	6,000	0	0	357,852
Train the trainer national workshop for building local capacity in rigging and deploying aFADs including undertaking site surveys of areas for aFAD deployment plus sea safety, fuel, venue and catering.	0	71,538	0	0	0	0	0	71,538
Deployment costs where boats need to be hired to undertake the actual deployment of aFADs in different locations.	0	244,295	180,755	154,750	115,285	0	0	695,085
Fuel costs for fisheries deployment vessel.	0	34,220	25,590	20,640	14,215	0	0	94,665
Communications costs for satellite communication for the GPS echo sounder buoys and other electronic equipment attached to aFADs.	0	15,901	31,802	31,802	31,802	22,840	0	134,147
Travel for people to attend the train the trainer workshop (airfare/boat fare, DSA and incidentals).	0	119,261	0	0	0	0	0	119,261
In-country freight costs to get aFAD materials and possibly fuel to the locations identified for aFAD deployments.	0	52,770	55,650	15,620	43,755	1,280	0	169,075
Fuel for quarterly aFAD maintenance trips.	0	5,956	23,824	23,824	23,824	17,868	0	95,296
Community trainings and awareness-raising in aFAD site surveys, rigging, deploying and maintenance, and sea safety in communities where aFADs are being deployed plus fuel, venue and catering.	0	33,232	74,055	49,000	7,937	0	0	164,224
Travel for trainers to community areas (airfares/boat fares, DSA, Incidentals etc).	0	11,869	33,716	20,812	3,700	0	0	70,097
Train the trainer national workshop for building local capacity in aFAD fishing skills and sea safety including practical sessions on participants boats plus fuel, venue and catering.	0	0	78,029	0	0	0	0	78,029

Travel for people to attend the train the trainer workshop (airfare/boat fare, DSA and incidentals).	0	0	119,321	0	0	0	0	119,321
Community trainings and awareness-raising in aFAD fishing skills and sea safety in communities where aFADs have been deployed plus fuel, venue and catering.	0	8,853	41,508	73,238	49,458	0	0	173,057
Travel for trainers to community areas (airfares/boat fares, DSA, Incidentals etc).	0	2,080	15,585	28,368	20,828	0	0	66,861
Activity 2.4: Strengthening national data collection on aFADs and their maintenance as well as catch and effort information from aFAD fishing activities based on using the SPC TAILS or IKASAVEA applications.	**0**	**0**	**128,644**	**35,728**	**27,838**	**11,234**	**0**	**203,444**
Train the trainer workshop for building local capacity in data collection on aFADs and catch and effort from aFAD fishing activities using tablets and the SPC TAILS or IKASAVEA applications, venue and catering.	0	0	40,725	0	0	0	0	40,725
Travel for people to attend the train the trainer workshop (airfare/boat fare, DSA and incidentals).	0	0	67,414	0	0	0	0	67,414
Community/fisher group training in the use of SPC TAILS or IKASAVEA.	0	0	10,980	21,830	15,250	6,830	0	54,890
Travel for trainer to community/fisher group areas (airfares/boat fares, DSA, Incidentals etc).	0	0	9,525	13,898	12,588	4,404	0	40,415
Activity 2.5: Developing and/or strengthening awareness-raising around aFADs, the aFAD Programme, sea safety and predicted climate change effects on the marine environment and resources at the national level through a structured campaign using different media platforms and approaches.	**0**	**12,585**	**500,837**	**497,085**	**308,138**	**257,136**	**0**	**1,575,781**
Development of the national awareness-raising campaign strategy including stakeholders and other government departments as a collaboration for consistent and accurate messaging across the countries.	0	12,585	12,587	12,585	12,588	12,586	0	62,931
Development of awareness-raising materials for different media platforms including social media	0	0	193,350	193,350	193,350	158,350	0	738,400

Development of educational materials for trialling in schools at different levels as part of their curriculum.	0	0	192,700	188,950	0	0	0	381,650
Dissemination of awareness-raising materials through the identified media platforms on a regular basis.	0	0	102,200	102,200	102,200	86,200	0	392,800
Activity 2.6: Trialling cyclone-proof storage areas in Vanuatu and Fiji, one location per country plus materials for 20 aFADs in each storage unit.	**0**	**0**	**0**	**145,000**	**0**	**0**	**0**	**145,000**
Construction of cyclone-proof storage area in identified locations including all materials and local labour.	0	0	0	145,000	0	0	0	145,000
Stock each storage area with materials for 20 aFADs which are purchased as part of the aFAD procurement process.	0	0	0	0	0	0	0	0
Subtotal for combined national budgets	**219,729**	**4,560,248**	**2,215,548**	**2,783,984**	**830,532**	**314,224**	**0**	**10,924,265**
5 percent contingency funding	**10,986**	**228,012**	**110,777**	**139,199**	**41,527**	**15,711**	**0**	**546,213**
Subtotal for national budget and contingency	**230,715**	**4,788,260**	**2,326,325**	**2,923,183**	**872,059**	**329,935**	**0**	**11,470,478**
Project management fee of 15 percent	**34,607**	**718,239**	**348,949**	**438,477**	**130,809**	**49,490**	**0**	**1,720,572**
Overall total	**265,323**	**5,506,499**	**2,675,274**	**3,361,661**	**1,002,867**	**379,425**	**0**	**13,191,050**

5.7 Potential risks that the investments do not fill the gaps effectively with recommendations to reduce the identified risks.

The implementation of 14 national aFAD Programmes in a diverse range of geographic, social and economic settings will be accompanied by some significant risks. Some of these risks, and potential responses to them, are presented in Table 18.

Table 18: Potential risks the intervention will not fill gaps and recommendations to reduce the risks in the 14 participating countries.

Potential risk	Recommendations to reduce risk
Government struggles to implement the sustainable financing mechanism identified for their country.	• Provide evidence that the sustainable finance approach is viable and the benefits to government. • Work with fishers and stakeholders to support the implementation of the sustainable finance mechanism.
Fishers reluctant to fish around the aFADs due to increasing fuel prices.	• Work with government to assess options for reducing fuel usage, possibly through the introduction and promotion of 4-stroke outboard engines and consider the introduction of a subsidy to assist fishers with the purchase price of the more fuel efficient 4-stroke engine. • Share the data on fish biomass under the aFADs in real time so fishers are more assured they are likely to achieve a good catch.
aFADs are lost as a result of vandalism.	• Awareness campaign on the benefits of aFADs and their importance for food security and livelihoods. • Enforce penalties for proven incidences of vandalism. • aFAD Management Plan to include a section on vandalism and the penalties that apply as a possible deterrent. • Switch design of aFADs to subsurface and/or the lizard design to reduce the chance of vandalism.
Good catches of tuna from aFADs at times drives the selling price down.	• Promote post-harvest processes to produce alternative products from the tuna that have a longer shelf life and support initiatives to diversify markets. • Promote fishers to possibly form associations or cooperatives so they work together and not compete for markets.
Government does not provide adequate support for resourcing of the national aFAD Programme.	• Consider the inclusion of some staff time and costs as part of the sustainable financing mechanism. • Nurture strong stakeholder support for the aFAD Programme and its importance to encourage stakeholder advocacy.
Sea safety incidents increase, and the lives of fishers are at risk.	• Awareness-raising campaign on sea safety issues, the carrying of sea safety equipment (including trials of new equipment), and regulations and requirements implemented and enforced. • Where sea safety legislation and regulations are inadequate for small-scale fishing craft, strengthen these and include in the sea safety awareness campaign.
Fisheries agency staff and fishers resist or are complacent around collecting and documenting aFAD data and/or providing data on their catches.	• Awareness-raising campaign to highlight the benefits that the provision of data can provide to strengthen the overall aFAD Programme. • Review the method of data collection using SPC systems to better suit the needs of fishers and provide training to fishers to raise awareness. • Provide regular analysis of the data back to fishers so they understand the purpose of the collection of data and the benefits generated for them.

5.8 Number of people expected to benefit from the intervention across the 14 PICs

The beneficiaries of this intervention, both direct and indirect, will vary among the 14 participating countries. In some of the smaller countries, such as Niue, Nauru and Tuvalu, it is anticipated that a relatively large proportion if not all of the national population will benefit. In the larger countries, such as PNG, Solomon Islands and Vanuatu, the proportion of the population benefitting from increased access to fish caught in association with aFADs will be less (as a consequence of practical realities associated with the distribution of aFAD-caught fish to potential markets significant distances from the point of capture). Table 19 provides a breakdown of the number of beneficiaries (Total estimated to be 558,890) by country or area within each country that will have access to the aFADs for fishing, or to the fish landed as a result of fishing around aFADs. The fate of fish harvested in association with aFADs includes home consumption, bartering and/or sale to the general public.

Table 19: Forecast number of beneficiaries by country, or area within each country, that will benefit from fishing aFADs or the catch landed from FAD fishing in 2030.

Region and country	Number of Beneficiaries (men, women and children)	Calculation of beneficiaries
Melanesia		
Fiji (Annex F)	72,483	30% of the population in Rewa, Serua and Namosi districts and 80% of the population in Kadavu, Lau and Lomaiviti districts.
Papua New Guinea (Annex G)	91,834	20% of the population of Manua and Bougainville provinces.
Solomon Islands (Annex H)	62,752	90% of the population of the Temotu Province and 20% of the population of Guadalcanal Province.
Vanuatu (Annex I)	66,850	50% the population of Shefa and Tafea provinces and 20% of the population of Port Vila.
Micronesia		
Federated States of Micronesia (Annex J)	38,588	80% of the population in Pohnpei State and 80% of the population in Yap State.
Kiribati (Annex K)	81,778	40% of the population of South Tarawa and all of the population in the other 16 inhabited Gilbert Islands Group islands.
Marshall Islands (Annex L)	26,993	50% of the population of the Marshall Islands.
Nauru (Annex M)	12,539	100% of the population of Nauru.
Palau (Annex N)	8,815	50% of the population for 14 States.
Polynesia		
Cook Islands (Annex O)	8,792	50% of the population of Rarotonga and 100% of the population of 5 inhabited islands in southern Cook Islands.
Niue (Annex P)	1,393	100% of the population of Niue.
Samoa (Annex Q)	41,874	20% of the population for Samoa.

Tonga (Annex R)	32,950	. 40% of the population for Tongatapu, Eua and Ha'apai.
Tuvalu (Annex S)	11,250	100% of the population of Tuvalu.
TOTAL	**558,890**	

6. Regional assessment and proposed activities

6.1 Introduction and Background

During the 1970s, the SPC's coastal fisheries development work focused on developing the deep-water snapper fishery with fishing in depths of 200-400 m for these species. Fishing trials in the different PICTs were undertaken with training programmes to introduce the new fishing methods. The SPC had two master fishers employed to undertake this work. The 1980s saw a move away from deep-water snapper fishing as catch rates for the deep-water snappers remained constant or started to decline, indicating this to be a fragile resource that could only sustain limited fishing pressure.

The SPC master fishers changed their focus to small-scale tuna fishing activities and the introduction of aFADs to many of the PICTs. The use of FADs was increasing in the Pacific, both in the industrial tuna fishery and the small-scale sector. SPC master fishers began by experimenting with aFAD designs that had been used in other locations. On the basis of that experience, in 1984 SPC produced a report on FADs 'An improved FAD mooring line design for general use in Pacific Island countries: a report of the SPC design study on fish aggregation devices.[32] This increased the information available to SPC member countries to support national aFAD activities. Coupled with this was the trialling of different mid-water fishing methods to target the larger, deeper-swimming tunas that aggregated around aFADs. These methods were primarily developed to reduce the fishing costs because, until that time, trolling was the favoured fishing method and it required significant fuel.[33]

In the 1990s, SPC supported three master fishers. Their work moved away from deep-water snapper fishing and focussed on the design, rigging and deployment of aFADs, and small-scale tuna fishing around aFADs. As a result of this work, several manuals were produced in the 1990s: Vertical longlining and other methods of fishing around FADs – a manual for fishermen[34]; Planning FAD Programmes[35]; Rigging deep water FAD moorings[36]; and Deploying and maintaining FAD systems[37].

[32] Boy, RL and Smith, BR. (1984). Design improvements to FAD mooring systems in general use in Pacific Island countries and territories. South Pacific Commission (SPC) Handbook No. 24 (1984).
[33] Chapman L. 2016. The history of SPC's involvement in fisheries development in the Pacific - Part 1: the 20th century. SPC Fisheries Newsletter 150:52-60. https://purl.org/spc/digilib/doc/hizys
[34] Preston, G., Chapman, L., Watt, P. 1998. Vertical longlining and other methods of fishing around fish aggregating devices (FADs): a manual for fishermen. Noumea: SPC. Secretariat of the Pacific Community. Coastal Fisheries Programme. Capture Section. v, 64 p. https://purl.org/spc/digilib/doc/8d3op
[35] Anderson J., Gates P.D. 1996. South Pacific Commission fish aggregating device (FAD). Volume I: Planning FAD Programmes. Noumea, New Caledonia: South Pacific Commission. vii, 46 p. https://purl.org/spc/digilib/doc/rcyaz
[36] Gates, P.D., Cusack, P., Watt, P. 1996. South Pacific Commission fish aggregating device (FAD). Volume II: Rigging deep water FAD moorings. Noumea: SPC Coastal Fisheries Programme. Capture Section. Fish aggregating device (FAD) manual, vii, 46 p. https://purl.org/spc/digilib/doc/7pof2
[37] Gates, P.D., Preston G., Chapman, L. 1998. South Pacific Commission fish aggregating device (FAD). Volume III: Deploying and maintaining FAD systems. Noumea: SPC Coastal Fisheries Programme. Capture Section. Fish aggregating device (FAD) manual, vii, 46 p. https://purl.org/spc/digilib/doc/y9aip

During the early 2000s, the main focus of many SPC members remained on providing technical assistance with the development of domestic tuna longline operations. A series of studies was undertaken in collaboration with the Forum Fisheries Agency (FFA) to assess development options and constraints, including training needs and infrastructure requirements, within the tuna fishing industry and support services in 10 countries, with a focus on domestic development of longlining and small-scale fishing around aFADs.[38]

The aFADs and aFAD-fishing skills continued to be a focal area for assistance provided by the SPC master fishers. Research continued on aFADs, and a study was undertaken in Niue, and in Rarotonga and Aitutaki in the Cook Islands from late 2001 to mid-2004, to trial different mooring designs with the objective of achieving a minimum two-year lifespan for moored aFADs. Additionally, a data collection system was implemented so a cost-benefit analysis could be undertaken on the effectiveness of the aFADs and the catch taken from around them, as opposed to trolling on free schools or around the reef.[38] Good results were obtained, and a aFAD manual covering low-cost moorings and programme management was developed.[39]

The cost-benefit analysis was based on a comparison of the costs of the aFAD materials and deployments against the value of the catch recorded by fishers and entered in the data collection system. Over 3,000 logsheets were completed, and these showed a marked season for wahoo trolling in open water along the reef (August to October), while catches from aFADs were spread more evenly throughout the year. The main fishing methods were trolling around aFADs, open water trolling and midwater fishing around the aFADs.[38] The catch recorded from aFADs in Niue was 27,468 kg of fish over the 3-year project, with a value of NZD $153,988. The recorded open water trolling catch for Niue equalled 25,714 kg with a value of NZD $169,359. The catch recorded from aFADs in Rarotonga (39,188 kg) during the 3-year project was higher than Niue's and had a value of NZD $230,302. In contrast, the recorded catch from open water trolling in Rarotonga was much lower than in Niue (15,609 kg, with a value of NZD $99,035). Due to the low levels of data collection coverage of fishing activities, the reported catch figures were estimated to be around one-third of the actual catch; increasing the value of the aFAD-related catch to around NZD $491,964 in Niue and NZD $690,906 in Rarotonga.[40]

The cost of all aFAD materials provided to Niue equalled NZD $91,007 and covered 14 aFADs of which 11 were deployed (8 original and 3 replacements) with materials for three remaining at the end of the project. The cost of the materials for Rarotonga aFADs equalled NZD 90,480. In the case of Rarotonga, four aFADs were deployed initially, with one replacement and materials remained for another three aFADs. In addition, three aFADs were initially deployed off Aitutaki with one replacement.[38] The value of the catch far exceeded the cost of the materials in both Niue and Rarotonga (3 to 7 times), especially as there were still materials on hand for three replacement aFADs at each location and some of the deployed aFADs from the project remained active. In terms of the overall catch, aFADs were a major contributor to the success of small-scale fishing operations in both locations. These deployments also provide important social benefits for local communities, with many subsistence and recreational fishers using the aFADs to catch fish for their families or for sport or pleasure.[38]

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[38] Chapman L. 2017. The history of SPC's involvement in fisheries development in the Pacific – Part 2: The 21st century. SPC Fisheries Newsletter 151:27–34. https://purl.org/spc/digilib/doc/anokc

[39] Chapman, L., Pasisi, B., Bertram, I., Beverly, S., Sokimi W. 2005. Manual on fish aggregating devices (FADs): Lower-cost moorings and programme management. Noumea, New Caledonia: SPC, Secretariat of the Pacific Community. Handbook, vi, 47 p. https://purl.org/spc/digilib/doc/xe3qt

[40] Chapman, L., Bertram, I., and Pasisi, B. 2005. FAD research project: Final results from community surveys, gender assessment, and catch and effort data analysis. SPC Fisheries Newsletter #113 April/June 2005. Pp 27-47.

The aFAD assistance work of SPC continued through the 2000s and 2010s, although the number of master fishers or fisheries development officers was reduced to one. However, the demand for technical assistance around aFADs has continued and was supported by SPC members at the Fifteenth Heads of Fisheries Meeting in 2023.[41]

SPC's advice to PICTs with technical assistance and capacity development in all aspects of aFAD work, from rigging, deploying and maintaining the aFADs to aFAD fishing skills, small boat operations and sea safety, has continued as the staffing in national fisheries agencies in SPC members change and skills are lost. This has been an ongoing challenge, resulting in many national aFAD Programmes being impacted by disruptions, only operating when funding is available from donors to purchase aFAD materials. Trials to improve aFAD designs have continued, the results of which have been published in a new SPC aFAD manual produced in 2020, ''An update on FAD gear technology, design and deployment methods in the Pacific Islands region''.[42]

The key lessons from SPC's long experience in supporting the deployment of aFADs in the region, and which the GCF Programme will benefit from, and build upon, are:

- The need for an approach that is inclusive to bring government and stakeholders together to develop and maintain an ongoing National aFAD Programme, with adequate resourcing to ensure continuity over time.
- The need for national fisheries agencies to order aFAD materials for several years at one time to fill a container (or two) to minimize the cost per aFAD and freight and maximize the availability of aFAD materials in-country for rigging and deploying when needed. When there are only materials left for several aFADs, a new order should be placed so the materials arrive before those in-country are fully used.
- The need for a sound governance structure to support an ongoing national aFAD Programme, guided by an aFAD Management Plan that is endorsed by the national government for implementation and supported by appropriate legislation and regulations.
- The need for national fisheries agencies to monitor and enforce the legislation and regulations, especially where the vandalism of aFADs leading to premature loss is an issue.
- The need to include stakeholders (community, fishers etc.) at all stages of developing the aFAD Management Plan and its implementation to draw on their experience, expertise and traditional knowledge.
- The need for national fisheries agencies to reach agreement with communities and fishers on the roles and responsibilities of each stakeholder prior to aFAD deployments.
- The need to undertake site surveys using GPS for position and echo sounder for depth to develop a contour map for all identified areas for aFAD deployments to ensure their suitability, and to identify the actual deployment location. If the bottom topography is not suitable for an aFAD anchor (e.g., the slope is too steep), then another area should be surveyed.
- The need for the national fisheries agencies to have a coordinated approach with

[41] Outcomes from the 15th Heads of Fisheries Meeting 2023: website https://spccfpstore1.blob.core.windows.net/digitallibrary-docs/files/2e/2e576f5387e32c47c33e4865bc2f78b3.pdf?sv=2015-12-11&sr=b&sig=yCP4l6RZlLIqML3jW3%2BreXoU54pkmYf1JrdjLNWO8RA%3D&se=2024-03-11T01%3A08%3A43Z&sp=r&rscc=public%2C%20max-age%3D864000%2C%20max-stale%3D86400&rsct=application%2Fpdf&rscd=inline%3B%20filename%3D%22HoF15_Outcomes.pdf%22

[42] Sokimi W., Blanc M., Colas B., Bertram I. and Albert J. 2020. Manual on anchored fish aggregating devices (FADs): an update on FAD gear technology, designs and deployment methods for the Pacific Island region. Noumea, New Caledonia: Pacific Community. 56 p. https://purl.org/spc/digilib/doc/xrz3p

stakeholders to maintain and service deployed aFADs to increase in-country capacity in this area and to maximize the lifespan of deployed aFADs.

- The need to greatly improve data collection at the national level covering both the aFADs themselves (positions, depth, materials used, when deployed and lost etc.), and catch and effort data on the fishing activity including species caught and fishing methods used. SPC has developed and supports the TAILS and IKASAVEA applications to assist national governments to collect these data.
- The need to improve communication on aFADs and national aFAD Programmes between fisheries agencies, stakeholders and the general community through awareness-raising using different media platforms to maximize dissemination.
- The need for ongoing research into the design of aFADs to increase their lifespan, use of more environmentally friendly materials as these are identified, and to reduce costs for materials where possible.
- The need to strengthen sea safety requirements and awareness to ensure fishers take responsibility for their safety when fishing outside the reef around aFADs.
- The need to assess deployment vessel options at the national level, especially because some countries struggle with deploying aFADs due to the availability of a suitable vessel locally and the costs involved in chartering vessels for undertaking deployments.

6.2 Regional component

A regional component is needed for coordinating the implementation of the Project to ensure consistency in delivery of activities across the participating countries. The regional component will allow the transfer of information across the countries while documenting the results from in-country activities. Countries are lacking local capacity with appropriate skills to implement many coastal fisheries activities. Therefore, having a pool of centralised expertise within the regional component will allow countries to request technical assistance when needed to support their aFAD Programme and related activities in support of national food security and small-scale livelihoods.

Data collection through a centralised approach is essential for the success of the Project. The regional component will support countries in their data collection, storage and analysis to ensure consistency for documenting the outcomes from different national activities. These outcomes can then be shared with other countries and more widely where applicable. Information sharing and capacity development across the 14 countries will be covered by the regional component to ensure consistent messaging and a standardised approach. The regional component will also be responsible for all reporting on Project activities under Component A to the Project Management Unit (PMU).

6.3 Proposed activities for regional component

The regional component will provide support to the 14 participating PICs in the implementation of their national aFAD Programmes in a structured manner while strengthening sea safety awareness. The regional component includes a range of related activities to complement the aFAD work. These include post-harvest activities, economic assessments and data collection, social/gender/human rights assessments, communications and information and knowledge management (IKM), technical and logistical support services, and capacity development.

Implementation of the regional component will complement and support the 2-phased approach proposed for the national component in two ways. Firstly, relevant governance structures will be strengthened in each country through legislation and regulations as outlined in the individual country profiles. Developing, revising and/or updating aFAD Management Plans for each country will be a primary activity under the first phase of the work – it will lay the foundation for the second phase. Phase two is the operationalisation of the aFAD Management Plan, including the purchase of

all equipment and arranging for its shipment to each country. Training and capacity development is a key task under the second phase, as is data collection and a range of other activities. The experience and skills of staff to be employed under the regional component of the Project to support the delivery of these tasks is detailed below (Sections 6.3.1 to 6.3.8). The specific activity plan with operational budget for all positions is provided in Section 6.4, as well as the engagement period for all positions presented in Table 20.

6.3.1 Project oversight and coordination

The Project Coordinator will have oversight of the Project activities and be the main focal point to coordinate activities. The Coordinator will have a background in fisheries development, preferably in small-scale fisheries in the Pacific Islands region. They will be responsible for the coordination of all Project-related activities with the Project staff. Providing technical assistance in the development of aFAD Management Plans or policies will be a primary task for the Coordinator who will work closely with both Project and SPC staff in this endeavour.

Working with the PMU, Letters of Agreement or equivalent will be developed with each of the 14 participating countries to support the disbursement of agreed funding to each country to support the implementation of national activities. Oversight of the procurement of all materials for both the regional and national components will be an important role for the position to ensure that equipment starts flowing to countries in year two of the Project. With assistance from Project staff and Fisheries Monitoring, Evaluation and Learning Office, the Coordinator will also be responsible for narrative and financial reporting. The Coordinator will also represent the Project at national, subregional and regional meetings as required.

An annual regional meeting/workshop of five days with three representatives per country will be arranged by the Coordinator for two main purposes. Firstly, this will act as a Steering Committee for the Project. It will support two-way information exchange between the national and Project staff on activities undertaken and allow planning of activities for the following year. It will also aid in documenting progress in each country for reporting back to the GCF. Secondly, the meeting will allow the countries to learn from each other as they exchange and share information and experiences from the aFAD-related activities being undertaken in their country. Such opportunities to share information and exchange views on all aspects of aFAD Programme implementation, management and initiatives to support sustainability have proven invaluable to the region over many years.

6.3.2 aFAD technical support

Two aFAD Specialist positions, one for the life of the project, and a second for a 3-year term from mid-year two to mid-year five will deliver technical and logistical support. The aFAD Specialists will initially work with the Project Coordinator to assist efforts to strengthen national governance arrangements. Their main focus will be on the aFAD Management Plan, policy development and/or updating. It is anticipated that some countries will undertake this process faster than others which will permit activities to be staggered across the participating countries.

The aFAD Specialists will also assist with the procurement of aFAD materials. The number of aFADs and the depth range for the aFADs has already been determined as outlined in the individual country profiles. However, the actual design of the aFADs to be used in each country requires further consultation as aFAD designs continue to evolve. The aFAD Specialists will consult with each country to determine the most appropriate design of aFADs for each country situation. These consultations will provide the basis for the preparation of a list of materials and equipment including lights, radar

reflectors and spare floats, shackles and swivels (for maintenance work). A competitive procurement process will then be supervised by the Project's Procurement Specialist.

Once the aFAD materials have arrived in each country the main work of the aFAD Specialists commences. Firstly, a 2-week in-country train-the-trainer workshop dedicated to rigging, deploying and maintaining aFADs, and undertaking site surveys of potential deployment locations, will be undertaken in each of the 14 PICs. It is expected that two or three aFADs will be deployed during the workshop. This will promote the development of the skills required for the deployment of aFADs nationally. Participants will primarily be staff from the national fisheries agency but representatives of fishers and/or community groups will also be encouraged to participate in the trainings.

Once some aFADs have been deployed (6-9 months after the first workshop), a second train-the-trainer 2-week workshop will be held on aFAD-fishing skills, small boat operations and sea safety in each country. This workshop will include at-sea fishing trials around aFADs that have been deployed. The purpose of the second training session will be to strengthen the skills of fisheries staff so they can deliver the same training around the country with fishers and community groups.

The two aFAD Specialists will provide ongoing technical and logistical advice and assistance to the countries on an as-needs basis. They will support the annual regional meeting facilitating discussions related to aFADs and aFAD work at the national level. They will also be involved in promoting data collection and monitoring aFAD Programmes to strengthen this in partnership with the Project Economist. Awareness-raising for the Project, support for national aFAD Programmes and sea safety will be an ongoing activity working in collaboration with the Project's Communications and IKM Specialist and national counterparts.

6.3.3 Post-harvest activities

A Post-Harvest Specialist will be employed to provide a range of services to the participating countries. Firstly, the Specialist will undertake an analysis of small-scale post-harvest activities previously undertaken in the 14 PICs to draw out any lessons that have been identified, challenges that were faced, and success stories regarding ongoing small-scale post-harvest activities. The results of this analysis will then be applied to develop a workplan for small-scale post-harvest activities to be implemented during the GCF programme. There is funding in the regional budget for the purchase of post-harvest equipment and expendable items to be used in-country as part of trainings and trialling value-adding activities. The Post-Harvest Specialist will be required to liaise with the Procurement Specialist and provide the specifications for any equipment to be purchased.

The post-harvest activities will mainly be with fishers or community members, with a focus on the participation of women and youth. Post-harvest activities will focus on different small-scale processing and packaging operations using the tuna that has been caught from the aFADs to add value, improve the shelf life of fish, diversify processing options, and generally endeavour to increase the return to fishers and communities. There may also be a need to improve the onboard handling of the tuna during capture to ensure good quality tuna are available for the post-harvest activities. The Project Economist and Social/Gender Specialist will work closely with the Post-Harvest Specialist to gather social and economic information that can be used for analysing the success or otherwise of post-harvest interventions. After the first few interventions have been completed, an assessment of adjustments required before working in other countries or with other communities on similar initiatives will be undertaken.

The Post-Harvest Specialist will also be involved in the annual regional meeting, where they will report to countries on activities undertaken and facilitate discussions around post-harvest activities

supported under the Programme. Awareness-raising and development of post-harvest IKM products will also be a part of the role of this position in collaboration with the Communications and IKM Specialist and national counterparts. Economic and social aspects of the activities that have been undertaken will be featured in reporting and awareness-raising efforts.

6.3.4 Economics and social/gender/human rights activities

The Fisheries Economist will focus on data collection and analysis from the aFAD component, coordinating activities with the SPC Coastal Fisheries and Aquaculture Economist and the SPC Coastal Fisheries Information and Database Manager. This will include data concerning the deployment and maintenance of aFADs and catch and effort data required to document the productivity of aFADs. One-week training on the SPC TAILS and IKASAVEA applications will be undertaken by the Fisheries Economist in each of the 14 countries. The Fisheries Economist will work closely with the SPC Fisheries and Aquaculture Economist and SPC Information and Database Manager to ensure all data collection aligns with SPC protocols and are collected and stored in the SPC systems. The Fisheries Economist will lead targeted data collection efforts from a subset of aFADs in each country over a 2–3-year period using local data collectors to estimate the annual catch rate from aFADs in each country, as described in Annex T. This important task, which is needed to establish the baseline to measure the success of Component A of the GCF regional tuna programme, will also support in-country efforts to establish systems and processes to sustain data collection activities in the longer term.

The Fisheries Economist will work closely with the Social/Gender/Human Rights Specialist to collect and analyse economic and social data from the Project's aFAD and post-harvest activities, documenting lessons learned and benefits to communities. The Fisheries Economist and/or Gender/Social/Human Rights Specialists will undertake targeted research and studies to better understand the flow-on effects from Project activities within communities. The results will assist in refining strategies and activities to increase the potential for success as implementation of the programme progresses.

Like other Project staff, the Fisheries Economist and Social/Gender/Human Rights Specialist will be involved in the annual regional meeting. They will report on in-country activities and future plans, provide analysis of data and facilitate discussions with national counterparts on these topics. Awareness-raising at the national and regional levels and the development of IKM products around the economic and social/gender/human rights work will also be undertaken in collaboration with the Communications and IKM Specialist to ensure the results of their work are widely circulated.

6.3.5 Pacific Island Fisheries Professional capacity development activities

One of the important capacity development activities the Project will undertake is the hiring of eight Pacific Island Fisheries Professionals (PIFP), each on a one-year, non-renewable contract over the life of the Project. The aim of the PIFP activity is to recruit fisheries department staff from the participating PICs on a temporary arrangement that does not require them to resign their current position with their national fisheries agency while on attachment with SPC. The PIFPs will work alongside the SPC and Project staff to gain experience on-the-job and assist with Project implementation at the country level. They will accompany Project staff to assist with a range of fieldwork activities, engage in research and reporting and participate in the annual meeting. At the end on their one-year term with the Project, they will return to their national employer where the experience and skills acquired during their attachment will be applied for national benefit.

6.3.6 Communications, information and knowledge management activities

The Communications and IKM Specialist will work with the Project team to strengthen the flow of information and communication of results at both national and regional scales. The appointee will work closely with national staff on the design and implementation of national communications and awareness-raising activities using appropriate communications and social media platforms locally available. Activities will include the development of generic material that is suitable for region-wide distribution and use.

The Communications and IKM Specialist will also promote the work of the regional component supporting the dissemination of the results of Project activities. The appointee will work closely with the Project Coordinator to assist with format and layout of donor reports and the development of audio-visuals for presentations and reports. The appointee will also support the annual regional meeting where awareness-raising, public relation and social marketing initiatives will be promoted.

6.3.7 Consultants

Consultants will be used for specific activities where the Project Staff do not have the required expertise. Some areas include reviews of aFAD legislation and regulations, sea safety legislation and regulations and minimum specifications and designs for small craft to ensure seaworthiness, and the drafting of amendments where needed. There is scope for *ad hoc* consultancies in the areas identified as the Project is implemented.

6.3.8 Project administration, finances and procurement activities

An integral part of the Project will be administration, finance and procurement with one person hired for each activity given the project's large budget, the number of staff that will be regionally engaged and the volume of procurement to be undertaken. The Project Administrator will be responsible for arranging travel for all staff and for participants attending the annual regional meeting and other activities. The appointee will also arrange the logistics (catering and venue) for the annual regional meeting plus any other workshops convened by the Project and provide general administrative support to the Project Coordinator and Project staff.

The Finance Officer will be responsible for making payments and accurately recording expenditure from the Project following approval of expenditure by the Project Coordinator. The Finance Officer will also work with the fisheries departments of each country to acquit any funds advanced under their Letter of Agreement or other formal engagement mechanism and arrange progress payments once the acquittal is approved. Some virtual training with national fisheries finance staff may be needed to ensure they are familiar with Project financial reporting requirements and can provide the required supporting documentation as part of the acquittal process. The Finance Officer will work closely with the Procurement Specialist on budget matters relating to procurement and the Project Coordinator on expenditure reports for the GCF.

The Procurement Specialist will be responsible for sourcing the equipment and materials required for the national and regional components of the Project. The Procurement Specialist will work closely with all Project Staff to ensure the specifications and requirements of all items to be procured are clearly described so that when a request for quotation (RFQ) or request for proposals (RFP) is prepared it accurately reflects requirements. The Procurement Specialist will also establish procurement assessment teams to review RFQs so successful bidders can be selected, and contracts awarded. The SPC procurement process will be followed at all times and the Procurement Specialist will work closely with the SPC procurement team.

Note: The above administration, finance and procurement positions form a "FAD Support Unit" necessary for implementing Component A of the GCF programme. A Project Management Unit is also being considered for the entire Project; however, this is in the discussion stage. The Project Management Unit may have administrative and finance staff and possibly staff to support communications and outreach, monitoring, evaluation and learning etc. There is a need to discuss or consider the relationship between these units.

6.4 Regional component activity plan and budget

The regional component will be implemented to align and complement national activities and timelines across the participating countries. Table 20 lists the staff to be engaged under the regional component and the duration of engagement. Table 21 provides a breakdown of the 2-phased approach for implementing the regional component across the 14 PICs. Year 1 of the Project will be a half year due to project setup and the recruiting of staff/consultants. Year 7 of the Project is also budgeted for 9-months as the Project winds down for completion. The total budget for the regional component including a contingency and project management fee is USD $22,190,831.

Phase I of the regional component will commence with the recruitment of staff at SPC for Project implementation. Staff will be recruited on standard 3-year contracts. Following the execution of Letters of Agreement or a similar formal mechanism to support national-level activities, the recruited regional staff will initially focus on assisting countries review and strengthen the national governance structure to support a national aFAD Programme. This will include the review of national legislation and the review and updating, as appropriate, of aFAD Management Plans across the 14 PICs. The Project staff will facilitate country-driven processes to recruit one or two national staff/consultant(s) to take responsibility for much of the national-level Project work with staff from the fisheries department in each country and other partners. Where required, Project staff will recruit consultants to review and/or develop sea safety legislation and regulations for small craft to further strengthen national level administration and regulation of FAD-associated activities.

As the aFAD Management Plan is developed through stakeholder consultations in each county, the Project will undertake the procurement process for all materials and equipment so that these are shipped to each country in year 2 of the Project. Other Project Staff will commence their work with undertaking a review of past post-harvest activities, the current state of data collected on aFADs and aFAD catches, economic and social/gender studies around community involvement and engagement with aFAD or post-harvest activities, and a review of awareness-raising campaigns and the platforms being used for disseminating information in each country. The results of the reviews will feed into the overall Activity Plan (Table 21) and allow Annual Work Plans to be developed for Project Implementation.

Arrangements will be established for the collection of catch data from at least three aFADs in each country during Phase 1 to develop a reliable annual catch rate per aFAD for each country (Annex T). The SPC TAILS and/or IKASAVEA applications will be used for data collection and storage. The Project will hire one or two data collectors in each country to undertake data collection over a two-to-three-year period under the guidance of the Fisheries Economist. As data for this purpose are required as early as possible, the catch monitoring may target fishing activities associated with aFADs of a similar design to those to be installed that already exist in some countries.

The first 5-day annual regional meeting will be arranged to bring the countries together for two-way information exchange and the first Steering Committee meeting. At the first meeting, Project staff will present the planned activities, work plans and timelines for finalisation with national

representatives. Countries will be requested to provide an update on the current status of their aFAD activities and sea safety programmes to reconfirm the baseline that will be used to measure progress over the life of the Project in each country.

Phase II is dedicated to supporting countries to operationalise their aFAD Management Plan including deploying the equipment purchased and shipped to each country. Project staff will undertake train-the-trainer workshops in the areas of aFAD rigging, deployment and undertaking site surveys, and in aFAD fishing skills including sea safety in each country. Staff from the fisheries department will then be able to undertake trainings in these areas with local fishers and at the community level, focusing on communities close to where aFADs are or will be deployed. Project staff will be available to provide technical advice and assistance when requested. Results from the different governance consultancies, including legislation and regulations for aFAD Programmes, sea safety and minimum standards for the construction of small craft will also be implemented in-country. Assistance for these activities will also be available from Project staff or consultants hired by the Project.

The Project Coordinator will continue working with countries to finalise their aFAD Management Plans and work with the administration, finance and procurement team to progress procurement and ensure that disbursements to participating countries comply with the provisions of the Letters of Agreement. The annual regional meeting will be arranged for years three to seven to provide countries with opportunities to exchange knowledge and share experiences. The meeting will also serve an oversight role, providing strategic input to the activities of the Project through the Steering Committee discussions. The Project Coordinator will draw on the outcomes of the meeting to compile information to inform reporting to the GCF. The Project Finance Officer will be responsible for acquittals of the national expenditure in accordance with SPC and GCF protocols.

Post-harvest, economic and social/gender/human rights activities will commence with countries based on the assessments undertaken during Phase-I of the Project. The activities will vary from country to country to align with national priorities and needs. Research and case studies will be undertaken to focus on benefits to fishers and communities from having access to an aFAD. Communities with a surplus of aFAD-sourced tuna will be targeted for post-harvest training.

Data collection and analysis will be a critical component of the work for the Fisheries Economist. This will include documentation of analysis of data relating to aFAD deployment and maintenance, catch and effort data analysis, including estimation of average annual catch rates per aFAD, and analysis of social and economic information to support future management decisions, illustrate lessons learned and support assessments of benefits and costs.

Project staff will also work with countries to either develop or strengthen awareness-raising around the national aFAD Programme and sea safety. Drawing on the expertise of Project staff, a range of platforms will be utilised to disseminate Project-related information and IKM products widely. Awareness-raising materials will include the presentation of information concerning the effects of climate change on the marine environment, the supply of reef fish, and related topics for each country. The Communications and IKM Specialist will assist with the development of educational materials for trialling in schools. This will include materials dedicated to climate change, aFADs, aFAD fishing, the contribution of fish to healthy diets, and sea safety.

Year seven will focus on the winding down of the Project. Financial reports, acquittals, audits and narrative reports will be finalised. A final annual regional meeting and Steering Committee meeting for participating countries and partners will be convened to help provide a final assessment of the

activities of the Project over its 7-year life, and document the impact of the Project and lessons learned throughout its implementation.

Table 20: Staff to be engaged under the regional component and the duration of engagement

Position	Year 1 - quarters				Year 2 - quarters				Year 3 - quarters				Year 4 - quarters				Year 5 - quarters				Year 6 - quarters				Year 7 - quarters			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Project Coordinator																												
Full-time aFAD Specialis																												
Short-term aFAD Specialist																												
Post-Harvest Specialist																												
Fisheries Economist																												
Social/Gender/Human Rights Specialist																												
Communications and IKM Secialist																												
Procurement Specialist																												
Finance Officer																												
Project Administrator																												
Consultants																												
Pacific Island Fisheries Professional (PIFP) - 1																												
PIFP - 2																												
PIFP - 3																												
PIFP - 4																												
PIFP - 5																												
PIFP - 6																												
PIFP - 7																												
PIFP - 8																												

Table 21: Activity plan and budget for the regional component to support the 14 PICs with conducting their national activities.

Regional support for in-country work through SPC Activity	USD Year 1 (6-months)	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7 (9-months)	Total
Total including contingency and project management fee	**833,175**	**3,536,164**	**4,394,696**	**4,304,134**	**3,766,193**	**3,265,080**	**2,091,390**	**22,190,831**
Phase I: Activities to strengthen national governance structure for aFAD Programme and small craft sea safety, including recruitment of national and regional staff.	**684,000**	**1,552,500**	**1,632,500**	**1,548,500**	**1,501,000**	**1,436,000**	**1,069,000**	**9,423,500**
Activity 1.1: Recruitment of local staff/consultants and SPC staff for implementing all areas of the regional and national component.	**670,000**	**1,439,500**	**1,522,500**	**1,548,500**	**1,501,000**	**1,436,000**	**1,069,000**	**9,186,500**
Suva-based position: Project Coordinator for Component A. Band 13 - managerial/policy position with some fisheries and climate change experience.	80,000	162,500	165,500	169,000	172,500	176,000	135,000	**1,060,500**
Suva-based position: Full-time aFAD Specialist. Band 11 - Technical position on aFAD work including development of aFAD Management Plans.	65,500	133,500	136,500	139,000	142,000	145,000	112,500	**874,000**
Pohnpei Regional Office-based position: Short-term aFAD Specialist. Band 10 - 3-year aFAD position starting in middle of year 2.		60,000	121,500	124,500	64,000			**370,000**
Suva-based position: Fisheries Economist. Band 11 - Fisheries and conservation economist to establish and oversee data collection and analysis including aFAD effectiveness in collaboration with Social/Gender Specialist.	65,500	133,500	136,500	139,000	142,000	145,000	112,500	**874,000**
Suva-based position: Social/Gender/Human Rights Specialist. Band 11 - Position to assess social impacts of aFADs in a climate change context and the effectiveness of aFADs to contribute to national food security in collaboration with the Fisheries Economist.	65,500	133,500	136,500	139,000	142,000	145,000	112,500	**874,000**

Suva-based position: Post-Harvest Specialist. Band 10 - Position for value adding and product development at the community level including marketing. Links in with work of the Fisheries Economist and Social/Gender Specialist.	0	60,000	121,500	124,500	127,000	130,000	99,000	**662,000**
Suva-based position: Project Administrator. Band 7 - Administration and travel logistics for Component A Project staff and in-country activities.	12,500	25,500	26,000	26,500	27,000	28,000	21,500	**167,000**
Suva-based position: Finance Officer. Band 10 - Maintain the finances for Component A covering both SPC regional component and in-country activities and disbursement of funds.	58,000	120,000	121,500	124,500	127,000	130,000	99,000	**780,000**
Suva-based position: Procurement Specialist. Band 10 - undertake all procurement activities for Component A for both SPC regional activities and in-country activities. Will need to work closely with SPC procurement team.	0	120,000	121,500	124,500	127,000	130,000	99,000	**722,000**
Suva-based position: Communications, Information and Knowledge Management (IKM) Specialist. Band 11 - assist countries with awareness-raising activities and the development of knowledge products for different media platforms.		67,000	136,500	139,000	142,000	145,000	112,500	**742,000**
SPC charges								
Onboarding cost at USD $25,000 per person (10 staff)	150,000	100,000						**250,000**
Onboarding cost at USD $25,000 per person - 8 Pacific Island Fisheries Professionals on 1-year contracts each.		25,000	50,000	50,000	50,000	25,000		**200,000**
SPC Facilities charge at USD $2,000/person/year in Suva	6,000	22,000	24,000	24,000	24,000	22,000	13,500	**135,500**
ICT charge of USD $7,000/person/year.	21,000	77,000	84,000	84,000	80,500	77,000	47,500	**471,000**
SPC cost recovery								
15% of SPC Deputy Director FAME (coastal fisheries)	10,000	30,000	31,000	32,000	33,000	34,000	27,000	**197,000**
15% of SPC FAME CFAP Economist	8,000	23,000	24,000	25,000	26,000	27,000	21,000	**154,000**
20% of SPC FAME MEL Officer	11,000	25,000	26,000	27,000	28,000	29,000	22,000	**168,000**
25% of SPC Coastal Fisheries Information and Database Manager	20,000	40,000	41,000	42,000	43,000	44,000	33,000	**263,000**
Equipment for Office								

Office tables and chairs	25,000	15,000						**40,000**
Printer for the office	10,000			10,000				**20,000**
Photocopier for the office including maintenance	25,000	2,000	2,000	2,000	2,000	2,000	1,500	**36,500**
Office consumables including printer cartridges	5,000	5,000	3,000	3,000	2,000	2,000		**20,000**
National activities (supported regionally)								
Assist countries with the recruitment of suitable aFAD technicians and/or data collectors. Note: the funding for the positions is in the national budget allocation.	4,000	4,000						8,000
Develop a Letter of Agreement or Service Agreement with each of the 14 countries to support the transfer of funds for national staff in each country to implement activities. Travel for SPC Project Coordinator to each country at $7,000 per 1-week trip and 14 countries.	28,000	56,000	14,000					98,000
Activity 1.2: Development or review of national aFAD Management Plan or policy in collaboration with the national fisheries agency and SPC.	**14,000**	**77,000**	**77,000**	**0**	**0**	**0**	**0**	**168,000**
Provide technical support and guidance in the development of the aFAD Management Plan though stakeholder consultations. SPC Project staff travel costs for first consultation. 10 countries with average estimate of USD $7,000/ 1-week trip	14,000	42,000	14,000					70,000
Provide technical support and guidance in the development of the aFAD Management Plan though stakeholder consultations. SPC Project staff travel costs for second consultation. 10 countries with average estimate of USD $7,000/ 1-week trip.		35,000	35,000					70,000
Provide technical support and guidance in the development of the aFAD Management Plan though stakeholder consultations. SPC Project staff travel costs for third consultation. 4 countries with average estimate of USD $7,000/ 1-week trip.			28,000					28,000

Activity 1.3: Arranging international consultants to undertake specific activities, reviews in consultation with the national fisheries agency, other appropriate government departments, and where appropriate, SPC, FFA or FAO.	**0**	**36000**	**33000**	**0**	**0**	**0**	**0**	**69,000**
a) Consultant to review national legislation and regulations for the national aFAD Programme with recommendations for improving these with draft text. SPC Project staff to assist with arranging the consultancy, but funding for consultant in national budget allocations. Advertising and selection of consultants at $3,000/consultancy and 12 countries.		18,000	18,000					36,000
b) Consultant to review national legislation and regulations for small craft (less than 12 m) covering qualifications for operators and sea safety requirements using the FAO-developed draft regulations or template and through national consultation develop specific legislation and regulation text for each country. SPC Project staff to assist with arranging the consultancy, but funding for consultant in national budget allocations. Advertising and selection of consultants at $3,000/consultancy and 7 countries.		12,000	9,000					21,000
c) Consultant to develop or review national legislation and regulations for minimum specifications and design for small craft (less than 12 m) to ensure seaworthiness with recommendations for improving these with draft text. SPC Project staff to assist with arranging the consultancy, but funding for consultant in national budget allocations. Advertising and selection of consultants at $3,000/consultancy and 4 countries.		6,000	6,000					12,000
Phase II: Implementing the aFAD Management Plan and addressing all gaps identified in the audit of the aFAD Programme and small craft sea safety, including SPC assistance and activities.	**6,000**	**1,376,000**	**2,007,000**	**2,016,000**	**1,618,000**	**1,268,000**	**663,000**	**8,954,000**

Activity 2.1: Procurement of all materials for the aFAD and sea safety component of the Project in all 14 countries and regional materials through a centralised competitive tender process at SPC.	**6,000**	**323,000**	**418,000**	**335,000**	**205000**	**105000**	**0**	**1,392,000**
Procurement Officer and Finance Officer to undertake the procurement of all materials for in-all country activities on behalf of the countries and have goods shipped to each country. Funding for procured items in the national budget for each country. Advertising and selection of service provider at $6,000/country and 14 countries.	6,000	60,000	18,000					84,000
Purchase of deep-water echo sounder(s) including freight (I deep-water echo sounder at $25,000 with transducers (3KW) for SPC Project Staff to use where needed.		25,000						25,000
Purchase of GPS or GPS/plotter(s) including freight 2 units at $1,500 each for SPC Project staff use with countries.		3,000						3,000
Purchase of FAD materials for research trials on new and/or improved FAD designs including freight to Fiji where the Project will be based.		50,000	25,000	25,000				100,000
Purchase of fishing equipment for SPC Project aFAD Specialists for training purposes at $5,000 each/year for 4 years.		10,000	10,000	10,000	5,000	5,000		40,000
Purchase of post-harvest equipment for community level activities including solar freezers, smokers, fish dryers and processing equipment.		100,000	300,000	300,000	200,000	100,000		1,000,000
Purchase of vessel tracking systems for small craft for trailing. Purchase 50 units at $300 each for trialling in several countries.			15,000					15,000
Purchase of 100 computer tablets at $500 each for data collection and training (aFADs and catch and effort), economic and social and gender information based on the SPC TAILS or IKASAVEA applications.		25,000	25,000					50,000
Purchase of sea safety grab bags (50 bags at $1,500 each) for training purposes.		50,000	25,000					75,000
								0
Activity 2.2: Implementing recommendations or findings from the different consultancies to strengthen the aFAD Programme, sea safety and other identified areas at the national level.	**0**	**24,000**	**126,000**	**90,000**	**42,000**	**20,000**	**10,000**	**312,000**

a) Implement the findings and recommendations of the national legislation and regulations review for the national aFAD Programme with the fisheries department. Using SPC Project consultancy funding to assist 8 countries with implementing review findings to strengthen legislation and regulations in support of the artisanal FAD Programme at $12,000 for fees and travel/country.		12,000	36,000	36,000	12,000			96,000
b) Implement the findings and recommendations of the national legislation and regulations for small craft (less than 12 m) covering qualifications for operator and sea safety equipment requirements with the fisheries department and maritime department. Using SPC Project consultancy funding to assist 5 countries with implementing review findings to strengthen sea safety legislation and regulations at the national level at $12,000 for fees and travel/country.		12,000	36,000	12,000				60,000
c) Implement the findings and recommendations of the national legislation and regulations for minimum specifications and design for small craft (less than 12 m) to ensure seaworthiness with the fisheries department and maritime department. Using SPC Project consultancy funding to assist 3 countries with implementing review findings to strengthen minimum specification and design for small craft legislation and regulations at $12,000 for fees and travel/country.			24,000	12,000				36,000
Implement other *ad hoc* consultancies as identified during the project to assist countries with implementing their aFAD Programme, sea safety programme or post-harvest activities.			30,000	30,000	30,000	20,000	10,000	120,000
Activity 2.3: Implement and operationalise the aFAD Management Plan in the locations identified in each of the 14 countries as well as post-harvest, economic and social/gender activities with the fisheries department staff, SPC Project and local staff/consultants hired under the Project once the aFAD materials have arrived in-country.	**0**	**732,000**	**953,000**	**1,014,000**	**985,000**	**812,000**	**551,000**	**5,047,000**

Train the trainer national workshop with SPC building local capacity in rigging and deploying aFADs including undertaking site surveys of areas for aFAD deployment plus sea safety. Travel cost for SPC Project aFAD Specialists at $9,000 for each 2-week training and 12 countries. Workshop costs covered in national budgets.		36,000	36,000	36,000				108,000
Train the trainer national workshop with SPC building local capacity in aFAD fishing skills and sea safety including practical sessions on participants boats. Travel for SPC Project aFAD Specialists at $9,000 for each 2-week training in 12 countries. Workshop costs included in national budgets.		18,000	36,000	36,000	18,000			108,000
Travel for responding to *ad hoc* country requests for technical assistance in all areas covered by the Project, with 4 ad hoc requests per year with travel at $9,000 per 2-week assignment over 4 years.			18,000	36,000	36,000	36,000	18,000	144,000
Increase local capacity by implementing a training programme for 8 x 1-year Pacific Island Fisheries Professionals (PIFP) positions at SPC for the PIFP's to be trained and work alongside SPC Project staff to expand their skill set to take back to their country at the end of their 1-year attachment to SPC.		100,000	200,000	200,000	200,000	100,000		800,000
Travel costs for the PIFP staff to undertake 5 by 2-week trainings in country under SPC Project staff guidance at $9,000 travel costs per training.		45,000	90,000	90,000	90,000	45,000		360,000
Annual regional workshop and steering committee meeting to bring the 14 countries together for discussions on all Component A activities as well as all aspects of data collection including catch and effort, social/gender data, economic data and the analysis of the data to better inform all countries. Annual 5-day meeting for 6 years at $500,000/meeting for travel of 3 representatives per country plus all meeting and travel logistics.		500,000	500,000	500,000	500,000	500,000	500,000	3,000,000
Trainings in post-harvest techniques at the community level processing the tuna caught from aFAD fishing to make a range of post-harvest and value-added products. Six trainings per year for 4.5 years at $9,000 per 2-week		33,000	33,000	66,000	66,000	66,000	33,000	297,000

training for travel and $2,000 per training for consumables.								
Production of post-harvest training materials and manuals for in-country use and capacity development.			15,000	25,000	25,000	15,000		80,000
Post-harvest product development including packaging and marketing trials in 6 countries			25,000	25,000	50,000	50,000		150,000
								0
Activity 2.4: Strengthening national data collection on aFADs and their maintenance as well as catch and effort and other economic and social information from aFAD fishing activities based on using the SPC TAILS or IKASAVEA applications.	**0**	**248,000**	**347,000**	**405,000**	**214,000**	**173,000**	**58,000**	**1,445,000**
Train the trainer workshop with SPC building local capacity in data collection and database support on aFADs and catch and effort from aFAD fishing activities using tablets and the SPC TAILS or IKASAVEA applications. SPC and Project Fisheries Economist to provide 5 trainings per year over 3 years at $7,000 for travel for each 1-week training.		21,000	35,000	35,000	14,000			105,000
Country monitoring targeting data collection from 2-3 aFADs per country using in-country data collectors to develop a reliable annual catch rate for each country from aFADs over a 2–3-year period. This data collection will transfer to national fisheries agencies as part of the overall data collection initiative under the Project.		200,000	200,000	200,000				600,000
Training in the collection of social/gender and economic data to understand the social impacts of aFADs on communities. SPC Project Social/Gender Specialist to provide 6 trainings per year for 4 years at $9,000 for travel per 2-week training.		27,000	54,000	54,000	54,000	27,000		216,000
Training in data collection for economic and environmental data to better understand the effectiveness of aFADs and look at whether their use does reduce fishing pressure on reef fish resources. SPC Project Fisheries Economist to provide 4 trainings per year for 4 years at $9,000 for travel for each 2-week training.			18,000	36,000	36,000	36,000	18,000	144,000

Specific research activities around social, gender and economic activities at the community level in 10 communities to pilot the benefits from aFADs to these communities with $30,000 per community including travel.			30,000	60,000	90,000	90,000	30,000	300,000
Production of data analysis reports for awareness-raising across the Pacific in support of promoting the aFAD Programme in each Pacific Island country.			10,000	20,000	20,000	20,000	10,000	80,000
Activity 2.5: Developing and/or strengthening awareness-raising around aFADs, the aFAD Programme, sea safety and predicted climate change effects on the marine environment and resources at the national and regional level with SPC assistance through a structured campaign using different media platforms and approaches.	**0**	**28,000**	**142,000**	**172,000**	**172,000**	**158,000**	**44,000**	**716,000**
Assist countries with developing their awareness programmes around aFADs, aFAD Programme, sea safety and climate change effects on the marine environment, to ensure consistent messaging across the countries. Travel for SPC Project Communications and IKM Specialist to all 14 countries over 5 years with 2 by 1-week travel per country at $7,000/travel.		28,000	42,000	42,000	42,000	28,000	14,000	196,000
Assist countries to develop awareness-raising materials for different media platforms including social media. Development of different print materials, short videos and short messages with photos for social media. Estimate of 60,000/year for 4 years to complement national budgets.			50,000	60,000	60,000	60,000	10,000	240,000
Assist countries to develop educational materials for trialling in schools at different levels as part of their curriculum. Specific education materials developed around climate change, aFADs, aFAD fishing and sea safety for curriculum at $40,000/year for 4 years to complement national budgets.			30,000	40,000	40,000	40,000	10,000	160,000

Assist countries in their dissemination of awareness-raising materials through the identified media platforms on a regular basis and disseminate regional messaging to complement the national work. Estimated $30,000/year for dissemination over 4 years to complement national budgets.			20,000	30,000	30,000	30,000	10,000	120,000
Activity 2.6: Trialling cyclone-proof storage areas in Vanuatu and Fiji, one location per country plus aFAD materials for 20 aFADs in each storage unit with SPC assistance.	**0**	**21,000**	**21,000**	**0**	**0**	**0**	**0**	**42,000**
Oversee the construction of a cyclone-proof storage area in identified location in Fiji and Vanuatu with materials and labour covered in national budget. Travel for 3 by 1-week trips to each country at $7,000/trip.		21,000	21,000					42,000
Stock each storage area with materials for 20 aFADs which are purchased as part of the aFAD procurement process.								0
Subtotal for regional budgets[43]	**690,000**	**2,928,500**	**3,639,500**	**3,564,500**	**3,119,000**	**2,704,000**	**1,732,000**	**18,377,500**
5 percent contingency funding	**34,500**	**146,425**	**181,975**	**178,225**	**155,950**	**135,200**	**86,600**	**918,875**
Subtotal for regional budget and contingency	**724,500**	**3,074,925**	**3,821,475**	**3,742,725**	**3,274,950**	**2,839,200**	**1,818,600**	**19,296,375**
SPC project management fee of 15 percent	**108,675**	**461,239**	**573,221**	**561,409**	**491,243**	**425,880**	**272,790**	**2,894,456**
Overall total	**833,175**	**3,536,164**	**4,394,696**	**4,304,134**	**3,766,193**	**3,265,080**	**2,091,390**	**22,190,831**

[43] Given the project will not start until 2025/2026 the budget estimates include projections of an early 2026 start date and staff costs with a 2% increase annually. Equipment costs are based current costs plus 5%. Travel costs are best estimates.

7. Overall activity plan and budget

As the PMU will be responsible for all reporting and acquitting of expenditure to the GCF, it will have oversight of Project activities and implementation at both regional and national levels. National activity plans and budgets provide for nationally-implemented activities. In addition, there is provision within the regional component, such as procurement and the hiring of consultants, that will be done in consultation with each country. Most countries expressed support for the Project to be responsible for the procurement process for all materials, as this has been problematic for many countries in the past. Table 22 presents the budget for both national and regional components by activity, plus the overall total including a five percent contingency and the 15 percent project management fee, with the total amount being USD $35,381,881.

Table 22: Combined activity plans and budgets for the national and regional components.

Combined regional and national activities Activity	Combined regional and national budget National	Regional	Total
Total including contingency and project management fee	**13,191,050**	**22,190,831**	**35,381,881**
Phase I: Activities to strengthen national governance structure for aFAD Programme and small craft sea safety including recruitment of national and regional staff.	**1,606,914**	**9,423,500**	**11,030,414**
Activity 1.1: Recruitment of local staff/consultants and Project staff for implementing all areas of the regional and national component.	889,906	9,186,500	10,076,406
Activity 1.2: Development or review of national aFAD Management Plan or policy in collaboration with the national fisheries agency and SPC.	214,530	168,000	382,530
Activity 1.3: Arranging international consultants to undertake specific activities, reviews in consultation with the national fisheries agency, other appropriate government departments, and where appropriate, SPC, FFA or FAO.	502,478	69,000	571,478
Phase II: Implementing the aFAD Management Plan and addressing all gaps identified in the audit of the aFAD Programme and small craft sea safety including SPC assistance and activities.	**9,317,351**	**8,954,000**	**18,271,351**
Activity 2.1: Procurement of all materials for the aFAD and sea safety component of the Project in all 14 countries and regional materials through a centralised competitive tender process.	4,869,884	1,392,000	6,261,884
Activity 2.2: Implementing recommendations or findings from the different consultancies to strengthen the aFAD Programme, sea safety and other identified areas at the national level.	56,010	312,000	368,010

Activity 2.3: Implement and operationalise the aFAD Management Plan in the locations identified in each of the 14 countries as well as post-harvest, economic and social/gender activities with the fisheries department staff, SPC Project and local staff/consultants hired under the Project once the aFAD materials have arrived in-country.	2,467,232	5,047,000	7,514,232
Activity 2.4: Strengthening national data collection on aFADs and their maintenance as well as catch and effort and other economic and social information from aFAD fishing activities based on using the SPC TAILS or IKASAVEA applications.	203,444	1,445,000	1,648,444
Activity 2.5: Developing and/or strengthening awareness-raising around aFADs, the aFAD Programme, sea safety and predicted climate change effects on the marine environment and resources at the national and regional level with SPC assistance through a structured campaign using different media platforms and approaches.	1,575,781	716,000	2,291,781
Activity 2.6: Trialling cyclone-proof storage areas in Vanuatu and Fiji, one location per country plus aFAD materials for 20 aFADs in each storage unit with SPC assistance.	145,000	42,000	187,000
Subtotal for combined budget	**10,924,265**	**18,377,500**	**29,301,765**
5 percent contingency funding	**546,213**	**918,875**	**1,465,088**
Subtotal for combined budget and contingency	**11,470,478**	**19,296,375**	**30,766,853**
Project management fee of 15 percent	**1,720,572**	**2,894,456**	**4,615,028**
Overall total	**13,191,050**	**22,190,831**	**35,381,881**

SPC will be responsible for narrative and financial reporting that complies with GCF procedures and policies. In addition to quarterly narrative and financial reports, an Annual Progress Report, an Annual Financial Report, and an Annual Audit will be provided to the GCF. The annual regional meeting will be scheduled to occur a month before the annual progress reporting deadline to allow information and updates from the countries to be included in the Annual Progress Report. The GCF Secretariat and other key partners, such as Conservation International and Minderoo Foundation, will be invited to observe the annual regional meeting and associated steering committee.

7.1 Conclusions

Based on the overall assessment undertaken across the 14 participating countries, strengthening the national aFAD Programme seems the most effective approach to support domestic food security in these countries. However, there is a great diversity of needs related to strengthening aFAD Programmes across the 14 participating countries, given differences in their population sizes, previous experiences with aFADs, abundance of tuna in their waters, etc.

It is essential to develop and/or strengthen the governance structure to fully support a national aFAD Programme including legislation and regulations and a comprehensive national aFAD

Management Plan that has been developed with all stakeholders. Once the national aFAD Management Plan is approved and endorsed by government, it provides the guidance and approach for implementing the aFAD programme as a collaboration between the fisheries agency, other relevant government departments and all stakeholders.

The aFADs will make a significant contribution to food security in the small countries, both in terms of the number of beneficiaries (Table 19) and the relatively high number of fish meals to be delivered per person per month (see Table 1 in Annex T).

The key benefit for the larger countries should not be measured in terms of the proportion of the total population supplied with more tuna – it is simply not possible for one programme to have a significant impact given the large national population. Rather, the main benefit is that the *ad hoc* nature of previous aFAD deployments will be transformed through establishment of a well-structured national aFAD Programme, following the guidelines in SPC Policy Brief 31/2017. This will lay the foundation for these countries to progressively extend a well-maintained aFAD network to additional provinces or states to enlarge the national infrastructure for food security. This can be done using a combination of national funding and resources available from other donors, e.g., the World Bank PROPER, ADB, etc.

Annexes

Annex A

A. Terms of reference for consultancy

Project Title: Studies and analyses to support the Green Climate Fund proposal: Adapting tuna dependent Pacific Island communities and economies to climate change.

Project Description

Background

Climate change is adversely affecting the Western and Central Pacific Ocean large marine ecosystem, degrading its coral reefs and changing the distribution of tuna. The impacts on coral reefs are reducing the supply of reef fishing and threatening the food security of more than four million people that live along the coasts of the programme's targeted 14 Pacific Island countries. In parallel to the threat to the food security of highly vulnerable populations, the redistribution of tuna will have profound implications for national economies that derive as much as 70% of their (non-aid) government revenue from tuna fishing, thereby dramatically reducing basic social services that are essential to the resilience of Pacific Island people.

Recognising this impending threat, the governments of the Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Niue, Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu have instructed the Pacific Community (SPC) to collaborate with Conservation International (as an Accredited Entity and Executing Entity for the Green Climate Fund) to prepare an application to the Green Climate Fund to support a programme that will:

1) Increase supply of tuna for domestic consumption as an adaption to degradation of coral reefs and the resulting food insecurity for vulnerable populations; and
2) Usher in the reforms needed to minimise the risks for citizens of countries with economies that are vulnerable to climate-driven redistribution of tuna.

The concept note for the proposal has been endorsed by the Green Climate Fund and the Pacific Community and Conservation International are currently designing the regional programme of work and preparing associated documentation for the Green Climate Fund. Ten independent feasibility studies will be commissioned to assist this process. These are outlined under the scope of work below. Potential consultants are invited to submit proposal for one or more of these studies or for tasks within each study.

Scope of Work

- This RFP aims at identifying entities interested in providing consultancy services in one or more of the studies detailed further below.
- Service Providers are expected to provide technical services and capabilities within one or more of the following studies (e.g.: 1 or 2; or 1 and 2; or 3, 7, and 10, etc)
- The Objectives, Expected Outputs, indicative Timeframe for Completion for each study are specified below:

B.3 GCF Study 3: Feasibility of scaling-up National FAD Programmes in all 14 participating countries

Objectives: Nearshore Fish Aggregating Devices (FADs) are now widely recognised as an effective way of increasing access to tuna and other oceanic fish species (hereafter grouped as 'tuna') to improve

the food security of rapidly-growing coastal communities in the Pacific Island region (see Chapter 13 in https://www.spc.int/cces/climate-book/spc-publications-on-climate-change#tab-682-2 and https://www.sciencedirect.com/science/arti:cle/abs/pii/S0308597X1400267X). Most Pacific Island countries have been deploying nearshore FADs for several years, often with the assistance of SPC, however, the number of FADs has yet to be scaled-up to the level where FADs are a significant part of the national infrastructure for food security.

SPC has provided a blueprint for sustaining and strengthening National FAD Programmes so that this simple technology can be used to meet the increasing demand for tuna driven by human population growth and the decline in reef fisheries caused by over-harvesting and poor management of coastal fish habitats in several locations, and by the degradation of coral reefs due to ocean warming and acidification across the region. This blueprint is available at https://www.spc.int/DigitalLibrary/Doc/FAME/Brochures/Anon_17_PolicyBrief31_FAD_Programmes.html

Component A of the GCF regional tuna programme is designed to strengthen National FAD Programmes in all 14 participating countries.

The purpose of this study is to document the existing needs and capacity of each country to maximise the benefits of investments by GCF in all activities related to strengthening National FAD Programmes.

The specific tasks to be completed during this study are described below.

(i) An analysis of the capacity of the national fisheries agency in each country to deploy the number of FADs needed to significantly increase the supply of tuna for domestic food security by the end of the Programme in 2030. The numbers of FADs required for this purpose are expected to vary widely among countries due to population size and the distribution of the population. In the smaller countries, the expectation is that the majority of FADs needed to fill the gap in fish supply would be installed. However, in the large countries, such as PNG, Fiji and Solomon Islands, an assessment will need to be made of the capacity to install sufficient FADs to significantly increase the supply of tuna in those coastal communities that have the greatest needs for an increased supply of fish. The important decisions about the number of FADs to be deployed in each country will be made during the consultations with the national fisheries agencies about the priorities for strengthening their National FAD Programmes during development of the Funding Proposal and guided by the information provided in the publication by CI and SPC on optimising the use of FADs for food security in the Pacific Islands http://dx.doi.org/10.1016/j.marpol.2015.02.010

(ii) In support of (i) above, analyse the current capacity in each of the 14 participating countries to:

- Implement the necessary increases in the deployment and management of nearshore anchored FADs, taking into consideration allocation of existing staff and shore-based facilities for the construction, installation and maintenance of FADs; development of protocols for procurement and storage of FAD materials; availability of suitable vessels for deploying FADs; and establishment/strengthening of fishers' associations as vehicles to help deliver all aspects of National FAD Programmes.

- Develop codes of conduct for harmonious use of FADs by multiple stakeholders (including, for example, a measure of how each country is implementing community-based fisheries management and resource sharing).
- Modify the design of FADs to further reduce any potential impacts on marine mammals, turtles and seabirds.
- Train small-scale fishers in safe and effective FAD-fishing methods.
- Improve the use of boating safety equipment by small-scale FAD fishers so that they can make the transition to fishing further offshore with confidence and safety.
- Monitor the performance of FADs to determine how to continually improve the effectiveness of the infrastructure and its use by small-scale fishers.
- Train coastal communities in remote locations without refrigeration in simple post-harvest methods (e.g., drying and smoking, home canning) to maximise use and storage life of tuna caught around FADs.

(iii) Synthesise the information in (i) to (iii) above to:

- Identify the gaps in capacity that need to be addressed to scale-up National FAD Programmes in each of the 14 countries;
- Recommend the priority areas and extent of investments (in USD) needed to achieve the GCF Programme objectives for nearshore FADs in each country; and
- Document the status of National FAD Programmes in each country to establish a baseline for measuring the achievements of the Programme.

Outputs/Deliverables: The main output from this study will be a report that documents:

I. The number, size and distribution of coastal communities in each participating country.

II. The optimum locations and numbers of FADs needed to maximise access to tuna for coastal communities and the (country-agreed) target and priorities for FAD deployment given the funding available for Component A of the GCF Programme for each country.

III. The status of National FAD Programmes in each country at the start of the GCF regional tuna programme, including a table summarizing the extent to which the various activities needed to implement a scaled-up National FAD Programme listed above are already in place (in percentage terms).

IV. The gaps in capacity needed to implement a National FAD Programme at the appropriate scale in each country, including a table summarizing the nature and cost of investments that will need to be made for each of the activities listed above to complete all FAD-related activities at the appropriate level before the end of the Programme.

V. An assessment of the risk that the proposed investments do not fill all the gaps in capacity effectively, and recommended measures for reducing any such risks.

VI. The total number of people expected to benefit from scaled-up National FAD Programmes in each participating country.

The report must be a stand-alone document that describes the findings from this study in detail, with an appropriate Executive Summary.

B. Questionnaire for assessing progress towards a sustainable national aFAD Programme including sea safety and other related areas

Part I: Assessing progress towards a sustainable national aFAD Programme

	Ad hoc (0-49%)	On the way to sustainability (50-99%)	Sustainable (100%)	Comments
1. Capacity				
1.a Country-based experts are available to manage the aFAD Programme including the rigging and deployment of aFADs.				
1.b The national fisheries agency owns or has easy access to the infrastructure and equipment required to deploy aFADs (e.g. suitable boat with echo-sounder and GPS).				
1.c Depending on the size of the country, one or more recurrent positions at the national fisheries agency are fully or partly dedicated to aFAD work and this is reflected in job descriptions.				
1.d A succession training plan is in place to ensure that the country does not lose its aFAD technical capacity when the existing aFAD experts move out or retire.				
2. Management				
2.a Political stakeholders understand the contribution of nearshore aFADs to food security and livelihoods.				
2.b The national fisheries agency has strategic plans or policies that mention nearshore aFADs and the aFAD Programme.				
2.c A registry is used to record aFAD deployments and keep track of lost aFADs that need to be replaced.				
2.d Legislation and regulations are in place and enforced to support the national aFAD Programme and to clarify the roles and responsibilities of aFAD users.				
2.e The national fisheries agency has a nearshore FAD management plan or policy to guide its aFAD work.				
2.f A monitoring framework is in place that captures fishers' use of aFADs and/or catches at representative sites.				
3. End-user engagement				
3.a Partnerships are developed with end-users (e.g. communities, fishers' associations, sports fishing charters, recreational fishers) for the ownership, co-management and potential cost-sharing of aFADs.				
3.b An effective feedback mechanism exists between the national fisheries agency and aFAD end users.				
3.c FAD awareness-raising and training in sustainable FAD fishing methods and safe aFAD				

fishing methods are undertaken in communities that are newly exposed to aFADs.				
3.d Conflict resolution protocols are in place and effective				
4. Funding				
4.a The government agency provides the national fisheries agency with a recurrent annual budget for the implementation of its aFAD Programme.				
4.b Donors and/or the government agency provide occasional funding for aFAD projects.				
4.c Partnerships with end users are in place, which include aFAD cost-sharing.				

Part 2: Assessing complementary activities such as sea safety in support of a sustainable National aFAD Programme.

May be a mix of Fisheries Department and Maritime Department jurisdiction for sea safety.	***Ad hoc* (0-49%)**	**On the way to sustainability (50-99%)**	**Sustainable (100%)**	**Comments**
5. Sea Safety Requirements				
5.a Country has regulations in place covering qualifications for small craft (3-8m in length) operators.				
5.b Country has regulations on sea safety equipment that needs to be carried when small craft are heading to sea.				
5.c Country has suitable training facility and trainers to provide training in qualifications and sea safety equipment use by small-scale fishers				
5.d Required sea safety equipment is available for purchase locally from public or private sector companies				
5.e Country has suitable facilities and skilled personnel for maintaining all sea safety equipment or has arrangements in place to have this done offshore.				
5.f Country has required small craft minimum specifications for design and construction to ensure seaworthiness				
5.g Good working relationship and proper information exchange protocols exists between fisheries and maritime authorities around sea safety				
5.h Fisheries provide coordinates for anchored aFADs to Maritime for updating navigation charts for merchant vessels				
5.i Country has aFADs marked for easy location day (flagpole with flag) or night (light and radar reflector).				
5.j Country has search and rescue vessels and plan in place when a small-scale vessel is reported missing.				
6. Sea Safety for Fishers				
6.a Fisheries agency uses and promotes the SPC sea safety checklist, or some form of checklist, and has this in local language for small-scale fishers				

6.b Fisheries agency encourages fishers to have a second smaller outboard for safety reasons				
6.c Fisheries agency encourages small-scale fishers to carry paddles and/or sail rig when fishing outside the reef.				
7. Fishing and processing				
7.a Fisheries agency is promoting fisher associations and/or cooperatives to encourage fishers to work together				
7.b Country has adequate ice making facilities providing ice at affordable prices for fishers to use				
7.c Fisheries agency is promoting post-harvest value-adding to tuna to develop new products and markets.				
7.d Fisheries agency is promoting and training fishers to troll around aFADs				
7.e Fisheries agency is promoting and training fishers in mid-water handlining and drift line methods around aFADs				
8. General information				
8.a What is the current price fishers pay for outboard fuel?				
8.b What is the current price fishers pay for ice?				
8.c What price do fishers sell their tuna for off the boat – per kg whole fish				
8.d What price do fishers sell their reef fish for off the boat – per kg whole fish				
8.e How much time do fishers spend fishing?				
8.f What other income earning activities do fishers engage in? Full-time fishers? Part-time fishers?				
8.g Where do fishers sell their catch? Roadside? Direct to buyers? Fish stalls? Other?				

C. List of all those consulted by country and region

Region and country	Name	Title	Organisation
Melanesia			
Fiji Islands	Ms Neomai Ravitu	Director	Ministry of Fisheries (MoF)
	Mr Navneel Singh	Principal Fisheries Officer (PFO), Inshore Fisheries Management Division	MoF
	Mr Saimoni Tauvoli	Senior Fisheries Officer (SFO), Fisheries Central Division	MoF
	Mr Kolinio Naivalu	SFO, Fisheries Northern Division	MoF
	Mr Aporosa Rabo	SFO, Fisheries Eastern Division	MoF
	Mr Anare Luvunakoro	Fisheries Officer Northern Division	MoF
	Mr Katagateman Tokabwebwe	SFO, Fisheries Western Division	MoF
	Mr Epeli Tawake	Fisheries Officer Western Division	MoF
	Mr Shalendra Singh	PFO Central Division	MoF
	Ms Mere Namudu	Regional Manager Eastern Division	MoF
Papua New Guinea	Mr Thomas Usu	Manager Tuna Fishery and Acting Executive Manager	Papua New Guinea (PNG) National Fisheries Authority (NFA)
	Ms Lorel Dandava	Manager, Inshore Fishery	PNG NFA
	Ms Rachel Rabi	Fisheries Management Officer - Sedentary	PNG NFA
	Mr Aisi Anas	Executive Manager, Fisheries Management	PNG NFA
	Mr Bredlee Murray	Inshore Fisheries Officer	PNG, NFA
	Mr Jonathan Manieva	Team Leader	Raun Wara Business Solutions
Solomon Islands	Ms Rosalie Masu	Deputy Secretary Technical – Inshore Fisheries Division	Ministry of Fisheries and Marine Resources (MFMR)
	Mr Bennie Buga	Deputy Director, Provincial Fisheries Division	MFMR
	Mr Aldrin Pezabule	Principal Fisheries Officer, FAD and Training section	MFMR
	Mr John Maefasimaoma	Chief Fisheries Officer Provincial Fisheries Division	MFMR
	Mr Ivory Akao	Deputy Director Inshore	MFMR

	Mr Jimmy Eroamae	Fisheries Officer Inshore	MFMR
Vanuatu	Mr Sompert Gereva	Deputy Director, Coastal / Acting Director	Vanuatu Fisheries Department (VFD)
	Mr George Amos	Manager, Development and Capture Section	VFD
	Mr Ajay Arudere	Fisheries Officer	VFD
Micronesia			
Federated States of Micronesia	Mr Bradley Phillip	Assistant Director, Fisheries Science Division	National Oceanic Resource Management Authority (NORMA)
	Mr Jamel James	Assistant Biologist	NORMA
	Ms Vanessa Fread	Assistant Secretary	Division of Marine Resources (DMR), FSM Department of Resources & Development (FSM R&D)
	Mr Dave Mathias	Fisheries Officer	DMR, FSM R&D
	Mr Dahker Abraham (Kyo)	Administrator	Office of Fisheries and Aquaculture (OFA), Pohnpei State Government (PSG)
	Mr Clay Hedson	Fisheries Specialist and FAD program coordinator	Coastal Fisheries Division, OFA, PSG
	Mr Bruno D. Ned	Administrator	Division of Fisheries and Marine Resources, Department of Resources and Economic Affairs - Kosrae State Government (KSG)
	Mr Kirisos Victus	Director	Department of Resources and Development (DRD) – Chuuk State Government (CSG)
	Mr Binaso Ruben	Deputy Director	DRD, CSG
	Mr Enjoy Rain	Chief of Marine	DRD, CSG
	Mr Anthony Yalon	Chief	Marine Resources Management Division – Department of Resources and Management – Yap State Government
Kiribati	Ms Tooreka Temari	Director, Coastal Fisheries Division (CFD)	Ministry of Fisheries and Marine Resources Development (MFMRD)
	Mr Karibanang Tamuera	Principal Fisheries Officer, CFD	MFMRD
	Mr Mike Savins	Managing Director and consultant with FAO on FAD (FishFAD) work	Kiricraft Central Pacific (boat builder) and FAO consultant
	Ms Rebeka Abaiota	National Project Assistant	FAO FAD project (FishFAD) in Kiribati

Marshall Islands	Ms Florence Edwards	Deputy Director	Marshall Islands Marine Resources Authority (MIMRA)
	Mr Glen Joseph	Director	MIMRA
	Mr Benedict Yamamura	Chief, Coastal Fisheries Division	MIMRA
	Mr Beven Wakefield	Programme Officer working on FAD Programme	FAO (FishFAD) and MIMRA
	Mr Junior Lanwi	Technician working on FAD Programme	MIMRA
Nauru	Mr Monte Depaune	Coastal Fisheries Manager	Nauru Fisheries and Marine Resources Authority (NFMRA)
	Ms Jasmina Jones	Fisheries Policy and Legal Manager	NFMRA
	Mr Being Yeeting	Fisheries Adviser	NFMRA
	Mr Giovanni Gioura	Senior Coastal Fisheries Officer	NFMRA
	Ms Breeze Grundler	Coastal Extension Officer	NFMRA
	Mr Elko-Joe Agir	Coastal Extension Officer	NFMRA
	Mr Micah Jeremiah	Coastal Fisheries Officer	NFMRA
Palau	Ms Kathy Sisior	Acting Director	Bureau of Fisheries (BOF), Ministry of Agriculture, Fisheries and the Environment (MAFE)
	Mr Fabio Siksei	Fisheries Specialist II/Acting Chief Division of Coastal Fisheries	BOF, MAFE
	Mr Erbai Yukiwo	Fisheries Extension Officer (and FAD person)	BOF, MAFE
	Mr Roman Mongami	Fisheries Extension Officer (and FAD person)	BOF, MAFE
	Mr Keobel Sakuma	Director of Conservation Policy (and FAD person), Micronesia and Polynesia Chapter	The Nature Conservancy (TNC)
Polynesia			
Cook Islands	Ms Pamela Maru	Secretary	Ministry of Marine Resources (MMR)
	Mr Koroa Raumea	Director: Inshore and Aquaculture Fisheries Division	MMR
	Mr Peter Graham	New FAD Programme Manager	MMR
	Mr Richard Story	Senior Fisheries Officer – Station Manager and FAD technician	MMR

	Mr Paul Upokokeu	Fisheries Extension Officer and assists with FAD work	MMR
Niue	Ms Josie Tamate	Director General	Ministry of Natural Resources
	Mr Poi Okesene	Director	Department of Agriculture, Forestry and Fisheries (DAFF)
	Mr Launoa Gataua	Fisheries Officer	DAFF
Samoa	Ms Moli Iakopo	Principal Fisheries Officer, Oceanic Fisheries and Compliance	Ministry of Agriculture and Fisheries (MAF)
	Mr Lorian Finau Groves	Senior Fisheries Officer, Fisheries Control and Development	MAF
	Mr Autalavou Tauaefa	Principal Fisheries Officer, Advisory	MAF
	Ms Serafina Ah Fook	Senior Fisheries Officer - Offshore	MAF
	Mr Roseti Imo	Assistant Chief Executive Officer	MAF
Tonga	Mr Poasi Ngaluafe	Deputy CEO, Head of Fisheries Science and Extension Division	Ministry of Fisheries (MOF)
	Mr Sione Mailau	FAD technician	MOF
	Mr Viliami Fatongiatau	??	MOF
Tuvalu	Mr Mike Batty	Fisheries Adviser to the TFD.	Tuvalu Fisheries Department (TFD), Ministry of Fisheries and Trade (MFT).
	Mr Nelly Seniola	FAD Technician and Training Officer	TFD of MFT
	Mr Viliamu Petaia	Fisheries Training and Development Officer	TFD, MFT
SPC Staff	Mr Ian Bertram	Principal Fisheries Adviser (Management and Livelihoods)	Division of Fisheries, Aquaculture and Marine Ecosystems (FAME), SPC
	Mr William Sokimi	Fisheries Development Officer (Fishing Technology)	FAME, SPC
	Mr Ludwig Kumoru	Technical focal point at SPC for the GCF fisheries proposal.	FAME, SPC
	Mr Phil Bright	Manager, Statistics Infrastructure and dissemination	Division of Statistics for Development, SPC

	Dr Andrew Smith	Deputy Director FAME (Coastal Fisheries and Aquaculture).	FAME, SPC
	Mr Franck Magron	Coastal Fisheries Information and Database Manager	FAME, SPC
	Dr Simon Nicol	Principal Fisheries Scientist (Fisheries and Ecosystems Monitoring and Analysis	FAME, SPC
	Mr Lui Bell	Fisheries Technician with SPC	SPC, FAME and based with MAF in Samoa
	Mr Andrew Wright	SPC staff to support writing the GCF funding proposal	SPC FAME
	Ms Mia Rimon	Regional Director - Melanesia.	SPC Melanesia Regional Office in Vanautu.
Conservation international staff	Dr Johann Bell	Senior Director Tuna Fisheries	Conservation International
	Ms Kara Miller	Technical Adviser, Pacific Tuna	Conservation International, Centre for oceans
Others that have been consulted	Mr Robert Jimmy	Deputy Chief of Party/Senior Regional Fisheries Adviser	USAID funded OurFish OurFuture project
	Mr Garry Preston	Fisheries consultant based in Vanuatu	Gillett, Preston and Associates (GPA)

D. Matrix for assessing progress towards a sustainable national aFAD Programme by region and country.

Matrix for assessing progress towards a sustainable national aFAD Programme.	Melanesia				Micronesia					Polynesia				
	FJ	PG	SB	VU	FM	KI	MH	NR	PW	CK	NU	WS	TO	TV
1. Capacity														
1.a Country-based experts are available to manage the aFAD Programme including the rigging and deployment of aFADs.	40	50	55	100	55	85	50	60	90	70	75	60	60	80
1.b The national fisheries agency owns or has easy access to the infrastructure and equipment required to deploy aFADs (e.g. suitable boat with echo-sounder and GPS).	60	90	50	80	43	60	60	75	55	80	75	20	60	100
1.c Depending on the size of the country, one or more recurrent positions at the national fisheries agency are fully or partly dedicated to aFAD work and this is reflected in job descriptions.	60	50	45	100	28	100	70	75	85	75	75	100	50	75
1.d A succession training plan is in place to ensure that the country does not lose its aFAD technical capacity when the existing aFAD experts move out or retire.	35	40	50	90	39	80	40	60	35	50	75	60	50	80
2. Management														
2.a Political stakeholders understand the contribution of nearshore aFADs to food security and livelihoods.	100	30	100	100	43	100	99	90	80	100	100	80	100	50
2.b The national fisheries agency has strategic plans or policies that mention nearshore aFADs and the aFAD Programme.	100	80	80	90	35	100	95	80	100	70	100	80	100	100
2.c A registry is used to record aFAD deployments and keep track of lost aFADs that need to be replaced.	60	60	65	100	53	45	80	80	90	75	100	100	100	75
2.d Legislation and regulations are in place and enforced to support the national aFAD Programme and to clarify the roles and responsibilities of aFAD users.	35	50	60	100	39	55	35	25	50	50	100	80	50	75

2.e The national fisheries agency has a nearshore aFAD Management Plan or policy to guide its aFAD work.	75	50	75	90		15	70	50	65	70		70	45	60	50	85
2.f A monitoring framework is in place that captures fishers' use of aFADs and/or catches at representative sites.	25	30	30	90		20	40	45	75	50		80	65	100	30	50
3. End-user engagement																
3.a Partnerships are developed with end-users (e.g., communities, fishers' associations, sports fishing charters, recreational fishers) for the ownership, co-management and potential cost-sharing of aFADs.	60	20	70	90		61	40	75	100	75		80	100	100	40	75
3.b An effective feedback mechanism exists between the national fisheries agency and aFAD end users.	55	50	45	90		40	85	50	65	70		80	100	100	70	80
3.c FAD awareness-raising and training in sustainable FAD fishing methods and safe aFAD fishing methods are undertaken in communities that are newly exposed to aFADs.	80	50	55	100		61	90	70	85	70		70	65	100	60	80
3.d Conflict resolution protocols are in place and effective.	25	30	55	100		43	40	49	85	40		20	45	80	80	95
4. Funding																
4.a The government agency provides the national fisheries agency with a recurrent annual budget for the implementation of its FAD Programme.	75	90	70	85		35	80	80	65	30		60	60	30	65	50
4.b Donors and/or the government agency provide occasional funding for FAD projects.	80	40	70	60		40	80	75	60	70		100	75	70	100	80
4.c Partnerships with end users are in place, which include aFAD cost-sharing.	70	20	80	60		23	30	60	0	40		50	75	10	35	0

E. Matrix for assessing the status of national sea safety requirements for small craft (<12m length) by region and country.

Matrix for assessing the status of national sea safety requirements for small craft (>12m length)	Melanesia				Micronesia					Polynesia				
	FJ	PG	SB	VU	FM	KI	MH	NR	PW	CK	NU	WS	TO	TV
5. Sea Safety Requirements														
5.a Country has regulations in place covering qualifications for small craft (3-8m in length) operators.	100	80	45	100	34	65	100	N/A	100	60	100	80	50	0
5.b Country has regulations on sea safety equipment that needs to be carried when small craft are heading to sea.	100	50	45	60	35	65	100	30	100	60	100	100	50	0
5.c Country has suitable training facility and trainers to provide training in qualifications and sea safety equipment use by small-scale fishers.	100	85	100	100	39	65	97	20	30	40	60	80	30	90
5.d Required sea safety equipment is available for purchase locally from public or private sector companies.	100	40	70	100	43	65	60	25	75	65	75	20	30	75
5.e Country has suitable facilities and skilled personnel for maintaining all sea safety equipment or has arrangements in place to have this done offshore.	100	50	80	80	29	45	30	20	65	40	60	20	10	50
5.f Country has required small craft minimum specifications for design and construction to ensure seaworthiness.	100	50	50	90	5	75	70	25	40	20	N/A	100	10	0
5.g Good working relationship and proper information exchange protocols exists between fisheries and maritime authorities around sea safety.	100	50	70	90	53	60	95	50	70	90	100	100	80	50
5.h Fisheries provide coordinates for anchored aFADs to Maritime for updating navigation charts for merchant vessels.	100	40	60	100	38	60	100	100	100	100	100	100	80	50
5.i Country has aFADs marked for easy location day (flagpole with flag) or night (light and radar reflector).	50	50	50	90	61	45	50	70	30	70	60	50	60	50

5.j Country has search and rescue vessels and plan in place when a small-scale vessel is reported missing.	100	70	60	100		56	90	100	60	100		70	90	100	100	100
6. Sea Safety for Fishers																
6.a Fisheries agency uses and promotes the SPC sea safety checklist, or some form of checklist, and has this in local language for small-scale fishers.	80	40	80	100		41	90	100	90	85		60	100	60	80	80
6.b Fisheries agency encourages fishers to have a second smaller outboard for safety reasons.	80	35	55	90		40	80	90	20	80		30	100	100	40	25
6.c Fisheries agency encourages small-scale fishers to carry paddles and/or sail rig when fishing outside the reef.	100	50	45	100		49	100	80	50	80		75	100	20	40	35

Melanesia

F. The aFAD Programme profile and proposed assistance: Fiji

G. The aFAD Programme profile and proposed assistance: Papua New Guinea

H. The aFAD Programme profile and proposed assistance: Solomon Islands

I. The aFAD Programme profile and proposed assistance: Vanuatu

Micronesia

J. The aFAD Programme profile and proposed assistance: Federated States of Micronesia

K. The aFAD Programme profile and proposed assistance: Kiribati

L. The aFAD Programme profile and proposed assistance: Marshall Islands

M. The aFAD Programme profile and proposed assistance: Nauru

N. The aFAD Programme profile and proposed assistance: Palau

Polynesia

O. The aFAD Programme profile and proposed assistance: Cook Islands

P. The aFAD Programme profile and proposed assistance: Niue

Q. The aFAD Programme profile and proposed assistance: Samoa

R. The aFAD Programme profile and proposed assistance: Tonga

S. The aFAD Programme profile and proposed assistance: Tuvalu

T. Method for measuring the contribution of strengthened national aFAD Programmes to domestic food security

The effectiveness of strengthening aFAD Programmes to increase access to tuna to improve domestic food security will be estimated in each country by: a) measuring the average annual catch of tuna and other pelagic fish from a range of aFADs, and b) combining this information with the number of additional aFADs installed in the country to calculate the total amount of additional tuna produced from the aFADs deployed by the Programme.

This increased tuna catch from the aFADs deployed by the Programme will then be converted into the number of fish meals provided by these aFADs. For the reasons explained below, the number of fish meals can be based on portions of 150 g and the typical ~60% recovery of fish flesh per kg from tuna and other large pelagic fish.

A fish meal of 150 g, although smaller than the fish meals eaten in many Pacific Island countries, is of important nutritional value for the following reason. The World Health Organisation (WHO) recommends that daily protein intake for good nutrition should be 0.7 g of protein per kg of body weight per day, derived from a variety of sources to prevent micronutrient deficiencies. Accordingly, the SPC Public Health Division has recommended that fish should be used to provide 50% of this dietary protein[44]. A tuna meal of 150 g will provide more than the recommended level of fish consumption per day for the average Pacific Island man and woman, and will meet the needs of two average Pacific Island children per day. These calculations are based on the average weights of Pacific Island men (85 kg), women (81 kg) and children of 5-18 years (45 kg) (Appendix 1), and the fact that tuna is ~23% protein (see Technical Study 2). Thus, a 150 g portion of tuna will provide ~35 g of protein, which is $\geq$50% of the protein intake recommended by WHO for someone with a body weight of up to 100 kg, and >50% of the dietary protein needed for two children of 45 kg.

A weakness in this approach, however, is that data on the average annual catches per aFAD are limited – they were collected irregularly 10¬20 years ago and are available for only five of the 14 countries[45]. This weakness can be overcome by a) monitoring catches around a representative subset (n = 3) of aFADs in each country over an ~2-year period as early as practical during Phase 1 of the aFAD Management Plan; and b) hindcasting the estimate of average annual catch (taking account of any other factors that may have influenced the use of tuna associated with aFADs) to create the baseline against which to measure the additional quantity of fish meals of 150 g made available per person resulting from the increased number of aFADs deployed under strengthened national FAD programmes.

To understand the general scope for increasing the quantity of fish meals available for local food security in each country through strengthening the national aFAD Programme, estimated catches from an aFAD in the range of 5¬10 tonnes per year have been used. This range is based on a more recent, albeit limited,

[44] SPC (2008). Fish and food security. Policy Brief 1/2008. Secretariat of the Pacific Community, Noumea.

[45] Bell, J.D., Albert, J., Andréfouët, S., Andrew, N.L., Blanc, M., Bright, P., Brogan, D., Campbell, B., Govan, H., Hampton, J. and Hanich, Q. 2015. Optimising the use of nearshore fish aggregating devices for food security in the Pacific Islands. *Marine Policy*, *56*, pp.98-105 (see Supplementary Table 3).

amount of unpublished data available from some SPC member countries and is somewhat higher than the range from the older data mentioned above. Use of the higher range of catches is thought to be appropriate because of the greater number of people now living (and fishing) in coastal areas and the efforts that have been made to disseminate information on effective aFAD-fishing methods. Even so, considerable variation is expected in annual catches from an aFAD both within and among countries. For example, 'inshore' aFADs placed relatively close to the coast (at a depth of 200 – 500 m) to provide access to tuna and other large pelagic fish for fishers in paddling canoes are not expected to be as productive as 'offshore' aFADs placed several km out to sea (at depths ranging from 800 – 2500 m) used by fishers who have motor boats. In countries where it is evident that there will be large differences in potential catches between inshore and offshore aFADs, it will be necessary to monitor catches from three representative aFADs from each type of location.

Based on the use of average annual catches from aFADs in this range, and the number of aFADs to be deployed in each country during the 7-year programme, strengthening national aFAD Programmes could deliver up to an additional 13 million fish meals across the region per year by 2030 (Table 1).

Importantly, for five of the smaller Pacific Island countries (Cook Islands, Nauru, Niue, Palau and Tuvalu), strengthening the national aFAD Programme could deliver up to 3¬8 additional fish meals per person per month (and 6¬16 meals for children) for the entire population or a target population that represents a significant proportion of the total population (Table 1) (and a much higher number of meals per month for Niue given the low number of people living there).

For the larger countries (PNG, Fiji, Solomon Islands and Vanuatu), Component A of the GCF regional tuna programme needs to be managed at the provincial level because it is simply not possible to scale-up the number of aFADs throughout all areas of the country to meet the needs of coastal communities nationwide. Given the relatively large population at the provincial level in these Melanesian countries, strengthening national aFAD Programmes is estimated to provide an average of only up to 1¬2 tuna meals per person per month for the target populations in these countries (Table 1). This is also the case for the remaining countries (FSM, Kiribati, Marshall Islands, Samoa and Tonga), where it is not possible to target the majority of the national population in some cases.

There are, however, good prospects for increasing the number of fish meals per person per month in several countries by harmonising the proposed aFAD-related activities in the GCF Programme with the plans that the World Bank's Pacific Islands Regional Oceanscape Program (PROP) also has to strengthen national aFAD Programmes. The second phase of PROP (known as PROPER) is now underway and involves many of the 14 countries participating in the GCF Programme. PROPER is expected to be active throughout much of the implementation phase of the GCF Programme and preliminary talks with the World Bank PROPER team on a collaborative approach have been promising. A collaboration between the two programmes to promote synergies and avoid duplication will enable more provinces in the larger countries to receive aFADs, and the number of aFADs for some provinces proposed under the GCF Programme to be increased where this is a national priority.

Table 1. Preliminary analysis of the number of fish meals per person provided in 2030 by strengthening national FAD programmes (assuming that annual catches from a FAD are in the range of 5 to 10 tonnes).

Country	No. of people expected to benefit in 2030	No. of FADs	No. of fish meals year^{-1}*		No. fish meals person^{-1} year^{-1}		No. fish meals person^{-1} month^{-1}	
			@5 mt per FAD year^{-1}	@10 mt per FAD year^{-1}	@5 mt per FAD year^{-1}	@10 mt per FAD year^{-1}	@5 mt per FAD year^{-1}	@10 mt per FAD year^{-1}
Melanesia								
Fiji	72,483[a]	40	800,000	1,600,000	11.0	22.1	0.9	1.8
PNG	91,834[b]	36	720,000	1,440,000	7.8	15.7	0.7	1.3
Solomon Is	62,752[c]	20	400,000	800,000	6.4	12.7	0.5	1.1
Vanuatu	66,850 [d]	34	680,000	1,360,000	10.2	20.3	0.8	1.7
Micronesia								
FSM	38,588[e]	24	480,000	960,000	12.4	24.9	1.0	2.1
Kiribati	81,778[f]	38	760,000	1,520,000	9.3	18.6	0.8	1.5
Marshall Is	26,993[g]	27	540,000	1,080,000	20.0	40.0	1.7	3.3
Nauru	12,539[h]	12	240,000	480,000	19.1	38.3	1.6	3.2
Palau	8,815[i]	16	320,000	640,000	36.3	72.6	3.0	6.1
Polynesia								
Cook Is	8,792[j]	20	400,000	800,000	45.5	91.0	3.8	7.6
Niue	1,393[k]	14	280,000	560,000	201.0	402.0	16.8	33.5
Samoa	41,874[l]	18	360,000	720,000	8.6	17.2	0.7	1.4
Tonga	32,950[m]	20	400,000	800,000	12.1	24.3	1.0	2.0
Tuvalu	11,250[n]	14	280,000	560,000	24.9	49.8	2.1	4.1
TOTAL	**558,890**	**333**	**6,660,000**	**13,320,000**	**11.9**	**23.8**	**1.0**	**2.0**

*Based on four fish meals of 150 g per kg of fish, based on a recovery rate of fish flesh of ~60%.

a. 30% of the population in Rewa, Serua and Namosi districts and 80% of the population in Kadavu, Lau and Lomaiviti districts; b. 20% of the population of Manua and Bougainville provinces; c. 90% of the population of the Temotu Province and 20% of the population of Guadalcanal Province; d. 50% the population of Shefa and Tafea provinces and 20% of the population of Port Vila; e. 80% of the population in Pohnpei State and 80% of the population in Yap State; f. 40% of the population of South Tarawa and all of the population in the other 16 inhabited Gilbert Islands Group islands; g. 50% of the population of the Marshall Islands; h. 100% of the population of Nauru; i. 50% of the population for 14 States; j. 50% of the population of Rarotonga and the full population of the other five inhabited islands in southern Cook Islands; k. 100% of the population of Niue; l. 20% of the population for Samoa; m. 40% of the population for Tongatapu, Eua and Ha'apai; n. 100% of the population for Tuvalu.

Appendix 1. Mean height, body mass index (BMI) and weight of men, women and children in the 14 participating countries (source Technical Study 2).

Country	Men			Women			Children (5-18 yrs) average		
	2019 Height (cm)	2016 BMI	Weight (kg)	2019 Height (cm)	2016 BMI	Weight (kg)	2019 Height (cm)	2016 BMI	Weight (kg)
Cook Is	178	33	104	167	33	93	150	24	53
Fiji	174	27	81	164	29	78	146	19	41
Kiribati	170	29	84	161	31	81	144	22	45
Marshall Is	165	29	79	155	31	73	139	21	41
FSM	170	28	81	160	32	80	142	21	42
Nauru	170	32	93	158	33	82	142	24	47
Niue	177	32	99	167	34	93	149	24	52
Palau	171	30	86	160	30	76	144	23	47
PNG	163	25	68	157	26	64	139	21	40
Samoa	174	31	93	164	34	92	143	22	45
Solomon Is	163	26	69	157	27	67	138	19	36
Tonga	175	31	94	166	34	94	148	23	50
Tuvalu	171	30	89	164	32	85	146	23	48
Vanuatu	168	26	73	160	27	69	142	20	40
Average	**171**	**29**	**85**	**161**	**31**	**81**	**144**	**22**	**45**