Disaster Risk Reduction in Fisheries in the Pacific Islands

Study 4 – Review of the capacity of national administrations to manage the risks posed by natural disasters to small-scale fishers.

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Acronyms

DRM	Disaster risk management
DRR	Disaster risk reduction
EWS	Early Warning Systems
FADs	Fish Aggregating Devices
FAO	Food and Agriculture Organization of the United Nations
FRDP	Framework for Resilient Development in the Pacific
ICSF	International Collective in Support of Fishworkers
NHMSs	National Hydrological and Meteorological Services
PDNA	Post disaster needs assessments
PIMS	Pacific Islands Meteorology Strategy
rPFSC	Regional Pacific Food Security Cluster
SIDS	Small Island Developing States
SPC	The Pacific Community
UNDRR	United Nations Office for Disaster Risk Reduction
WMO	World Meteorological Organization

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Executive Summary

As climate change continues to impact the Pacific Islands and their fisheries in a myriad of ways, building adaptation strategies and improving reliance within the fisheries sector and coastal communities is essential. Natural hazards such as extreme weather events already have a large impact on the Pacific with 41% of all declared disasters over the last decade in the region being meteorological. However, the fisheries sector is often not adequately considered or integrated into disaster risk management. Small-scale fisheries and associated communities are on the frontline of metrological events and resulting declared disasters leaving communities and the essential food and nutrient source of coastal fisheries in peril. Improved integration and fisheries specific plans for disaster risk reduction as well as anticipatory actions can reduce, or even mitigate the impact of natural hazards.

This study was conducted through desk-based research, a national survey of fisheries administrations and National Disaster Management Offices (using a google survey) and a fisher survey (using KoboToolbox) administered by Neelam Bhan, Viliami Fatongiatau, Nimilote Halatoafa, Georgina Kaising, Janet Saeni-Oeta, Maria Sapatu, Laitailiu Seono and Tooreka Temari. The latter inputs are summarized in this report and were used to design the proposed activities for the GCF project, “Adapting tuna-dependent Pacific Island communities and economies to climate change,” on the topic of disaster risk manage the risks posed by natural disasters to small-scale fishers.

1. Introduction

1.1. Disaster risk reduction and fisheries

Throughout the tropical Pacific, coastal aquatic systems deliver many of the benefits from fisheries that directly affect coastal communities, such as food security, nutrition and family income. Yet, according to a study from the Food and Agriculture Organization of the United Nations (Barange et al. 2018), Pacific Island countries will be among the most affected by climate change impacts on fisheries and aquaculture. Climate change impacts are not only expected to affect fish reproduction, replenishment and distribution, they are also linked to changes in global weather patterns, sea levels, and the frequency, intensity, geographic distribution and timing of extreme events. The World Meteorological Organization reported that from 1970 to 2019, weather, climate and water hazards accounted for 50% of all disasters, 45% of all reported deaths and 74% of all reported economic losses worldwide (WMO 2021).

The fisheries and aquaculture sector has a particularly high exposure to weather-related hazards and faces substantial threats from extreme events, which can lead to short- and long-term displacement of human populations, safety and health hazards caused by flooding, as well as severe loss and damage to infrastructure, such as wharves, markets, access roads, and fishing boats and gear.

Although the impacts of climate change may originate as an external shock, the interplay of vulnerability, exposure and the severity of a natural hazard combine to create disasters. Reducing disaster risk is critical to alleviating poverty, meeting sustainable development goals and improving resilience, particularly in exposed and vulnerable countries such as many Pacific small island developing states (SIDs). In the latest risk assessment profile from IFHV and Bündnis Entwicklung Hilft (2023), Melanesian countries score high on vulnerability and exposure to disaster risk, with Papua New Guinea and Solomon Islands rating as the most vulnerable within the subregion. In addition, fisherfolk and their communities are often particularly exposed to natural hazards, a situation that is compounded by typically low incomes and few alternative livelihoods for small-scale fishing communities. Thus, integrating fisheries into disaster risk reduction is crucial for building resilience in the Pacific Islands.

Disaster risk reduction (DRR) guides policy and actions to reduce existing risk to natural hazards, such as flooding, drought and storms, as well as strengthen resilience. Whereas disaster risk management (DRM) refers to the entire process from reducing risk to response and recovery after a disaster has struck. These concepts are defined and brought to the forefront of policy through the internationally agreed Sendai Framework for Disaster Risk Reduction (2015 to 2030).

Unfortunately, the fisheries sector in many countries is not adequately integrated into DRR and DRM frameworks or strategies. To illustrate the disconnect, in a 2021 FAO study, out of 71 post disaster needs assessments (PDNA) reviewed, only a few mentioned the fisheries sector (FAO 2021). This lack of inclusion of the sector holds true for Pacific Islands nations as well, at both regional and national levels. For this reason, there is an urgent need to expand DRR and DRM systems for the fisheries and aquaculture sector in order to anticipate, prevent, prepare for, and reduce the impact of extreme events and disasters, as well as protect and build resilient fisheries-based livelihoods and support production systems.

1.2. The Pacific, fisheries and natural hazards

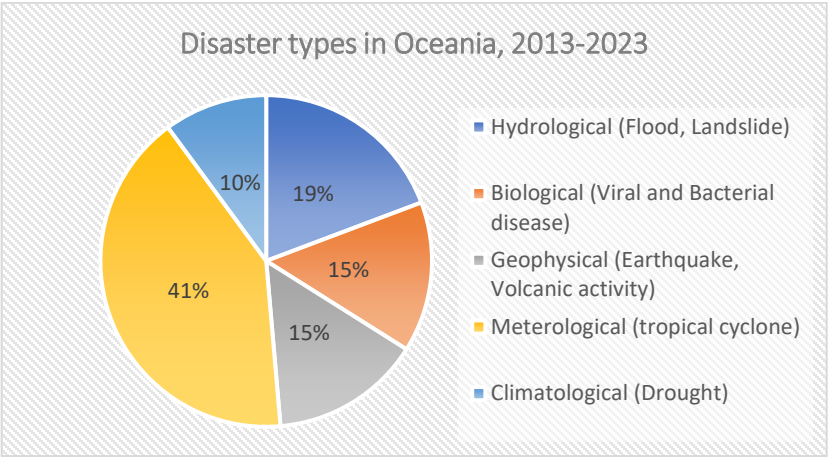
Globally, over the last three decades, there has been a rising trend in the occurrence of disasters and related economic damage. This is particularly noteworthy in relation to climatological events such as droughts, hydrological events like floods and meteorological events such as storms and cyclones.

Despite the paucity of attention to fisheries in the wake of disaster, the fisheries sector is in a unique position to assist in recovery to re-establish food security. Fisheries provide a high-quality, protein and nutrient-rich food source (see Technical Study 2) which is usually immediately accessible after a disaster, depending on the impact on fish habitats and fishing assets. This contrasts with agricultural consumables, which may take many months to replant, recover, and provide viable food and income sources. Relatively small inputs to small-scale fisheries may enable the sector to restart food production activities quickly, as described for small-scale fisheries targeting tuna in the Pacific Island region (Bell et al. 2018). Additionally, quickly re-starting these crucial fisheries activities after a disaster can help local communities generate cash and assist with restarting the local economy.

Despite this, FAO (2021) reports that the fisheries sector is often an absent or a newly adopted partner in many parts of the world. Sector-specific disaster risk reduction plans and strategies, as well as improved integration of fisheries, into overall disaster risk management is a missing piece of improving recovery options and resilience for affected communities.

The fisheries subsector is most affected by tsunamis and storms, such as hurricanes and cyclones, which is particularly evident in small island developing states, such as the Pacific SIDs, where a large percentage of declared disasters (41%) according to the Centre for Research on the Epidemiology of Disasters in the last decade have been meteorological, including storms and cyclones (Figure 1). Thus, the Pacific Island region stands to benefit substantially from the integration and consideration of the fisheries sector in disaster risk reduction and management.

Figure 1. Cumulative declared disasters in Oceania from 2013 to August 2023, excluding Australia and New Zealand. *Source: EM-DAT, CRED / UCLouvain, Brussels, Belgium. Accessed August 4, 2023.*



1.3. Terms of reference and methodology

This study is one of the series of Technical Studies commissioned to inform the development of the Funding Proposal for the GCF regional tuna programme (RTP)[1]. The main purpose of this study is to assess the capacity of national administrations to manage the risks posed by natural disasters to small-scale fishers and identify gaps to be filled. A complementary focus on accessibility and utilization of existing systems to support disaster risk reduction in fishing or coastal communities has been included.

To accomplish this, a desktop study was conducted as well as online surveys of national administrations and an in-person survey of fisherfolk. Results from a complementary study on early warning systems in the Pacific Islands completed by the International Collective in Support of Fishworkers (ICSF) has been drawn (Naidu et al. In preparation). The fisher-focused survey has informed the majority of the outputs and was designed to glean insights into the mechanisms and channels through which small-scale tuna fishers and their communities receive critical information regarding severe weather warnings and disaster recovery information. The survey was intended to provide a snapshot of the current situation at the local level, which served to inform the development of specific DRR and DRM activities in the RTP, rather than a comprehensive analysis.

The fisher survey was undertaken in the eight countries which responded to the request by a combination of fisheries staff and independent national consultants supported by national fisheries staff. These surveys were conducted at fish markets, fish landing sites, and dockside locations. Enumerators in each country sought out small-scale fishers who were likely to be engaged in fishing using nearshore, artisanal fish aggregating devices (aFADs) or targeting tuna and other large pelagic fish species (hereafter 'tuna'). The survey was administered using the KoboToolbox platform.

In total, 329 individuals were interviewed, comprising 89% male and 11% female participants. Most respondents had extensive fishing experience, with 62% having engaged in fishing for over a decade, and only 11% with less than five years of experience. Over half of the respondents were over 40 years old, 45% between 25 to 40 years old and only 2% were under 25 years old.

Table 1 – Total number of respondents to fisher survey by country

Country	Total	Male	Female
Tonga	71	62	9
Solomon Islands	75	73	2
Fiji	87	73	14
Samoa	24	19	5
Cook Islands	6	6	0
Kiribati	15	9	6
Vanuatu	35	35	0
Tuvalu	16	16	0

[1] https://www.greenclimate.fund/document/ppf-adapting-tuna-dependent-pacific-island-communities-and-economies-climate-change

2. Policy framework

The Pacific region has developed and implemented many relevant policies outlining strategies and frameworks from the disaster risk reduction, meteorology and fisheries perspective. All of the frameworks outlined below are supporting structures for disaster risk reduction in the fisheries sector, but do not provide explicit advice, steps or tools to inform how to forecast disasters, turn forecasts into products and communication materials to support timely and tailored preventive actions by small-scale fishers or train small-scale fishers in how to use the information from forecasts referred to in the terms of reference for this study (see Annex 5).

The frameworks listed below are important elements of national plans, providing guidance on disaster risk reduction, advancing early warning systems and improving meteorological information for small-scale fishers. In addition, these frameworks and associated agreements lay out commitments made by the Pacific SIDs including the 14 RTP participating countries at the regional level on reducing impacts of disasters and improving the lives and livelihoods of small-scale fishers.

Policies and Strategies	Related global frameworks
The Framework for Resilient Development in the Pacific (FRDP)	Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication
Pacific Islands Meteorology Strategy (PIMS)	T he Small Islands Developing States Accelerated Modalities of Action (S.A.M.O.A) Pathway
The Noumea strategy: A new song for coastal fisheries – pathways to change	United Nations Framework Convention on Climate Change (UNFCCC)
Asia-Pacific Action Plan 2021-2024 for the Implementation of the Sendai Framework	Sustainable Development Goals (SDGs)
2050 Strategy for the Blue Pacific Continent	Sendai Framework for Disaster Risk Reduction, 2015–2030

The Framework for Resilient Development in the Pacific (FRDP), 2017 – 2030

The Framework for Resilient Development in the Pacific (FRDP), 2017–2030[2] combines the two previous separate regional strategies on disaster risk reduction and climate change to combine expertise and reduce overlaps.[3] The FRDP provides high level guidance useful to the fisheries sector, but as a high-level document does not provide specific guidance on training or tools. It does set out strong policy basis for empowering communities, including fisheries communities to develop skills and access resources to be able to respond to disasters and climate change.

Pacific Islands Meteorology Strategy (PIMS), 2017-2026

The Pacific Islands Meteorology Strategy (PIMS), 2017-2026 outlines the aspirations of the national meteorological and hydrological services (NMHS) of the Pacific Islands. This strategy guides the national services and provides a framework for capacity development and resourcing. The strategy is updated every five years and supported by

[2] Framework for Resilient Development in the Pacific: An Integrated Approach to Address Climate Change and Disaster Risk Management (FRDP) 2017-2030. Voluntary Guidelines for the Pacific Islands Region

[3] The Pacific Islands Framework for Action on Climate Change (PIFACC) and the Pacific Disaster Risk Reduction and Disaster Management Framework for Action (RFA)

the Pacific Meteorological Council (PMC) and the Pacific Meteorology Desk Partnership (World Meteorological Organization (WMO) and the Secretariat for the Regional Environment Programme (SPREP).

Priority 1 is of particular relevance to the development of DRR activities needed to support the RTP because it includes the objective to achieve "Improved marine weather services and establishment of ocean services.'' The policy notes that although many "meteorological services are often well developed in the region, communication to communities and other user groups requires strengthening." In addition, Priority 2 highlights disaster risk reduction and notes "Strengthened National Hydrological and Meteorological Services capacity to implement Multi-Hazard early Warning Systems" as a priority.

While not directly relevant as a high-level policy to the capacity development or training for small-scale fisheries, the policy is crucial in bringing together NMHS' of the Pacific to work toward improved marine weather services, strengthening of early warning systems and a focus on inclusion and access for vulnerable groups for weather information. There is a disconnect from the fisheries sector which would benefit from collaborative discussions on practical improvements for marine weather services and more accessible weather information.

Asia-Pacific Action Plan 2021-2024 for the Implementation of the Sendai Framework

This Regional Action Plan meets the need for regional action plans and strategies under the Sendai Framework for Disaster Risk Reduction 2015-2030 and builds on the 2018-2020 Plan[4] for the region. The Plan notes that when the impact of disasters is viewed through the lens of the percentage of a population impacted, the Pacific Islands region has experienced some of the worst disasters. As examples, Cyclone Gita in 2018 affected 86% of Tonga's population and Cyclone Tino in 2020 which affected 50% of Tuvalu's population. This new Action Plan aims to accelerate the Asia-Pacific's transformation to risk-informed development, by treating DRR as a cross-cutting theme and by increasing investment in prevention, risk reduction, climate change adaptation and anticipatory approaches to enhance resilience.

At the national level, the Plan outlines the importance of mainstreaming DRR across sectors and strengthening linkages between NDMOs, metrological and relevant agencies, including agricultural (and fisheries) agencies, as well as advancing innovative low-cost technologies for DRR.

At the local level, the Plan calls for ensuring early warning and disaster impact information is available in formats that are understood by everyone in the community, as well as addressing misinformation.

2050 Strategy for the Blue Pacific Continent

Recognizing the deep connection of the Pacific Islands to the Pacific Ocean, a long-term strategy for resilience and opportunities to harness the power of the blue Pacific continent was developed with ten commitments and seven thematic areas.[5] This Strategy builds on the values as well as challenges that Pacific region may face with increasing impacts from climate change and seeks to bring resilience to the region through the shared stewardship of the "Blue Pacific Continent." It maps various pathways toward resilience, including regional cooperation and collaboration to build capacity and resilience of communities to address the impacts of climate change and

[4] The Action Plan 2018-2020 of the Asia Regional Plan for Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030

[5] 2050 Strategy for the Blue Pacific Continent. https://www.forumsec.org/2050strategy/

disasters. One of the thematic areas of the Strategy is "Climate Change and Disasters" which aims to ensure that "all Pacific peoples remain resilient to the impacts of climate change and disasters and are able to lead safe, secure, and prosperous lives."

This Strategy builds on several related regional strategies, including the Framework for Pacific Regionalism (2014), the Regional Roadmap for Sustainable Fisheries (2015) and The Blue Pacific Narrative (2017).

The Noumea strategy: A new song for coastal fisheries – pathways to change.

The *New Song for Coastal Fisheries – pathways to change: The Noumea strategy* was developed and approved by SPC Heads of Fisheries and the Forum Fisheries Committee in 2015. The Strategy recognizes the importance and value of coastal fisheries and provides a platform to measure, elevate and work toward actions to improve the small-scale fisheries in the region. Of relevance to disaster risk reduction are goals related to fisheries agencies working toward integrating and coordinating on small-scale fisheries management activities; ensuring coastal fisheries are included in development; cross sectoral advice is provided; and that there is equitable access to benefits and resources.

A Regional Roadmap for Sustainable Pacific Fisheries

In 2010, Pacific Islands Forum Leaders were presented with the outcomes of a forward-looking study on the Future of Fisheries, which identified very broad focal areas to achieve a best-case scenario for the region over the following 25 years. Five years later, in an effort to address missed opportunities, and the importance of coastal fisheries for food security and livelihoods, that are under threat from growing populations and, in the longer term, from the impacts of climate change, SPC and FFA also adopted a Regional Roadmap with broad aims to improve the management of coastal fisheries and provide alternative livelihoods and protein sources which can prevent a decline in fish supplies and further degradation of the coastal environment.

Key goals that are of specific importance to small-scale fisheries and disaster risk reduction include the below goals under both the Tuna Fisheries and Coastal Fisheries sections.[6] The relevant goal under the section on Tuna Fisheries is Goal 4 on Food Security which aims to increase the "supply of tuna for domestic consumption in the region by 40,000 tonnes per year by 2024". Increasing the amount of tuna available domestically will ensure a continuous supply of a crucial healthy and nutrient dense food source as well as reduce pressure on coastal fisheries. The Roadmap envisions that this goal could include the contribution of small-scale tuna fisheries.

The section on Coastal Fisheries includes a goal on Empowerment (Goal 1). The goal seeks to ensure that communities are involved and have a say in the management of coastal resources which facilities disaster risk reduction. Communities need access to information, knowledge and resources from fisheries agencies, disaster risk management offices and National Hydrological and Meteorological Services to protect their families, assets and businesses from the impacts of disasters. In addition, goal 2 which is focused on resilience is relevant to the topic of disaster risk reduction. Resilience of coastal ecosystems to threats from outside of the fisheries sector supports disaster risk management goals for the fisheries sector and coastal communities. Developing DRR and DRM systems to protect communities from the increasing impacts of climate change will include healthy coastal ecosystems that provide services and protection to communities from natural hazards.

[6] A Regional Roadmap for Sustainable Pacific Fisheries.
https://www.spc.int/DigitalLibrary/Doc/FAME/Brochures/FFA_SPC_2015_Roadmap.pdf

Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication

While global in nature, the SSF guidelines are a valuable reference as the main link between small-scale fisheries and disaster risk reduction and response. They specifically discuss policy elements of disasters and climate change and include the following as guiding principles.

- The importance of integrated and cross-sectoral collaboration to address disaster risks.
- Acknowledgment of the specific impacts that a disaster may have on the fisheries sector including the post-harvest and trade areas.
- At the national level, an understanding of how emergency response and preparedness address or include small-scale fisheries is essential.
- Emergency response should include a view toward long-term development and building resilience when working with the small-scale fisheries sector.

Table 2. Global policy and strategy linkages to regional frameworks on disaster risk reduction, meteorology and small-scale fisheries

	Global linkages				
Regional frameworks	**SAMOA Pathway**	**Sendai Framework**	**UNFCCC**	**SDGs**	**VG - SSF**
The Noumea strategy: A new song for coastal fisheries – pathways to change. 2015					
The Framework for Resilient Development in the Pacific (FRDP)					
Asia-Pacific Action Plan 2021-2024 for the Implementation of the Sendai Framework					
A Regional Roadmap for Sustainable Pacific Fisheries					
2050 Strategy for the Blue Pacific Continent					
ASEAN Framework on Anticipatory Action in DM					
Pacific Islands Meteorology Strategy (PIMS) 2017-2026					

3. Weather warnings and meteorological information in small-scale fisheries

3.1. Weather warnings and early warning systems

Accessing weather information and being informed in advance of severe weather is an important component of resilience and allows small-scale fishers to make appropriate decisions to reduce their exposure to dangerous sea conditions and protect their assets and themselves. Full, transparent and accessible weather warnings and information links to regional goals such as empowering communities (Noumea Strategy), ensuring that practical on-the-ground actions are embedded across all sectors (FRDP), and Priority 2 of the *Pacific Islands Meteorology Strategy (PIMS)* which highlights disaster risk reduction and notes that strengthened NHMSs capacity to implement multi-hazard early warning systems is an imperative.

The world of development and humanitarian aid is continually evolving to improve outcomes and increase responsiveness as well as work toward locally owned solutions to support resilient communities. One key aspect of reducing impacts and supporting particularly vulnerable populations is the use of early warning systems (EWS). Such systems save lives by allowing people to act before a natural hazard becomes a disaster. EWS have such

importance in the global dialogue that the UN Secretary-General launched, in March 2022, the Early Warnings for All initiative which called for every person on Earth to be protected by early warning systems by 2027.[7]

The four main components of an early warning system as identified by the Sendai Framework (chapter G) include; (i) Disaster risk knowledge, (ii) Observations, monitoring and forecasting systems, (iii) Warning dissemination mechanisms, and (iv) Preparedness and response capability. A recent report on the global status of early warning systems notes the importance of such systems in saving lives but also the paucity of functional EWS in many SIDS (UNDRR and WMO 2022).[8] This is also true in the Pacific Island region where governments, and regional and international agencies, have placed importance on EWS but often struggle to achieve long-term functional, effective EWS systems. Important initiatives, such as the policy frameworks outlined above and regional funding initiatives such as Strengthening Hydro-Meteorological and Early Warning Services in the Pacific (CREWS Pacific SIDS 2.0; WMO) and the Community Based Early Warning Systems (World Bank, WMO and UNDRR), have moved EWS forward. However, most countries do not yet have fully functional, timely, accurate and accessible EWS (see Annex 1).

Another crucial component to reducing impacts on vulnerable populations lies in the recent work to develop anticipatory actions. This can comprise actions to reduce impacts to both slow-onset or quick-onset disasters, such as cyclones, and can include concepts such as cash advances to assist communities in protecting assets or infrastructure. A number of pilot activities involving anticipatory actions for fishing or coastal communities within Pacific Island countries are underway.[9]

Both effective and accessible early warning systems, and clearly communicated effective anticipatory actions, will be a tremendous improvement for the small-scale fisheries sector in preparing for and responding to natural disasters. This can be seen in the comments from fisheries personnel from the various countries who responded to the survey requesting timely and accurate early warnings as well as options for useful and cost-effective anticipatory actions.

Information voluntarily reported by governments on the targets of the Sendai Frameworks show that progress is being made (Table 3).

[7] WMO and the Early Warnings for All Initiative. https://wmo.int/site/wmo-and-early-warnings-all-initiative

[8] UNDRR and WMO (2022) "Global status of multi-hazard early warning systems: Target G", United Nations Office for Disaster Risk Reduction

[9] Current pilot activities include anticipatory action pathways for coastal communities in Fiji including assistance to act to protect assets through early warning systems. The works is being undertaken by the Anticipatory Action group in the FAO Asia Pacific Office (RAP). Further information on FAO work in the Pacific on Anticipatory Action can be found here: Davila, F. Jones, C. Jenkinson, K. Talakai, M. 2022. Pathways towards anticipatory action in Pacific Island Countries: Phase One Summary – Regional Analysis. Food and Agriculture Organization of the United Nations and University of Technology Sydney. Bangkok/Sydney.

Table 3. Data reported against Target G-3 - Number of people per 100,000 that are covered by early warning information through local governments or through national dissemination mechanisms.[10]

	Vanuatu	Fiji	Sol Is	Marshall Is	Samoa	PNG	Kiribati	Palau	Nauru	Tuvalu	FSM	Tonga
2022	-	0.8	-	1	.35*	-		-	0.98	-	-	-
2021	0.7	0.8					1	0.8	0.66	0.45	0.48	
2020	0.88	0.8	0.5	0.8			0.7		0.66	0.45	0.47	
2019		0.7	0.5	0.8								

* It is mostly urban areas that has warning systems in place and have access to the internet, including Upolu (Fagalii to Vaitele, Vailima, Magiagi & Aleisa) and Savaii (Salelologa & Faasaleleaga 1-5) urban areas. The other two islands of Apolima and Manono Tai have poor coverage of internet with no warning system in place and therefore, heavily rely on information from main island of Upolu.

** The Cook Islands and Niue were not included in the database.

Despite the progress reported in global monitoring frameworks, country-level interviews and on-the-ground validation show that the systems do not necessarily reach or serve coastal communities and small-scale fishers as many fishers and members of coastal communities report not receiving or have access to warnings. In some cases, fishers may not be aware of, or have access to, early warning systems and in other situations they do have access but do not consider the weather warnings provided to be frequent, timely or reliable.

Voices of Pacific fishers

"Weather warnings reporting timing is always late. Bad weather comes first and weather warnings came later." Fisher from Malaita, Solomon Islands

"We need more awareness on preparation for natural disasters as not always we are able to get weather updates. For instance, if there is a cyclone, we get power cut and reception is also down so we are unaware of the track of cyclone." Fisher from Macuata Province, Fiji

The overview of early warning systems in the Pacific Islands in Annex 1 undertaken in 2022 provides a snapshot of significant improvements in recent years and identifies accessible current opportunities to improve existing systems and reach for early warnings. However, it is clear that much remains to be done to ensure that robust early warning systems provide timely, actionable information to fishers and coastal communities. Outer islands and remote communities, in particular, often have little or no access to such information and are extremely vulnerable to the impacts of natural hazards.

[10] *Source*: https://sendaimonitor.undrr.org/analytics/country-global-target/18/8?indicator=35&countries=9

3.2. Small-scale fishers – availability, access and timeliness of weather information and warnings

The majority of fishers consulted during this Study advised that they do check the weather forecast before heading to sea, largely on the local radio but also with many fishers checking various mobile applications (Table 4). The proliferation of cell phones and access to mobile data is rapidly changing the options for warning systems and improving safety-at-sea even in remote areas. However, despite a large number of respondents advising that they utilize a mobile phone for weather information, many identified the need to improve cell phone reception to improve warning systems. In addition, many fishers identified SMS emergency warnings as an area requiring improvement in relation to awareness, access and accuracy of updates where such a system already exists.

Table 4. Response to the question: Where do fishers check the weather before leaving for a fishing trip? Percentages based on total number of respondents to the fisher survey by country.
Source: Fisher survey

	Tonga	Solomon Islands	Fiji	Samoa	Kiribati	Cook Islands	Vanuatu	Tuvalu
Radio (local station)	97%	48%	87%	54%	60%	33%	97%	75%
Marine radio / VHF	15%	41%	1%	0%	7%	0%	3%	6%
Smart phone	13%	39%	80%	46%	33%	67%	97%	31%
Internet	11%	33%	8%	33%	0%	33%	6%	31%
Check with community or family member	6%	33%	71%	4%	20%	0%	89%	100%
N/A don't check in advance	1%	0%	0%	0%	20%	17%	3%	0%
Other	0%	0%	41%	17%	0%	17%	3%	0%

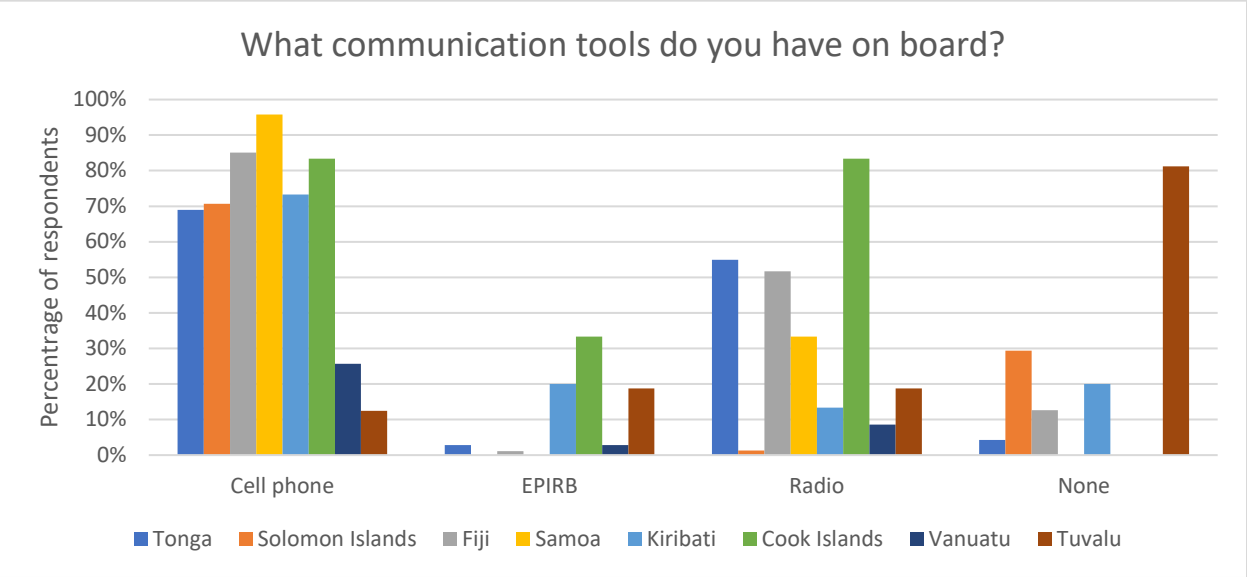
However, once fishers go to sea their communication channels and avenues for warning systems change drastically. Most appear to take their cell phones to sea with them and while reception varies by country and island, many use their cell phones to call family when close enough to shore to check in and receive weather updates (Figure 2). Overall, an average of 56% of respondents reported having some kind of mechanism to check weather while at sea with the notable exceptions of Solomon Islands and Kiribati, where fishers largely did not have any access to weather information while at sea (Table 5). The Cook Islands respondents reported having no weather access at sea but did carry emergency communication devices onboard their vessels.

Table 5. Response to the question: Do fisherfolk receive weather information and warnings while at sea? Percentages based on total number of respondents to the fisher survey by country.
Source: Fisher survey

Do you receive weather while at sea	Tonga	Solomon Islands	Fiji	Samoa	Kiribati	Cooks	Vanuatu	Tuvalu
Yes	58%	24%	78%	88%	27%	0%	83%	31%
No	42%	76%	22%	13%	73%	50%	17%	69%

Figure 2. Small-scale fisher communication tools carried onboard fishing vessels by country. Percentages based on total number of respondents to the fisher survey by country.

Source: Fisher survey



Now that cell phones are the primary tool used to check weather before going to sea as well as carried onboard fishing vessels, a deeper dive into the websites and mobile applications was warranted. Fishers in some countries are using real-time weather applications such as Windy TY in Fiji, whereas others are frequent users of national MET Facebook pages, including in Vanuatu, Samoa, Fiji and Tonga. Fishers in Solomon Islands were unusual in that they use cell phones to communicate with family, friends and other fishers to access weather information (Table 6).

Table 6. Response to the question: Which mobile app, internet site or phone function do you use for weather information? Percentages based on total number of respondents to the fisher survey by country. The total percentage is the overall percentage of respondents using this site / tool from all countries.

Source: Fisher survey

	Tonga	Solomon Islands	Fiji	Samoa	Kiribati	Cook Islands	Vanuatu	Tuvalu	Total
Windy	6%	0%	75%	0%	13%	17%	0%	25%	20.1%
Nadraki		0%	10%	0%	0%	0%	0%	0%	2.4%
local Met service	24%	0%	0%	0%	7%	0%	0%	81%	1.5%
Facebook (local MET office)	41%	4%	53%	58%	0%	0%	43%	0%	26.4%
Use phone to call and ask about weather	0%	33%	0%	0%	0%	0%	0%	0%	65.5%
Use SMS for weather update	0%	6%	0%	0%	0%	0%	3%	0%	1.2%
Local news site	0%	0%	8%	0%	0%	0%	0%	0%	1,8%
Google weather	0%	0%	8%	5%	13%	17%	51%	0%	8.5%
Weather radar	0%	0%	9%	0%	0%	0%	0%	0%	2.1%
Flowx	0%	0%	0%	0%	0%	17%	0%	0%	0.3%

Windfinder	0%	0%	0%	0%	0%	17%	0%	0%	0.3%
Wind Guru	0%	0%	0%	0%	0%	17%	0%	0%	0.3%
Fiji MET service	0%	0%	0%	0%	0%	17%	0%	0%	0.3%

3.3. Small-scale fishers' perception of weather warning quality and recommendations

Many fishers in the countries surveyed do feel that they receive advance warnings of adverse weather conditions (Table 7). In Tonga, Solomon Islands, Samoa and Cook Islands fishers also felt the weather forecasts received were very reliable. However, it is clear from the individual recommendations from fishers that there is a disconnect between the reported frequency and reliability of weather information received and the recommendations for early warnings (which seem to not be in place for many respondents based on recommendations).

Table 7. Do fisherfolk receive advance warnings about extreme weather events (adverse weather conditions), e.g. cyclones, king tides, storms, etc. Percentages based on total number of respondents to the fisher survey by country.
Source: Fisher survey

	Tonga	Solomon Islands	Fiji	Samoa	Kiribati	Cook Islands	Vanuatu	Tuvalu
Yes	99%	64%	94%	71%	53%	83%	94%	50%
Occasionally	0%	31%	6%	29%	33%	0%	6%	50%
No	0%	5%	0%	0%	13%	17%	0%	0%

Table 8. Reporting on reliability of weather forecasts by fisherfolk. Percentages based on total number of respondents to the fisher survey by country.
Source: Fisher survey

	Tonga	Solomon Islands	Fiji	Samoa	Kiribati	Cook Islands	Vanuatu	Tuvalu
Very reliable	83%	79%	8%	67%	40%	67%	23%	25%
Somewhat reliable	17%	20%	90%	29%	47%	17%	77%	75%
Not reliable	0%	0%	0%	4%	0%	0%	0%	0%
Other	1%	1%	2%	0%	13%	17%	0%	0%

Of the options presented to interviewees, a large number considered improvements, such as more local signage and better communication in more languages as priority needs (Figure 3). Country-by-country responses allow for a more comprehensive picture of recommendations, with Tonga and Cook Islands reporting that existing systems are largely functional. Solomon Islands, Fiji, Samoa, Kiribati, Vanuatu and Tuvalu had a number of recommended improvements, with many respondents detailing their suggestions under the ''other'' category (Figure 3).

Figure 3. Recommendations for improved weather warnings from small-scale fishers. Percentages based on total number of respondents to the fisher survey.
Source: Fisher survey

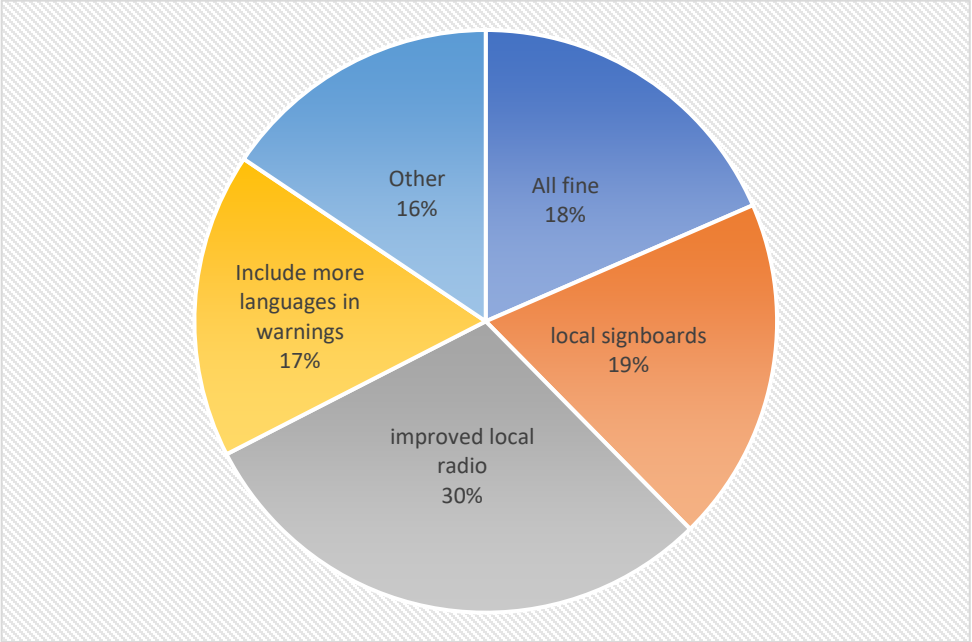


Table 9. Recommendations for improved weather warnings from fisherfolk. Percentages based on total number of respondents to the fisher survey by country.
Source: Fisher survey

	Tonga	Solomon Islands	Fiji	Samoa	Kiribati	Cook Islands	Vanuatu	Tuvalu
All fine	85%	32%	2%	54%	33%	83%	0%	0%
Local signboards	10%	7%	69%	8%	33%	0%	97%	0%
Improved local radio	6%	49%	94%	46%	40%	17%	100%	69%
Include more languages in warnings	8%	8%	61%	4%	53%	0%	74%	69%
Other	7%	59%	37%	17%	33%	33%	0%	100%

Fishers had many practical suggestions on how to improve access to weather information and early warnings (Table 9). The full list is included in Annex 2. Recommendations have been listed by country and grouped around the major topics raised including awareness, preparedness, or anticipatory actions; more frequent, accessible and accurate weather warnings; alternative communication options; and extension of radio or cell phone access.

Voices of Pacific Fishers

"We would like SMS text for early warning as everyone is now with a cell phone." Fisher in South Tarawa, Kiribati

"Use language that local fishers can understand, not words like longitude, latitudes, degrees etc." Fisher in Guadalcanal, Solomon Islands

Some of the suggestions raised by fishers are relatively easy improvements that can be done at the provincial level. These include displays of weather information in fish markets. More extensive changes relate to the need for improved access to cell phone networks in outer islands. In some cases, there is an inconsistency between the recommendations of fishers and early warning systems that are reported to be in place already. Thus, connecting fishers and fishing communities to national meteorological agencies and national disaster management organizations may serve to increase access to information from early warning systems, or weather information services, that are already in place. The fishers' suggestions and, where appropriate, existing programs can be included for discussion in the national workshops integrated into the priority activities in Section 6.

4. Mainstreaming the fisheries sector into disaster risk reduction

4.1. National disaster risk strategies and guidelines relevant to fisheries sector

Many countries have begun to update their disaster risk reduction and management strategies and plans with some now considering sector-specific roles and mainstreaming across the various agencies. Very few countries have fisheries-specific strategies or guidance for disaster risk management, with the notable exception of Tuvalu as well as Fiji, Solomon Islands and Vanuatu, which are in the process of preparing standard operating procedures for Disaster Preparedness, Response and Recovery in Fisheries. A few countries have made significant progress with training for the fisheries sector on disaster response and the sector is highlighted in national disaster response strategies, e.g., in Samoa and Tonga. However, there remains a significant gap for most countries, and opportunities for countries at various stages of progress in mainstreaming fisheries into national disaster strategies to share experiences, successes, and challenges (Table 10).

Table 10. Overview of DRM and DRR contexts in each country as well as specific integration of the fisheries sector.
Source: Compilation of survey data from national fisheries administrations, desk-based research and Naidu et al (*In Preparation*).

National Context			
Country	**Relevant Offices**	**DRR legislation / plans**	**Fisheries sector inclusive**
Cook Islands	Emergency Management Cook Islands (EMCI) Cook Islands Meteorological Service (CIMS)	National Disaster Risk Management Policy 2005 Emergency and Disaster Risk Management Plan 2019 Climate and Disaster Compatible Development Policy 2013-2016	Reported that fisheries inclusive strategy is in progress.
Federated States of Micronesia	National Disaster Committee FSM National Weather Service Office Pacific Region of the National Weather Service	National Disaster Response Plan 2016 Disaster Risk Management and Climate Change Policy (Yap, Kosrae 2015; Pohpei 2016; Chuuk 2017)	No specific strategy. The fisheries unit is included under the Livelihood working group under the National Disaster Management Response Structure
Fiji	National Disaster Management Office (NDMO)	National Disaster Management Act 1998	SOPs for Disaster Preparedness, Response and Recovery in Fisheries [Final

	Fiji Meteorological Services	Standard Operating Procedures (SOPs) for Disaster Preparedness and response for the Ministry of Fisheries and Forestry are under preparation (FAO CanAdapt Project)	version being approved by MOF November 2023]
Kiribati	Kiribati Meteorological Service National Disaster Management Office	Kiribati Climate Change Policy Kiribati Joint Implementation Plan for Climate Change and Disaster Risk 2019-2028 Kiribati Meteorological Service Strategic Plan	Fisheries is recognized as key sector for food security. No specific DRR/M role for fisheries sector.
Marshall Islands	Marshall Islands Weather Service Office National Disaster Management Office (NDMO) The National Disaster Committee (NDC)	The NDMO Strategic Plan 2020-2023 The Pacific Islands Meteorology Strategy 2017-2026 Standard Hazard Mitigation Plan	The role of fisheries in the country context is highlighted but there is no fisheries specific action plan or strategy for DRR/M.
Nauru	Nauru Disaster Risk Management (NDRM) Office National Emergency Service	National Disaster Risk Management Act (2016, amended 2020) National Disaster Risk Management Plan Nauru Framework for Climate Change Adaptation and Disaster Risk Reduction (RONAdapt)	The importance of fisheries in the country is recognized but no specific role is elaborated.
Niue	Climate Change Section of the Department of Meteorology National Climate Change and DRM Committee	National Climate Change Policy 2009 Joint National Action Plan for Disaster Risk Management and Climate Change Adaptation 2012	The importance of fisheries in the country is recognized but no specific role is elaborated.
Palau	Disaster Executive Council (DEC) National Emergency Committee (NEC) National Emergency Management Office (NEMO)	National Disaster Risk Management Framework 2016	The importance of fisheries in the country is recognized but no specific role is elaborated.

	Palau National Weather Office		
Papua New Guinea	National Disaster Centre (NDC) to be replaced by National Environment and Disaster Mitigation Authority PNG National Weather Service (PNGNWS)	National Disaster Risk Reduction Framework (NDRRF) 2017-2030 Disaster Management Act (DM Act) 1984 (revised 1987)	The importance of fisheries in the country is recognized but no specific role is elaborated.
Samoa	Ministry of Natural Resources and Environment (MNRE) Disaster Management Office	Disaster and Emergency Management Act 2007 National Disaster Management Plan (NDMP) 2017-2020 Samoa's National Action Plan for Disaster Risk Management (NAP for DRM) 2017-2021	In 2016, the NAP indicated that Agriculture and Fisheries had advanced plans to integrate DRR. DRR is also integrated into the Agriculture and Fisheries Sector Plan 2022-2026. However, it is unclear how implementation has progressed.
Solomon Islands	Solomon Islands Meteorological Services National Disaster Management Office	National Disaster Council Act 1989 National Disaster Risk Management Plan 2010 Standard Operating Procedures (SOPs) for Disaster Preparedness and response for the Ministry of Fisheries and Marine Resources are under preparation (FAO CanAdapt Project)	SOPs for Disaster Preparedness, Response and Recovery in Fisheries [1st draft complete - stakeholder validation to take place in Honiara, December 2023]
Tonga	National Emergency Management Office (NEMO) Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications (MEIDECC) Tonga Meteorological Services (TMS)	Tonga's National Strategic Development Framework (TSDF, 2015-2025), National Emergency Management Act 2021 National Emergency Management Plan (2009) Joint National Action Plans on Climate Change Adaptation and Disaster Risk Management (JNAP 2018-2028)	The ministry of Fisheries is a co-lead on the national Food Security and Livelihoods cluster and has fisheries specific surveys for disaster response.
Tuvalu	Tuvalu Meteorological Service Tuvalu Disaster Management Office	National Disaster Management Act National Climate change policy Tuvalu Fisheries Sector DRR Plan	Yes, fisheries specific DRR plan in place. Information on the implementation of fisheries plan and associated

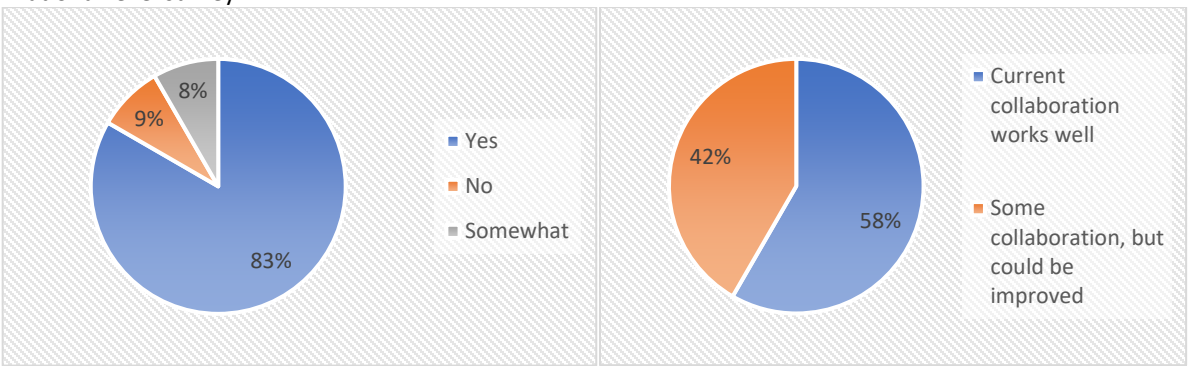
			recommendations is not available.
Vanuatu	Vanuatu Meteorology and Geo Hazard Department National Disaster Management Office	Vanuatu Climate Change and Disaster Risk Reduction Policy 2016-2030 International Disaster Response Laws, Rules and Principles (IDRL) in Vanuatu Standard Operating Procedures (SOPs) for Disaster Preparedness and response for the Fisheries Department are under preparation (FAO CanAdapt Project)	SOPs for Disaster Preparedness, Response and Recovery in Fisheries [Final version validated at stakeholder meeting November, 2023, now awaiting sign off by Director Fisheries]

4.2. Collaboration between national fisheries agencies and meteorological agencies and/or national disaster risk management offices

Fisheries departments and ministries report a significant level of existing collaboration with national meteorological agencies and national disaster management offices. However, the level of collaboration and specificity of work directly relevant to the fisheries sector is unclear. While most respondents (83%) to the national level survey indicate that there is collaboration, 42% report that the quality of collaboration could be improved (Figure 4).

Figure 4. Cumulative responses from Pacific Islands Fisheries Administrations to question a (left): Is the Fisheries Ministry or Department's collaboration with the national meteorological (MET) agency or national disaster management office (NDMO) sufficient? And question b (right): Does the current collaboration between the Fisheries Ministry or Department and the MET agency or NDMO work well?

Source: National level survey



Recommendations by fisheries departments and ministries to improve collaboration and the way that the fisheries departments handle disaster response and management included:

- Include DRR in fisheries sector plans.
- Improve capacity of fisheries departments and ministries on Disaster Risk Management.
- Allow for DRR in the structure of ministry of fisheries or institutionalize DRR within fisheries.
- Improve collaboration of responsible agencies to reduce community impacts and improve resilience.

- National-level agencies or organizations could offer a grant to communities and fishers for preparedness and response to disasters, and governments should offer repair or replacement of equipment after cyclones or disasters for the benefits of local people, as well as food security and income; and
- Governments, through the relevant ministries, should be more responsive to fisherfolk and fishing industries in the post-disaster period. There should be better direction of funding support for fisherfolk and industries affected by disasters.

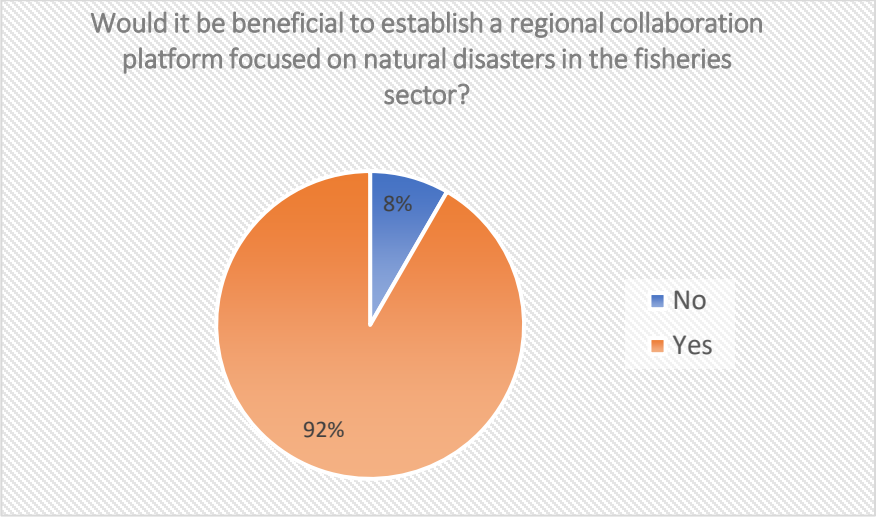
4.3. Regional collaborative platform for the fisheries sector

Despite the various platforms in the Pacific Island region for collaboration on fisheries matters, such as the Heads of Fisheries Meeting (HoF), the Regional Technical Meeting on Costal Fisheries and Aquaculture (RTMCFA) or the Marine Sector Working Group (MSWG), and those for humanitarian response such as the Regional Pacific Food Security Cluster (rPFSC), a fisheries specific platform or mechanism to collaborate on and discuss disaster risk reduction as well as recovery and response does not exist. The possibility for establishing such a group has been discussed over the years with an idea to create a sub-group to the rPFSC. However, although the fisheries and aquaculture sector is in theory included in both the rPFSC as well as at the national level Food Security Cluster when cluster systems are in use, the fisheries sector reportedly rarely participates. In some countries, this is beginning to change as the fisheries sector becomes more active in DRR and DRM. Examples include Fiji and Tonga, where a representative from fisheries co-chairs the national food security cluster when active.

The rPFSC functions at the regional level to support national governments, country-level actors, and regional stakeholders on topics such as resilience building and emergency preparedness and response. Given the transboundary nature of many disasters in the Pacific Island region, and the wealth of new information on DRR and DRM programs in fisheries, there is much to be gained from such a group.

The majority of respondents from fisheries ministries or departments agreed that the establishment of this group is a good idea and so warrants further discussion (see Figure 5).

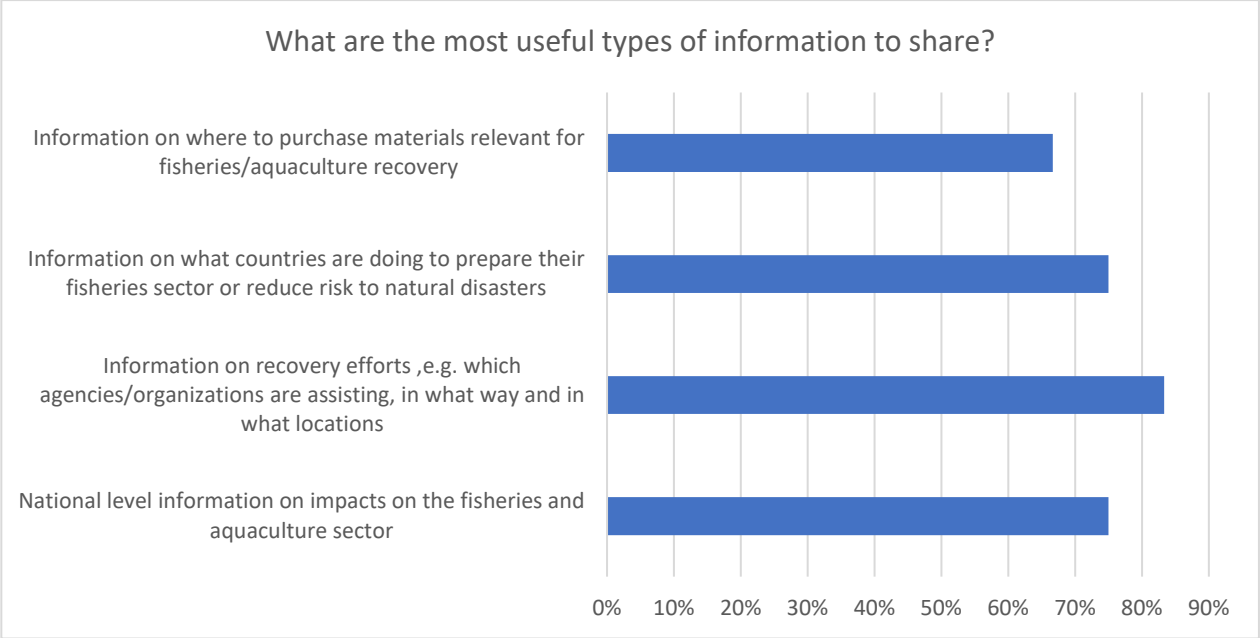
Figure 5. Response to the below question from fisheries departments and ministries.
Source: National level survey



A number of focal areas were proposed to respondents to the survey for potential inclusion in a fisheries working group under the rPFSC. Respondents clearly valued collaboration on recovery efforts after a disaster as a priority,

but the majority would like to include information on where to purchase materials for fisheries and aquaculture for recovery, country-level preparation to reduce risk, and national-level information on impacts on the sector (Figure 6).

Figure 6. Cumulative responses from Pacific Islands Fisheries Administrations to the below question from fisheries departments and ministries on the most useful information to share through a potential regional platform on disaster risk management and the fisheries sector.
Source: National level survey



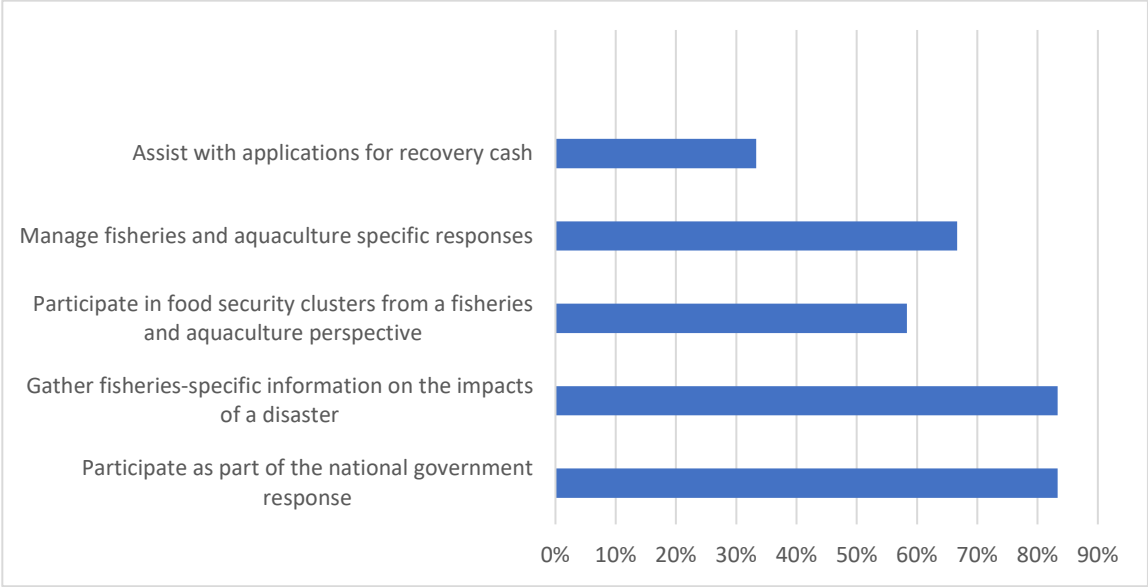
5. Disaster response and recovery

5.1. Participation of the fisheries sector in disaster response

Although many countries do not have a fisheries-specific role in national disaster management planning or strategies, most fisheries administrations still play important roles in recovery with over 80% reported that they assisted with gathering of fisheries data on the impacts of a disaster and participate in general in the national response. Some countries reported that the fisheries administrations managed the fisheries and aquaculture response (67%) as well as participating in the food security cluster (58%) when activated.

Figure 7. Cumulative responses from Pacific Islands Fisheries Administrations to the question - How does the Fisheries Ministry or Department respond to disasters at the national level?

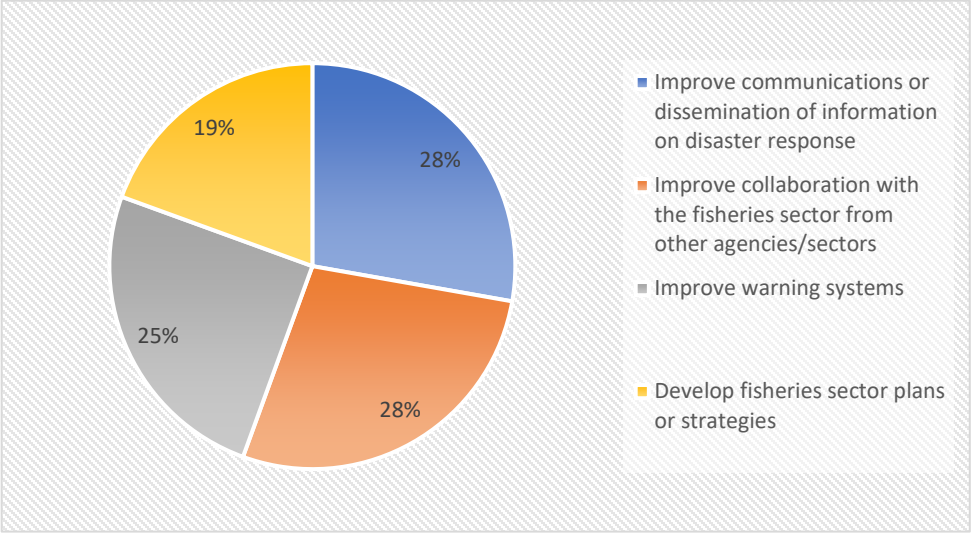
Source: National level survey



When asked how disaster response in the fisheries sector could be improved, many respondents from national fisheries agencies recommended improved communication and collaboration (28%), as well as better warning systems (25%). Those that reported that no fisheries-specific strategy existed, or was being prepared, recommended the preparation and implementation of such a strategy (Figure 8).

Figure 8. Cumulative responses from Pacific Islands Fisheries Administrations to the question - How could disaster response in the fisheries sector be improved?

Source: National level survey



5.2. Small-scale fishers - disaster response and resilience

In many countries fishers do not necessarily have a chance to report damages or receive assistance after damages and losses are reported (Table 11). Fishers voiced concerns about disaster recovery, including issues such as lack of response when damages were reported, a desire to have been trained to prepare for a disaster to reduce impacts, and a concern that traditional knowledge of weather systems is being lost.

Voices of Pacific Fishers

"Maybe media platforms could be used to announce it. Fishermen should have a chat group for an update of the weather when one of the fishermen received any information. Also family members should also advice when the receive any weather forecast before departing for fishing." Fisher in Funafuti, Tuvalu

"We should continue with what our ancestors have taught us about weather and integrate that with modern weather science. Our traditional knowledge, like watching how certain birds fly, how the sky color changes, it helps us know more about how the weather acts close to us and when seasons change." Fisher in Fiji

Table 11. Who do fishers report damage to after an extreme weather event or disaster?
Source: Fisher survey (percentages indicate total number of respondents by country)

	Tonga	Solomon Islands	Fiji	Samoa	Kiribati	Cook Islands	Vanuatu	Tuvalu
Local Gov	59%	16%	40%	25%	47%	67%	83%	0%
Fisheries Authority	35%	4%	10%	50%	0%	0%	86%	0%
Town leader	68%	0%	0%	0%	0%	0%	74%	0%
Cooperative / Association	1%	1%	0%	33%	7%	0%	0%	0%
No one	20%	65%	16%	58%	67%	17%	6%	100%
Other	1%	28%	49%	4%	7%	33%	6%	0%

Building resilience to reduce risk to natural disasters that is not tied to external support or the physical presence of central government officials is challenging in many Pacific Island nations, particularly in remote islands far from central administrations. Options that support coastal communities in areas near and far from central government should be explored, together with the many valuable ideas conveyed by the fisherfolk and national government staff surveyed in this study.

Social protection schemes can be an important part of resilience and stability for coastal communities. According to the 2022 review of social protection systems (Naidu *In preparation*), a variety of formal systems exist in much of Polynesia and Micronesia, but such support is often new or informal in much of Melanesia. Fiji is an exception, with a broader range of social support mechanisms.

Notwithstanding the availability of some social protection schemes, other tools that provide direct support and reduce the need for recovery assistance are vital. Insurance is not a frequently used tool in small-scale fisheries, but new products and concepts are becoming available that may be of use to the sector. Access to low-cost, high-quality options for what - insurance? can improve resilience and bring stability. Pilot projects have started in the region, including in Fiji, where the government has launched an anticipatory action pilot insurance scheme to support farmers to prepare for cyclones. Other regional options have emerged, including through the Pacific Catastrophe Risk Insurance Company (PCRIC). This emerging sector has not yet been considered in national and

regional fisheries fora and warrants dedicated discussion, particularly as the results of pilot schemes become known.

6. Priority activities

The program and activities proposed below draw on the information summarized in the above sections. Fisheries administrations in the region are either in the initial or nascent stage of developing specific DRR and DRM policies and actions for the sector. A platform for integrating DRR and DRM will provide the necessary platform for sharing of ideas, harmonizing work plans and exploring new concepts for both regional and national benefit. At the national level, there is a clear opportunity to bring together the main DRM actors with fisheries administrations to share ideas and link the fisheries sector to broader national planning and policy. In addition, it is evident that, despite the progress and systems currently in place for DRR and early warning systems, fisherfolk and their communities are not necessarily aware of these systems and how to access them. Thus, the proposed activities are designed to address the recommendations and concerns for national governments as well as fisherfolk drawn from the surveys and information summarized in this paper.

The proposed activities described below and should be read in conjunction with Annex 3 (Activities-based budget). Information on the implementation timeline and full budget to address priority areas of need in relation to strengthening DRR and DRM fisheries considerations is presented in annexes 4 and 6, respectively. The activities are designed to be across 5 years with year one primarily being hiring and commencing activities and year 5 being a wrap down year for evaluation and finalizing any remaining activities. Supporting staff and consultants are listed below to assist with clarity of roles in the activities.

Table 12. Staff and consultants to be hired to conduct the proposed activities

Title	Role
Project Coordinator	To support and coordinate activities (to be based in and from a country in the Pacific region)
Early Warning System (EWS) Expert	Develop EWS triggering concept for regional workshop
Fisheries Working Group (WG) Facilitator	Drive and facilitate the Fisheries WG
MET / Safety-at-sea Expert	Prepare training materials to be integrated into safety-at-sea materials for the region
Engineer	Review mobile coverage for small-scale fishers and provide recommendations for improvements
EWS / DRR National Experts	National DRR / EWS experts to provide national overviews for workshops
Gender Expert	To provide gender strategy and gender equity guidance
Monitoring and Evaluation Specialist	To provide monitoring plan and monitor outcomes of activities

6.1. Output 1: Enable regional collaborative platform on disaster risk reduction in the fisheries sector

Activity 1.1 – Enable the Regional Pacific Food Security Cluster (rPFSC) working group on fisheries and aquaculture. Create and enable a Working Group (WG) on fisheries and aquaculture through the rPFSC. This WG is intended to include countries, civil society, regional agencies, donors and NGOs. Set up tasks include developing systems and forms for partners (e.g., governments, NGOs, donors, etc.) on emergency responses as well as facilitating discussions, seminars, collaborative events.

Implementation Notes: The activity will be led by the WG Facilitator (funded through this project) and includes funding for 2 travels per year as well as editing or graphic design for two informational pieces related to the WG (e.g. document prepared for the WG under below activities, formalization of forms for the WG and associated administrative functions, etc). The WG facilitator will prepare documents and online forms including the 5W Food Security Cluster form (Who does What, Where, When and for Whom?) tailored for fisheries and aquaculture (ready for a potential disaster), facilitate the platform and associated regional meetings, link the WG to national FSC systems and the rPFSC as well as other associated regional platforms (e.g. Pacific MET Council, Pacific Resilience Council, etc.). The platform should assist with coordination during disaster response, but also host discussions and working groups for the region on disaster risk reduction and management in the fisheries sector. The other activities listed in this output are intended to be hosted and deliberated by participants in the WG through this platform.

The Project coordinator in collaboration with WG facilitator will develop a sustainability plan and eventually handoff to a regional agency or agencies as appropriate.

Activity 1.2 – Advancing early warning systems and disaster risk reduction in the fisheries sector. Enhance national and regional Early Warning Systems (EWS) as well as options for anticipatory actions by developing concepts for a triggering system or leveraging existing systems in specific countries. The Early Warning System Expert (EWS expert) will be hired to conduct a retrospective analysis of past cyclone-related (to be eventually expanded to other hazards such as storm surge, coastal flooding, oil spill, tsunami) damage to the fisheries sector and examine the relationship between the impact and the forecasted event's intensity. A preliminary set of responses to meteorological hazards will be developed to facilitate options for anticipatory actions and early warning systems to reduce impacts on small-scale fishers and their communities. The analysis prepared by the EWS expert will be reviewed by countries, regional experts and organizations at the regional workshop on advancing EWS and DRR facilitated by the rPFSC Working Group on Fisheries and Aquaculture. The preliminary suggested responses will provide guidance on recommended anticipatory actions for local fishers, communities and governments, tailored to an event's severity, to proactively mitigate its impact.

Implementation Notes: This activity should be carried out by the EWS Expert and guided by the Project Coordinator working in close collaboration with the WG Facilitator and with countries. It should also be cross sectoral in nature - Fisheries, MET and NDMO and related agencies in order to develop and assess appropriate trigger points that are realistic and responsive to small-scale fishers. The activity should assess the potential to build on the work that is currently under development with FAO CERF's Anticipatory Action (AA) program in Fiji. Funding for a regional meeting which could be conducted through a Letter of Agreement (LoA) with a relevant organization is included to present the analysis and collect feedback. The regional meeting could also include presentations from countries on the current state of early warning systems for fisheries, possible incorporation of triggers into national early warning systems and review of suggested preventative or mitigative actions governments and communities can take.

Activity 1.3 – Initiate a repository for best practices on preparedness. Build and populate a regional repository for preparedness and anticipatory actions based on best practice. These can be both community-based actions as well as those funded by the government/partners (no-cost or costed actions). The repository should be presented, reviewed and further populated during the workshop mentioned in activity 1.2. The output and repository (a working document) will be linked to the rPFSC Working Group (e.g. hosting the repository and supporting resource materials).

Implementation Notes: The work will be carried out through a LoA or contract and will be guided by Project Coordinator in collaboration with the WG Facilitator. Support and examples from other regions can be requested from the FAO RAP Anticipatory Action group.

Activity 1.4 – Integrate early warning systems into safety-at-sea guidance and training. Review options for linking existing early warning systems, guidance on what is available at the regional level and training on understanding meteorologic information into safety-at-sea trainings and materials provided to fishers/fishing communities within the region. Regionally relevant materials and guidance will be developed and reviewed through a small expert workshop with SPC/FAO to develop and agree on integration of EWS and meteorological training into safety-at-sea material.

Implementation Notes: A review of gaps in understanding of meteorological information and regional EWS systems should be done by Meteorological Expert prior to the small workshop. The new materials and guidance will then be reviewed within a small expert group facilitated by FAO and SPC. Note that SPC is working on a larger safety at sea component within this project. This meeting could be linked to an existing regional meeting such as the Regional Technical Meeting on Coastal Fisheries and Aquaculture (RTMCFA) for cost savings and integration into regional mechanisms.

6.2. Output 2: Improved access and awareness of emergency preparation, response and recovery systems for fishers and fishing communities at the national level

Activity 2.1 – Review DRR plans and EWS relevant for the fisheries sector for each country. In preparation for the below national workshops, a short overview of each country's disaster risk reduction/management policies or procedures related to the maritime and fisheries sector will be prepared. This should include how and when the fisheries sector is involved in disaster preparedness and response, identification of early warning systems in place or being developed (including how to access and utilize them), and future plans for DRR or DRM specifically tailored for the fisheries sector. Gaps and recommendations should be included for discussion in the national workshops.

Implementation Notes: The review will be presented to each country at the national workshops described below. It may be useful to look for an organization or agency which can undertake the above review and organize the workshop in a single LoA or contract.

Activity 2.2 – National workshops to build awareness on EWS and develop action plans for improving preparedness and anticipatory actions in the fisheries sector. National workshops on emergency response, preparedness, anticipatory action and early warning systems (access and awareness) in the fisheries sector are funded for each country. These workshops should focus on building awareness and access to existing systems as well as looking to the future for recommendations and next steps (i.e., an action plan to improve DRR). Workshop participants should include fisheries agencies, national disaster management offices, meteorology offices, fisherfolk and other civil society groups working in the sector.

As a step toward anticipatory action, the workshops may collate and discuss what procedures are in place to trigger early warning activation, what the experience has been in terms of timing, and any recommendations to improve or advance these triggers.

Implementation Notes: Funding for the national workshops is provide through a LoA which could be organized with either the individual countries or an organization with relevant experience in each country.

Activity 2.3 – Share best practices on emergency response, preparedness, anticipatory action and EWS from the fisheries sector. A regional workshop will be held to share lessons learned and outcomes from national experiences with preparedness and response in the fisheries sector (e.g., implementation of Standard Operating Procedures (SOPs) /DRR strategies or plans in DRR in the fisheries sector) utilizing the outputs from the above national workshops. Lessons learned from implementation of early warning systems, anticipatory actions and fisheries-specific DRR plans or operating procedures could be shared at the workshop to develop recommendations and further this work throughout the region.

Implementation Notes: Development of this workshop should be led by the Project Coordinator and could be held within the context of the WG under the rPFSC. The workshop is designed to be carried out through a Letter of Agreement or contract with relevant organization.

6.3. Output 3 – Developing and expanding early warning systems and risk reduction options for fishers and fishing communities.

Activity 3.1 – Using mobile phone applications to expand early warning systems. Identify mobile phone applications and other types of communication channels (e.g. FM/AM radio, VHF, AIS) that have been successful for small-scale fishers within the Pacific Island region and in other jurisdictions to improve safety and EWS, e.g., receive warnings, connect to disaster preparation and recovery information as well as improve skills on information, communications and technology (ICT). Fund a study and regional workshop to review/present options. This review could be presented to the rPFSC and reviewed and discussed for promising opportunities. While this project does not have the funding for the development and trialing of a mobile application, opportunities for future funding opportunities could be explored through the rPFSC and donor community.

Activity 3.2 – Extending coverage of mobile phones to improve access to warnings, preparedness and recovery. Identify options and work with mobile phone companies to extend coverage of radio, mobile phone at sea in 2-3 Pacific Island countries. This work will include identifying countries where mobile phone providers and other groups (e.g., WASH in the Food Security cluster) may be interested in collaborating to determine mobile phone coverage at sea where this is unknown and reviewing low-cost options for improvements (e.g., reduce signal errors, change orientation, etc.). It may also be useful to include an overview of where other types of communication tools, e.g., VHF, etc., would be a better option and link to other components of this project (or other national projects) to potentially trial / fund options to improve safety-at-sea.

Activity 3.4 – Exploring insurance and assistance options for small-scale fishers. A workshop will be held to discuss existing options for insurance products and social protection schemes relevant for small-scale fishers in the Pacific Island region as well as information on successes and challenges from other regions (e.g., COAST in the Caribbean). The workshop will bring together select insurers, fisheries authorities, relevant civil society organizations and fisherfolk representatives to discuss insurance options and present successful schemes from elsewhere in a small 2-day workshop (possibly back-to-back with the or other regional meeting) on options to increase resilience to disasters.

6.4 Output 4. Project Management

Activity 4.1 – staffing and project set up. This will include staffing of the project, as well as initial project set up tasks such as the development of a monitoring and evaluation plan and a gender strategy. A project manager from the region will be hired to lead activities.

Activity 4.2 – Project support. This activity includes funding for FAO support costs such as time and travel for the lead technical officer, project evaluation and reporting.

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Annex 2. Fisher recommendations for improved weather warnings

Source: From the Fisher survey and based on the open-ended question, "What other improvements for weather warnings would you like to see?" Responses from each country are grouped by main topic area. Cells with a dash indicate that no comments were received from that country on the topic.

Type of recommendation	Country						
	Fiji	**Solomon Islands**	**Tonga**	**Vanuatu**	**Kiribati**	**Cook Islands**	**Samoa**
Anticipatory Action and disaster preparedness	Improved training and awareness on preparedness More and better safety items for fishers Better training for remote islands that are frequently cut off from communications including focal points with communication devices Knowledge sharing – pass on traditional knowledge and teach younger generations about weather patterns	Revive use of traditional knowledge on weather patterns - wind, cloud, current, stars. Educational awareness by Fisheries Department on seafaring safety Awareness on cyclone preparation to communities	Requests for materials in preparation for extreme weather i.e supply water tank and safety equipment for small-scale fishing boat i.e VHF radio	-	-	Technology is already improving rapidly which helps us get up to date information	Use of traditional knowledge to be promoted Continuous awareness via TV, radio and Facebook and need for quick and prompt sharing
Early warning systems and more frequent, accessible and accurate weather warnings	More accurate and frequent weather warnings Nadi weather report station should be upgraded so more accurate info is received Maybe some kind of a signal device to be	Big need to improve accuracy and frequency of weather information Awareness on weather patterns and extreme weather conditions made at community level e.g., during church	Signboards could be posted in communities or at landing sites	-	Fishers would like to see SMS texts used for early warnings as everyone is now has a cell phone They would also appreciate weather warnings on local TV	texts to mobile phones to advise of extreme weather. This does happen sometimes.	Weather update at Fish market More usage of Facebook to share info

Type of recommendation	Country						
	Fiji	**Solomon Islands**	**Tonga**	**Vanuatu**	**Kiribati**	**Cook Islands**	**Samoa**
	installed in remote locations which alarms when change in weather	services or in schools. More radio awareness in communities Improve radio warnings and not use lots of meteorology jargon Make weather reports available at fish markets. Meteorology should work with markets Meteorology to improve their system for reporting of extreme weather warnings. Warnings are reported late.					
Alternative communication networks	Apps should be developed which don't really need internet access Development of free apps like windy for locals. Awareness should include alternative ways of receiving weather news if we can't access radio/TV etc.	All communities should have a village disaster and climate risk committee There is a need for a "Base-kinda-system" so fishers could have a base where they could report their position when they are out at sea. We could know	-	-	-	-	-

Type of recommendation	Country						
	Fiji	**Solomon Islands**	**Tonga**	**Vanuatu**	**Kiribati**	**Cook Islands**	**Samoa**
	In remote islands not always we are we are able to connect to radio and smart phones, so better alternatives are required	if fishers don't report then we will know if they are in trouble. There is a need to strengthen a buddy system for fishers to travel in pair when going out fishing. Fishers should use smartphones with apps that tells them the weather. Fisheries department to educate fishers on safety at sea and use app to access weather information on mobile phones. Services like Telekom, Meteorology Department should send messages through all phones even SMS messages.					
Extended radio, cell phone access	We should have tower for proper signal so that the remote communities can get the access to	Fishers to have radio on their boats Coverage of mobile in areas more than 90 nautical miles, otherwise fishers	-	-	-	-	-

Type of recommendation	Country						
	Fiji	**Solomon Islands**	**Tonga**	**Vanuatu**	**Kiribati**	**Cook Islands**	**Samoa**
	reception to check on weather frequently. Install towers for remote areas to allow them to have access	need to use satellite phones. Private radio base for fishers to report to when they are out fishing. Install more mobile towers in more islands and location Telekom and Bemobile to build mobile towers in all our islands so fishers can have mobile connection to call in case of trouble on the boat or weather is bad Fishers to have EPIRB on board their boats					

1. **Annex 3. Activities-based budget**

Activity	Activity description	Type		Unit/ days	Rate (USD)	Total cost (USD)
Output 1 - ***Functioning collaborative platform at the regional level on disaster risk reduction in the fisheries sector***						***248,625***
Activity 1.1	Create and enable working group on fisheries and aquaculture / facilitate on output 1	regional consultant (NPP)	Month	5.8	4,500	23,625
		Travel	Lumpsum	6	4,000	24,000
		editor / graphic design consult.	Lumpsum	2	4,000	8,000
Activity 1.2	Advancing regional EWS - initial triggering system.	EWS Int/Reg consultant	Days	40	525	21,000
		EWS Int/Reg consultant Travel	Lumpsum	1	4,000	4,000
	2-3 persons per country (MoFish, MET, NDMO)	workshops	Lumpsum	1	100,000	100,000
Activity 1.3	Build a repository for preparedness and anticipatory actions including development and population of repository					
		Contract (LoA)	Lumpsum	1	30,000	28,000
Activity 1.4	Develop materials to integrate MET training into safety at sea trainings or materials provided to fishers/fishing communities	consultant or contract	Days	30	525	15,000
	Small workshop with SPC/FAO to agree on integration of early warning systems into safety at sea materials	SPC/FAO meeting (LoA)	Lumpsum	1	34,000	25,000
Output 2- ***Improved access and awareness of emergency response and recovery systems for fishers and fishing communities at the national level***						***544,500***
Activity 2.1						
	National workshops on emergency response and early warning systems (access and awareness) and DRR. Focus on building awareness, access of existing systems and looking to the future for next steps. Project manager and national consultants to support workshops.	national workshop (LoA)	Lumpsum	14	25,000	350,000
	National DRR or EWS expert to review policy/regs	EWS or DRR Nat Consult. (NPP contract)	Month	14	4,500	63,000

Activity 2.2	Regional workshop on lessons learned and outcomes from national experiences with preparedness and response (e.g. Implementation of SOPs /DRR strategies or plans in DRR in the fisheries sector)	workshops	Lumpsum	1	100,000	100,000
Output 3 - *Developing and expanding concepts for early warning systems and risk reduction options for fishers and fishing communities*						***159,250***
Activity 3.1	Identify useful applications for cell phones that have been successful for small-scale fishers in other regions to receive warnings, connect to disaster preparation and recovery	contract	LOA	1	55,000	55,000
Activity 3.3	Extending coverage of radio, cell phone at sea - review cell phone coverage at sea and possible opportunities to expand in at least 3 countries (possible collaboration with local cell phone companies)	Int/Reg Consult or contract	Days	135	550	74,250
Activity 3.4	Workshop on insurance options for small-scale fishers in the Pacific, with lessons learned from other SIDS regions. Outcomes to be presented and discussed in a Fisheries WG meeting.	contract (LoA)	Lumpsum	1	40,000	40,000
Output 4 - *Project management*						***303,255***
Activity 4.1	Staff					
	Project manager (based in country of origin)	NPP	Months	43	4,500	193,500
	Support to national / regional workshops	NPP travel	lumpsum	16	4,000	64,000
Activity 4.2	Project monitoring and gender strategy					
	project M&E plan	staff/consultant	Days	20	500	10,000
	ongoing monitoring	staff/consultant	Days	21	500	10,500
	Preparation of gender strategy (and contribution to workshops / materials)	Int or regional consultant	Days	30	525	15,750
Activity 4.3	Office Infrastructure					
	Office / desk set up (laptop, screen, chair, etc)	Procurement	lumpsum	1	8,630	8,630
Activity 4.3	Evaluation and reporting					
	FAO project evaluation		lumpsum	1	6,000	6,000
	FAO reporting costs		lumpsum	1	6,200	6,200
Activity 4.4	FAO staff support					

FAO technical support services (P4)	TSS	Days	8	1048	8,384
FAO backstopping travel (lumpsum for flight and DSA)	Travel	lumpsum	8	4,000	32,000
				TOTAL	

2. **Annex 4. Activities timeline**

	Activity	Activity description	Yr 1	Yr2	Yr3	Yr4	Yr5
Output 1	***Functioning collaborative platform at the regional level on disaster risk reduction in the fisheries sector***						
	Activity 1.1	Create and enable working group on fisheries and aquaculture / facilitate on output 1	hiring				Transfer over
		support to regional workshops (2 trips per year for 3 yrs)					
		preparation of documents, materials					
	Activity 1.2	Advancing regional EWS - initial triggering system.					
		2-3 persons per country (MoFish, MET, NDMO)					
	Activity 1.3	Build a repository for preparedness and anticipatory actions including development and population of repository					
	Activity 1.4	Develop materials to integrate MET training into safety at sea trainings or materials provided to fishers/fishing communities					
		Small workshop with SPC/FAO to agree on integration of early warning systems into safety at sea materials					
Output 2	***Improved access and awareness of emergency response and recovery systems for fishers and fishing communities at the national level***						
	Activity 2.1	National workshops on emergency response and early warning systems (access and awareness) and DRR. Focus on building awareness, access of existing systems and looking to the future for next steps. Project manager and national consultants to support workshops.					
		National DRR or EWS expert to review policy/regs	hiring				
	Activity 2.2	Regional workshop on lessons learned and outcomes from national experiences with preparedness and response (e.g. Implementation of SOPs /DRR strategies or plans in DRR in the fisheries sector)					
Output 3	***Developing and expanding concepts for early warning systems and risk reduction options for fishers and fishing communities***						

Activity 3.1	Identify useful applications for cell phones that have been successful for small-scale fishers in other regions to receive warnings, connect to disaster preparation and recovery (latest systems that support DRR and operations)	tender				
Activity 3.3	Extending coverage of radio, cell phone at sea - review cell phone coverage at sea and possible opportunities to expand in at least 3 countries (possible collaboration with local cell phone companies)		tender			
Activity 3.4	Review of existing options for insurance options for small-scale fishers (in the Pacific, with lessons learned from other SIDS regions).			Hiring /tender		
Output 4	***Project management***					
Activity 4.1	Staff					
	Project manager (based in regional country of origin within the region)	hire				
	Travel to support to national / regional workshops					
Activity 4.2	Project monitoring and gender strategy					
	Project M&E plan					
	Ongoing monitoring					
	Preparation of gender strategy (and contribution to workshops / materials)					
Activity 4.3	Office Infrastructure					
	Office / desk set up (laptop, screen, chair, etc)					
Activity 4.3	Evaluation and reporting					
	Project evaluation (for FAO to later discuss with CI)					
	Project reporting					
Activity 4.4	FAO staff support					
	FAO technical support services (P4)					
	FAO backstopping travel (lumpsum for flight and DSA)					