Food and Agriculture Organization of the United Nations

TUVALU FISHERIES

TUVALU FISHERIES SECTOR

DISASTER RISK REDUCTION (DRR) PLAN

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Acronyms and Abbreviations

CSD	Central Statistical Department
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EEZ	Exclusive Economic Zone
FAO	Food and Agriculture Organization of the United Nations
FOFA	Fishermen on Funafuti Association
IDC	Island Disaster Committee
KOF	Kaupule of Funafuti
MRA	Marine Resources Act
NDC	National Disaster Committee
NDMO	National Disaster Management Office
NDRMA	National Disaster Risk Management Arrangements
PNA	Parties to the Nauru Agreement
RAT	Rapid Assessment Team
TC	Tropical Cyclone
TFD	Tuvalu Fisheries Department
TMS	Tuvalu Meteorological Service
UNCLOS	United Nations Convention on the Law of the Sea

Abstract

This Disaster Risk Reduction Plan for the Tuvalu Fisheries Sector was prepared within the framework of the TCP/TUV/3801 (e) "Emergency assistance to reduce impacts and build resilience in the fisheries sector caused by Cyclone Tino and COVID -19 in Tuvalu". It is hoped that by following the recommendation of this plan, the time for recovery from future disasters in the fisheries sector will be shortened and that the sector will be more resilient to future disasters.

The Plan introduces the fisheries sector and its importance to the nation and presents important data about the fisheries sector in the context of disaster risk reduction. It describes the different hazards that the sector has been exposed to such as, strong winds, cyclones, storms and wave surges and other external physical factors such as socio-economic issues, climate change and lack of disaster risk considerations at all levels.

The Plan further reviewed the policies, structure, and legal framework of the National Disaster Management Office (NDMO), the Government Departments responsible for disaster management, the role of the Tuvalu Meteorological Service office and its early warning system was also reviewed.

The plan details the consultations with communities in the Northern, Central and Southern Islands groups, summarizes the discussions and opinions of government authorities, women, men, and youth fishers and makes recommendations based on the consultations. The document also provides an indicative budget for implementing the risk reduction measures.

Immediately after a major hazard or disaster, the Government dispatches a Rapid Assessment Team (RAT) to immediately assess the damages and investigate the imminent requirements of affected Islands. This is of course a particularly important aspect of humanitarian assistance in times of disasters. However, the focus of this plan is preparedness and prevention, with a closer look into how communities may prepare themselves to confront the potential destruction by disasters and what contingency planning would complement their efforts to mitigate the damages and losses that these disasters may cause.

TABLE OF CONTENTS

Table of Tables

Table of Figures

1. EXECUTIVE SUMMARY

a. Fisheries play a great role in the economic development of Tuvalu. Revenue from fisheries in 2019 was estimated at nearly AUD$38 million[1].
b. The domestic fisheries have been adversely affected by disasters over the last 30 years. However, due to lack of information, it is not possible to quantify the losses to disasters in the fisheries sector.
c. The approach to disaster management to date has been to respond to the disaster after the catastrophic event. Preparedness with the air to build resilience and reduce risks have not been prioritized to date.
d. The approach to disaster management has not had sectorial focus, and as a result, recovery related to food security from the fisheries sector has been slow.
e. The NDMO does not have the human and financial resources to fulfill its mandate.
f. It is recommended that:
    i. The Tuvalu Fisheries Department ensures that all baseline data on boats, canoes, engines, grab bags, capacity building training for fishermen is up to date.
    ii. The Tuvalu Fisheries Department work in partnership with Tuvalu Meteorological Service, Tuvalu National Disaster Management Office and the Kaupule(s) to develop contingency plans for different hazards utilizing all early warning products available in Tuvalu.
    iii. The Tuvalu Fisheries Department preparedness, response, and recovery actions are incorporated into the revised National Disaster Risk Management Arrangements and National Disaster Management Plan.
    iv. The Tuvalu Fisheries Department damage assessment form takes a holistic view and incorporates views from all population sectors, is reflected in the Island Disaster Committee Situation Report document.
    v. Coordinate with the Tuvalu Fisheries Department in the collection of data for Fisheries damages assessment and coordination on disaster response needs.
    vi. The Tuvalu Fisheries Department develops a Fisheries risk and vulnerability profile in partnership with relevant stakeholders such as the National Disaster Management Office.
    vii. Tuvalu Fisheries Department develops sustainable fishing initiatives such as inland fishponds in partnership with national such as Kaupule's and regional partners.
    viii. Tuvalu Fisheries Department should work more closely in partnership with the National Disaster Management Office and Tuvalu Meteorological Service to conduct community awareness on hazards and associated risks/ impacts, and early warning services.
    ix. Develop institutional mapping to review responsibilities within the Fisheries sector.

[1] Tuvalu Fisheries Department 2019 Annual Report

x. Review response mechanism in contingency plans.

xi. The Fisheries Department should consider stockpiling an inventory of fishing gear, boat repair materials and engine spares to be used for rapid rehabilitation of the fisheries sector immediately after a cyclone. The inventory could be based on experience from previous losses. The quantities can be budgeted in the annual recurring budget.

xii. Kaupule(s) reserve some funding for Fisheries sector preparedness, response, and recovery efforts.

xiii. Detailed data on losses in fisheries should be collected in a manner so that analysis would show the different types of losses in quantities and values of assets lost or damaged. This would help fisheries managers to better plan for quick recovery of the sector in terms of technical specifications and procurement.

xiv. Consider development of a Continuous Marine Broadcast (CMB) VHF frequency where fishermen and marine vessels can access up to date weather forecast on Funafuti.

Figure 1 Passage at Niulakita on a good day, photo credit: Taukelina Finikaso**.**

2. INTRODUCTION

Disasters are events that causes great damage and loss of life, they happen everywhere in the world depending on which region and the types of disaster that befalls such region. These Disasters emanate from natural hazards such as cyclones, floods, and tsunamis to name a few. They become disasters when people are affected, or costs are incurred. UNISDR defines disaster as:

> "*a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts which exceeds the ability of the affected community or society to cope using its own resources.*"

Section 3 of the Tuvalu National Disaster Management Act 2008 Section 3, states that

> *"A disaster is the actual or imminent occurrence of an event which endangers or threatens the safety or health of any communities or persons in Tuvalu, or which destroys or damages, any property in Tuvalu, arising from: (a) a cyclone; (b) a flood; (c) tsunami; (d) a drought; (e) an air disaster; (f) a maritime disaster; (g) a major civil accident (such as major fire or explosion); (h) a plague or epidemic; or (i) any other similar natural or man-made event, except those in Section 4 and Section 5."*

Notwithstanding, what a disaster is, the prognosis is for the frequency of these disasters intensify, and possibly more frequent.

There are basically 5 types of disasters[2];

1. Geophysical (such as earthquakes, landslides, tsunamis, and volcanic activity)
2. Hydrological (such as avalanches and floods
3. Climatological (droughts, wildfire, extreme temperatures)
4. Meteorological (cyclones, storm/wave surges)
5. Biological (disease, epidemic, insect, and animal plague)

2.1 International Disaster Framework

The Sendai Framework for Disaster Risk Reduction[3], provides an excellent platform upon which we could work towards our own resiliency. The framework sets out 4 specific priorities for action.

(a) understanding disaster risk
(b) strengthening disaster risk governance to manage disaster risk,
(c) Investing in disaster risk reduction for resilience
(d) enhancing disaster preparedness for effective response and to "Building back better" in recovery rehabilitation and reconstruction.

[2] https://ifrc.org/en/what-we-do/disasters

[3] Sendai Framework for Disaster Risk Reduction (2015 – 2030)

These are issues that Governments and its partners/other organizations, need to investigate to make effective and informed decisions to lessen the impacts of disasters on their population. It involves investment decision in looking into areas of which disaster risk reduction activities are to be taken and in what priorities.

Figure 2 Damages to the Nui Community Fisheries Centre TC Tino. Photo Credit: Neli Seniola

These decisions are not cheap especially in cases of developing countries with limited resources There are also a lot of competing priorities which makes it extremely difficult to allocate limited resources to issues where the effects are mostly contemplated.

3. METHODOLOGY

The following methodology was used in the preparation of this document.

Interviews and information gathering were carried out with the National Disaster Management Organization's to understand and discuss all aspects of work related to disaster management and especially its work related to disaster risk reduction efforts.

Simultaneously, discussions and interviews were held with the Tuvalu Fisheries Department (TFD) looking at their programs and their vision for the sector and the focus of their programs including those related to Disaster Risk Reduction.

The major aspect of the plan was to go out to all the outer islands and discuss with the communities' aspects of disaster risk reductions and to get their views and insights. One of the questions posed was, what kind of preparations do they see as important and relevant to their islands to mitigate the potential damages to fisheries activities done by disasters such as cyclones, strong winds and storm surges and other disasters? These discussions were carried out with the FAO project Assistant and the targeted participants were as follows:

- Pule Kaupule – President of each Island Council.
- Island Council Member that looks after Fisheries
- Women's Group President
- Youth Leader
- President of Fishers' Association
- Fisheries Data Collector
- General Manager of Community Fishing Centers

The selection was done to ensure inclusivity and to ensure all stakeholders were well represented in these consultations. Prior to the trip to each island community, a letter requesting the respective Island Councils was sent to acquire approval to visit the island and to organize the meetings with the targeted participants. In all 120 persons were interviewed 76 males and 44 females.

Each consultation lasted an average of two hours, due to the short turnover time of the ship scheduled on each of the outer islands. Interviews done were usually semi-structured to ensure participants feet at ease to voice their opinions on ways to improve DRR for the Fisheries' sector. Outcome of these consultations were captured by note-taking. The outcomes of these discussions are detailed in Annex 2, starting on Page 43 of the report.

Further to this, data were collected and reviewed from reports published by the Tuvalu Fisheries Department, statistical reports from the Central Statistics Department (CSD), the Department of Marine & Ports Services manifests and National documents such as the National Disaster Risk Management Arrangements and relevant legislation. The TFD provided data on fisheries statistics and the CSD provided data on fish consumption and amount of money that people spend on fish and/or fish products.

Manifests from the Department of Marine and Ports Services enabled the confirmation on the trips made by each passenger vessel in the previous years. Travelling to the outer islands has been a major obstacle in the data collection. Usually there are two passenger vessels that can transport to and from the islands. During the time of the DRR consultation, there was only one working boat. Additionally, landlines (telephones) in the islands are not working and organizing logistics for each trip was impossible.

Furthermore, the consultation would have been easier if we were able to spend at least two days on the island, however, the passenger vessel in only on the island for at most 8 hours, and travelling officials are required to complete their programs during that time. The passenger vessel travels to the islands once every month, and there are usually 10-12 travelling teams that go on these roundtrips. In additional to the limited time on the island, officials also compete for the attention of the Local Council/Kaupule and the community on the island.

The findings of this plan will be presented at a stakeholder workshop to validate the findings and incorporate these comments and discussions into a final version. The workshop is programmed for 01 July 2021.

Figure 3 Fishermen on Vaitupu Island. Photo credit: Jason Chute photography Facebook page

4. TUVALU FISHERIES PROFILE

4.1 Institutional Framework for Fisheries

The Department of Fisheries in its Corporate Plan of 2020 – 2022 has set its vision on (a) securing a productive inshore fishery for the livelihood and a healthy source of food for the local population, and (b) a sustainable oceanic fishery providing sustainable and consistent revenue, jobs, and other economic opportunities. In its mission the Department undertakes to (a) maximize social and economic returns to the people of Tuvalu through the sustainable management and wise use of Tuvalu's living marine resources, and (b) act as a responsible custodian of oceanic and designated inshore fishery resources and fisheries rights so that they generate national revenues and sustainable employment opportunities.

The Marine Resources Act 2006 (MRA) as amended in 2012 and 2017 provides the legal framework upon which the Fisheries Department provides for the sustainable use of the fisheries resources of Tuvalu. It is within this marine resource that the exclusive management and control over fish, fisheries, and other aquatic resources within the fishery waters are vested in Government[4], Section 5[5] empowers the Minister responsible for Fisheries, the authority and responsibility…to make laws, policies for the conservation management and the sustainable use of the fisheries resources for the full benefit of Tuvalu. The Act further empowers the Minister to investigate issues of Conservation, Management, Development and Sustainable use of the living resources in the Exclusive Economic Zone[6]

The management of coastal fisheries is within the area of control of the Kaupule who under the Act works together with the Tuvalu Fisheries Department for Fisheries Management Plans[7].

However, the TFD does not have policies or laws related to Disaster Risk Reduction in the Fisheries Sector. It should be noted that no other Pacific Island Countries or Territory has policies or regulations related to DRR in Fisheries.

4.2 Fish Production

The Tuvalu Fisheries Department does not have information on the volume of fish that are caught by artisanal fishermen in the country. Enquiries were also made to Island Councils and Fishers' Association, and it was confirmed that this type of data is extremely hard to collect and maintain as it will require Fishermen to report on their catch every time they go out to fish. The only data available, is the number of fish that are caught commercially each year in Tuvalu's EEZ. However, The TFD has estimates of fish caught by artisanal fisheries. The following graph shows the annual catches reported for different species of tunas caught by foreign and national flagged vessels that

[4] Section 4 of the Marine Resources Act

[5] Supra

[6] Supra s.3 (2)

[7] Supra s.8 (5) (a)

fish within the Tuvalu EEZ between 2015 and 2019. The Total annual catches in tonnes by species for Tuvalu's EEZ[8].

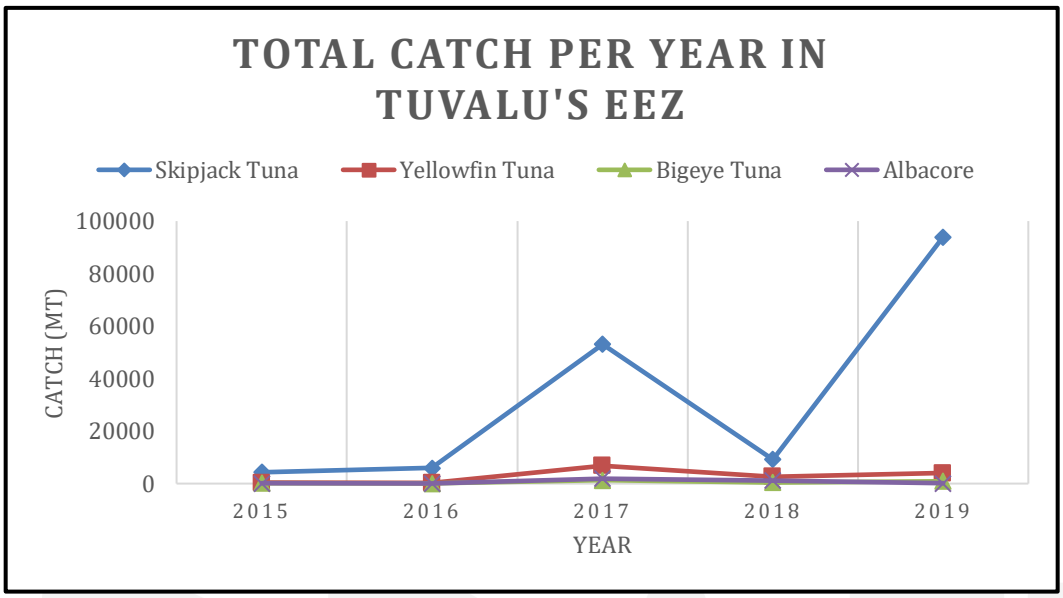


Figure 4 Total annual catch between 2015 and 2019 for tuna species caught in Tuvalu's EEZ.

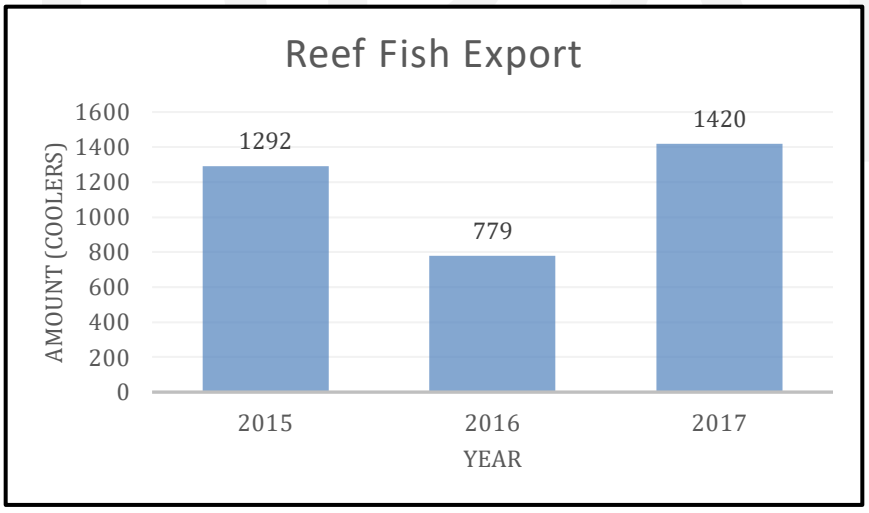


Figure 5 Export of Reef Fish in coolers [9]

Interestingly, from 2015 to 2017, the TFD collected the number of fish-coolers that are exported by Tuvaluans to families usually in Fiji. Figure 3 shows the number of coolers that were exported. The average weight of each cooler is approximately. 10kg[10]

[8] (Tuvalu Fisheries Department Report 2015, 2016, 2017, 2018, 2019)
[9] (Tuvalu Fisheries Department, 2017)
[10] Tuvalu Fisheries Department

4.3 Fish Consumption

There are no available data on total fish consumption in Kgs per person annually. Although some estimates have been made by various studies in the past. This statistic is not systematically reported. However, the 2015/ 2016 Household Income and Expenditure Survey (HIES) report produced by the Tuvalu Central Statistics division provided some statistics on household expenditure on fish and/ or fish products.[11]

Total Annual Household Expenditure on fish/fish products				
	HIES 2010		**HIES 2015/2016**	
	Cash (AUD$)	**Subsistence (AUD$)**	**Cash (AUD$)**	**Subsistence (AUD$)**
Urban	$620,000	$363,000	$432,020	$143,940
Rural	$374,000	$121,000	$251,940	$845,180
Total	**$994,000**	**$484,000**	**$683,960**	**$989,120**
Total annual expenditure on fish/fish product per capita				
	HIES 2010		**HIES 2015/2016**	
	Cash	**Subsistence**	**Cash**	**Subsistence**
Urban	$153.90	$95.22	$90	$7.20
Rural	$28.62	$23.98	$61.92	$51.60

Table 1 Annual expenditure by household and by per capita on fish and fishery products

[11] (Tuvalu Central Statistics Division, 2010)

The following table shows the configuration of the artisanal fishing fleet belonging to members of fishing associations in 2020.

Island	Aluminium Boats	Fiberglass Boats	Wooden Boats	TOTAL BOATS	Wooden Canoes	Aluminium Canoes	TOTAL CANOES
Nanumea	10	2	13	**25**	35	6	**41**
Nanumaga	34	0	25	**59**	33	0	**33**
Niutao	13	0	0	**13**	30	3	**33**
Nui	19	0	0	**19**	27	0	**27**
Vaitupu	21	2	12	**35**	10	2	**12**
Nukufetau	43	11	7	**61**	9	0	**9**
Nukulaelae	50	8	14	**40**	13	3	**16**
Niulakita	2	0	0	**2**	0	0	**0**
Funafuti	Not available	Not available	Not available	**143**	Not available	Not available	**93**

Table 2 Number of artisanal fishing boats[12]

Figure 6 Photo of typical Fishing vessel at Nukufetau Island (Photo credit: Taukelina Finikaso)

[12] (Lopati, 2021) Tuvalu Fisheries Department

4.4 Fishing Equipment

The following table shows the types of fishing gear that are commonly used by fishermen in Tuvalu. With net-fishing, gillnet and scoop net is much more common as compared to throw net. For spear-diving, there are a few fishermen who usually wear the proper diving gears. Most young men in Tuvalu only wear goggles when out spear-diving. When trolling, there are fishermen that buy imported lures, other fishermen are still practicing traditional methods of creating lures depending on the type of fish that they want to catch. Although fishing is usually done by men in Tuvalu, women engaged in several gleaning fishing activities.

MOST COMMON FISHING METHOD	MOST COMMON TYPE OF FISHING GEARS USED.
Net Fishing	● Throw net, Gillnet, Scoop Net
Spearfishing – freediving	● Snorkeling gear, Pole Spear, Spear Gun, Torch
Rod & Reel Fishing	● Flexible rod, Mechanical reel, Lures, Fishing Hooks
Trolling	● Fishing lines, Lures
Gleaning	● Knives

Table 3: Most common fishing gears

Figure 7: Photo of damaged canoe on Niulakita island. Photo credit: Paeniu Lopati.

4.5 Fish Preservation

The Tuvalu Fisheries Department (TFD) has focused its post-harvest and value adding activities over the years on the smoking and bottling methods. These trainings have been conducted on all island communities, including various church communities on Funafuti. Despite these training, none of the island communities are making use of these new methods, as most are still using the traditional fish preservation method of salting and baking of fish.

Figure 8 Traditional food preservation method of sun-drying fish in Tuvalu. Photo credit: Petesa Finikaso

The Ice-plant(s) in Niutao, Nui, Nukufetau and Nukulaelae are not working due to the lack of capacity on the island to carry out proper maintenance work.

A table with fish prices by species and by island can be found in Annex 1.

The following table shows the locations conditions and other ancillary preservation equipment by island.

ISLAND	LOCATION OF ICE PLANT	CONDITION	RACKS FOR DRYING/ SALTING FISH
Nanumea	Nanumea CFC[13]	Not operational	Yes
Nanumaga	Nanumaga CFC	Operational	Yes
Niutao	Niutao CFC	Not operational	Yes
Nui	Nui CFC	Not operational	Yes
Vaitupu	Vaitupu CFC	Operational	Yes
Nukufetau	Nukufetau CFC	Not operational	Yes
Funafuti	TFD Office	Operational	N/A
Nukulaelae	Nukulaelae CFC	Not operational	Yes
Niulakita	No CFC	None	None

Table 4 Fish preservation equipment by island

[13] TC Tino report

4.6 Characteristics of fisher communities

The following table shows the demographic profile of the fishing communities and their equipment.

Island Name	No. of People [14]	No. Fishers[15]		No Boats	No. Canoes	No. Engines	No. Markets	Community Fishing Centre
		M	F					
Nanumea	495	91	N/A	25	41	No data	1	Yes
Nanumaga	384	51	N/A	59	33	No data	1	Yes
Niutao	499	56	N/A	13	30	No data	1	Yes
Nui	494	22	N/A	19	27	No data	1	Yes
Vaitupu	1190	14	N/A	35	12	No data	1	Yes
Nukufetau	531	27	N/A	61	9	No data	1	Yes
Funafuti	6,308	70	N/A	143	93	No data	1	None
Nukulaelae	260	16	N/A	40	16	No data	1	Yes
Niulakita	43	No	N/A	2	0	No data	0	None

Table 5 Demographic profile of the fishing communities and the fishing assets

[14] 2017 Preliminary Census Report

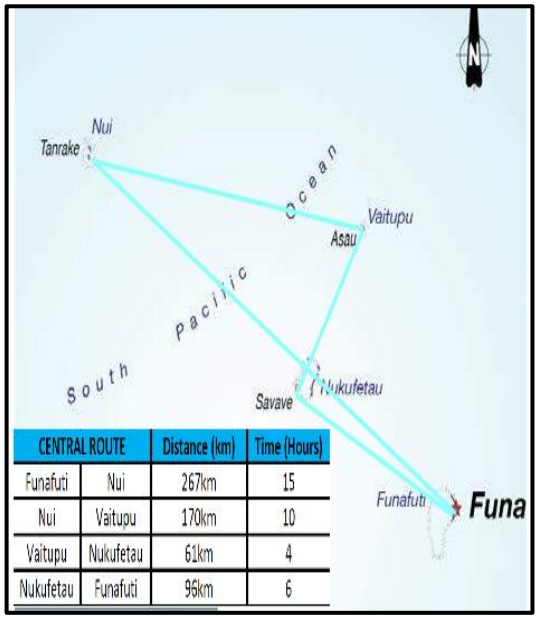
[15] The number of fishermen belonging to each island, shows the number of fishermen who are part of each island fishers' association. It does not represent the number of people who are engaged in fishing activities on each island.

4.7 Map showing CFC locations.

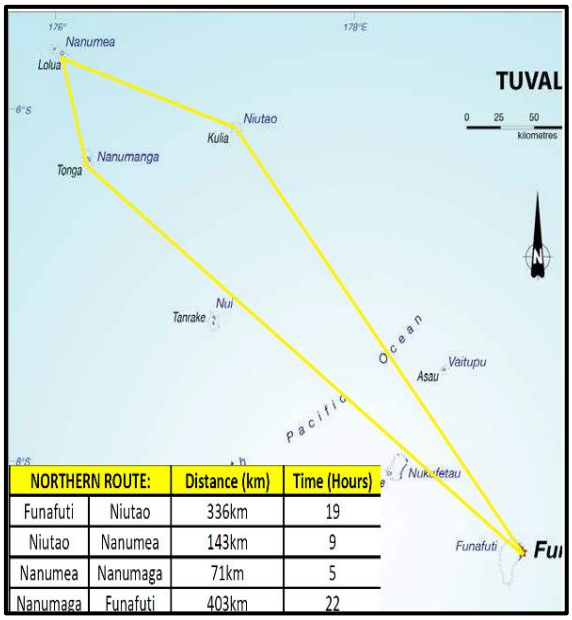
The following figure shows the locations of Community Fisheries Centres on each island. All maps are oriented to True North. Strong winds including gusts and cyclone speed winds are usually Westerly and you can see that almost all CFCs are vulnerable to strong winds.

Figure 9: Maps Community Fishing Centers and vulnerability to Westerly winds

4.8 Shipping Routes and schedules showing isolation of the outer islands.



CENTRAL ROUTE		Distance (km)	Time (Hours)
Funafuti	Nui	267km	15
Nui	Vaitupu	170km	10
Vaitupu	Nukufetau	61km	4
Nukufetau	Funafuti	96km	6



NORTHERN ROUTE:		Distance (km)	Time (Hours)
Funafuti	Niutao	336km	19
Niutao	Nanumea	143km	9
Nanumea	Nanumaga	71km	5
Nanumaga	Funafuti	403km	22

Island	Trips made by **MV Nivaga III** from Funafuti in 2019	Trips made by **MV Manufolau** from Funafuti in 2019	**Total Trips in 2019**	Number of Trips made by **MV Nivaga III** from Funafuti in 2020	**Total trips in 2020**
Nanumea	9	5	**14**	11	**11**
Nanumaga	9	5	**14**	14	**14**
Niutao	11	5	**16**	11	**11**
Nui	9	12	**21**	12	**12**
Vaitupu	15	9	**24**	15	**15**
Nukufetau	8	10	**18**	12	**12**
Nukulaelae	9	6	**15**	12	**12**
Niulakita	9	5	**14**	11	**11**

Figure 10 **Shipping and route tables**

4.9 Shipping Routes and Schedules in Tuvalu

The figures above visualize the routes of the passenger vessels. The passenger vessel groups the island into three routes. Nanumea, Nanumaga and Niutao is its Northern route. Nui, Vaitupu and Nukufetau is its Central route. Niulakita and Nukulaelae is its Southern route. The lone passenger vessel that is currently in operation, usually travel to each island once every month. If there is construction project that may require shipping of building materials, then the vessel is bound to travel to that island more than once each month. Vaitupu on the hand has several visits by the boat, and this is due to the Government Secondary School that is in Vaitupu. The extra trips to Vaitupu entails the picking and dropping of students to and from Vaitupu. [16]

Figure 11: Passenger Vessel Nivaga III anchored at Nukulaelae. Photo credit Taukelina Finikaso

[16] (Department of Marine & Ports Services, 2021)

5 DISASTER PROFILE OF TUVALU FISHERIES SECTOR

The Fisheries sector has always been affected by the various disasters in the past 30 years. There is limited data from past disasters with regards to damages caused in the Fisheries sector.

Immediately after a disaster the country sends out the Disaster Rapid Assessment Team (RAT) which comprises all the relevant personnel from Government Departments such as NDMO, PWD, Department of Health, Department of Lands, Meteorological Office together with NGOs such as Red Cross. The RAT travels out by Government vessel, to assess the damage and to identify where there may be a need for immediate assistance. This has been the norm as an effective means to assess the country's requirement immediately after a cyclone and where reports from outer islands may suggest that it has struck some of the islands badly.

In addition to the RAT, each Island community has an Island Disaster Committee, established under the National Disaster Management Act 2008, section 18. This Island Disaster committee is comprised of Kaupule members (Local Government) and other traditional Leaders of the community together with relevant stakeholders such as medical personnel, and Policemen.

Section 18 of the National Disaster and Management Act 2008 specifies who the members of the Island Disaster Committee are. At the national level, the Act also provides for a National Disaster Committee under section 7, with members specified under section 9. A National Disaster Preparedness Working group is established within the National Disaster Management Office under section 14.

Together, the RAT team and the Island Disaster Committee would do the assessment of damages on the Island looking into all aspects of the disturbance to the lives of the people on the Island.

5.1 Number of disasters over last 30 years

The number of cyclones works out to 1 cyclone every 18 to 19 months over the last 30 years.

TYPE OF DISASTER	NUMBER OF OCCURRENCES IN THE PAST 30 YEARS
TROPICAL CYCLONE	19[17]
DROUGHT	**1**

Table 6 Breakdown of types of disaster over the last 30 years.

[17] Sourced from <https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/vulnerability_profile_tuvalu_2012.pdf>

5.2 Disaster Impacts on fisheries in Tuvalu.

Tuvalu's EEZ comprises almost of 900 000 square kilometers of sea area with a land mass of 26 square kilometers. When considering its geographical configuration of small low-lying atolls with small economies, Tuvalu is highly vulnerable to the impacts of natural disasters and climate change. Its small economy and isolation from shipping and air traffic makes it even more susceptible to the shocks from disasters and economic instability.

Tuvalu with its geographic configuration is indeed particularly vulnerable to sudden changes in climatic conditions. Small in landmass, low lying atolls, with the maximum altitude of about 4 meters above sea level, does not provide much ground to buffer the impacts of hazards such as cyclone, storms, wave surges that frequently hits the islands.

Tuvalu has basically 2 seasons. The wet season is typically from November to April and the dry season from May to October. The strong seasonal cycle is driven by the strength of the South Pacific Convergence Zone, which is strongest during the wet season. The occurrence of cyclones is mainly during the wet season. Not only do the cyclones bring strong winds and storm surge but also flooding. The impacts are exacerbated due to Tuvalu's low-lying elevation.

A total of 19 cyclones and one severe drought have hit the Island nation in the past 30 years. In Tuvalu, tropical cyclones, storms, and storm surge are the hazards that most frequently affect the nation. Cyclone Tino in early 2020 was the last cyclone with damaging effects on some of the islands in Tuvalu[18]. Heavy rains, strong winds, flooding, damaging tree crops such as Breadfruit trees and swamp taro[19] (pulaka). The earlier Tropical Cyclone Pam 2015 also did a lot of damages to food crops and Fisheries and Aquaculture.

The drought which occurred in 2011 affected the whole of Tuvalu, since the country depends solely on rainfall for its water supply. The Government declared a state of emergency as families were facing acute shortage of water with the latter being rationed with 2 buckets of water a day from Government water and community water cisterns which the government had taken over at that stage.

The damages from cyclones have been extensive, with TC Ofa being one of the worst tropical cyclones to hit the Pacific Islands together with Tuvalu. TC Ofa struck in 1990, hitting 7 Polynesian Islands; Tuvalu, Wallis & Futuna, Tokelau, Samoa, American Samoa, Tonga, and Niue. It was considered the worst to hit the Polynesian islands since Hurricane Bebe of 1972. Damages were estimated at US$187 million[20].

[18] Cyclone Tino RAT Report

[19] Swamp Taro' scientific name is **Cyrtosperma merkusii.**

[20] https://infogalactic.com/info/cyclone_ofa

Empirical data points to the growing frequency of such quick onset hazards, coupled with the slow onset impacts of climate change has made it necessary, to look closely into the nature of all impending disasters and to be more proactive and better prepared to lessen the impact of such disasters and of the impacts of climate change. Rising sea levels affecting freshwater lenses, loss of coastline, rising sea surface temperatures with possible impacts on the migration of some species away from Tuvalu are just as important to begin addressing now by beginning to adapt to the coming changes before it is too little too late.

5.3 Damages to fisheries from Tropical Cyclone Tino in 2020

The following table gives a breakdown of the damages to the fisheries sector caused by Cyclone Tino in **2020.**

ISLAND	BOATS		CANOES		FISHING GEAR		CFC	
	Wooden	Aluminium	Wooden	Aluminium	Engines	Fishing Gear	Building	Equipment
Nanumea	1	0	15	1	0	0	1	1
Nanumaga	0	1	6	1	0	0	0	0
Niutao	0	6	6	0	0	0	0	1
Nui	0	3	4	0	0	1	1	1
Vaitupu	0	0	0	0	0	0	0	0
Nukufetau	1	1	0	0	0	1	0	0
Funafuti	1	1	1	1	1	1	0	0
Nukulaelae	0	2	1	1	0	0	0	0
Niulakita	1	0	0	0	0	3	0	0
TOTAL	4	14	33	4	1	6	2	3

Table 7 Summary of damages to Fisheries Sector during TC Tino[21].

CFC damage included damage to the building and equipment inside. Damage was estimated at AUD$266,374.20[22]

5.4 Impacts of COVID-19 pandemic on the Fisheries Sector:

Since the advent of the global Covid-19 pandemic, government funding has been prioritized to the protection of Tuvalu from Covid-19. This in turn, has relegated other important activities of the government to lesser priorities. Although Tuvalu has not had any COVID-19 cases, the pandemic has had various impacts on the country and its people.

Impacts include the closure of all international air and maritime borders except for cargo ships, fuel ships and repatriation flights. As such, all sectors reliant on overseas travel have had setbacks. Due to travel restrictions, there have been restricted movement for 77 at-sea fisheries observers which have affected livelihoods of their families. With restricted movement of at-sea fisheries observers, this may open fishing operators in Tuvalu waters to conduct illicit fishing activities as there is no monitoring personnel on-board.

Another impact of the Covid-19 pandemic to fishermen was due to border closure, making difficult access to overseas markets for fishing gear and equipment. Fishermen in the outer island

[21] TC Tino damage assessment reports.
[22] TC Tino damage assessment report

have also commented that fuel supply is decreasing therefore fuel prices are increasing, which affects the number of times that they can go out fishing, which in turn affects supply of fresh fish for local consumption.

Shipping agencies have also been affected losing a significant portion of their revenue, thus laying off staff further affecting livelihoods, whilst loan repayments, maintenance of equipment costs have further depleted their finances due to loss of revenue and no assistance from government.

Lack of frequency of cargo ships has meant that only essential cargoes are uplifted from Fiji to Tuvalu, so non-essential items such as spare parts for outboard engines and other fisheries equipment that Fishermen require are not getting in or taking a long time to get into the country. This has affected the fishermen in their activities as evidenced by some of the complaints that the fishermen raised during the consultations.

Figure 12 *Boat damaged on Nanumea Island during TC Tino. | Photo Credit: Neli Seniola*

5.5 Disaster Mapping[23]

The following map shows cyclone tracks that came within 100 kilometers that affected Tuvalu in the last 30 years.

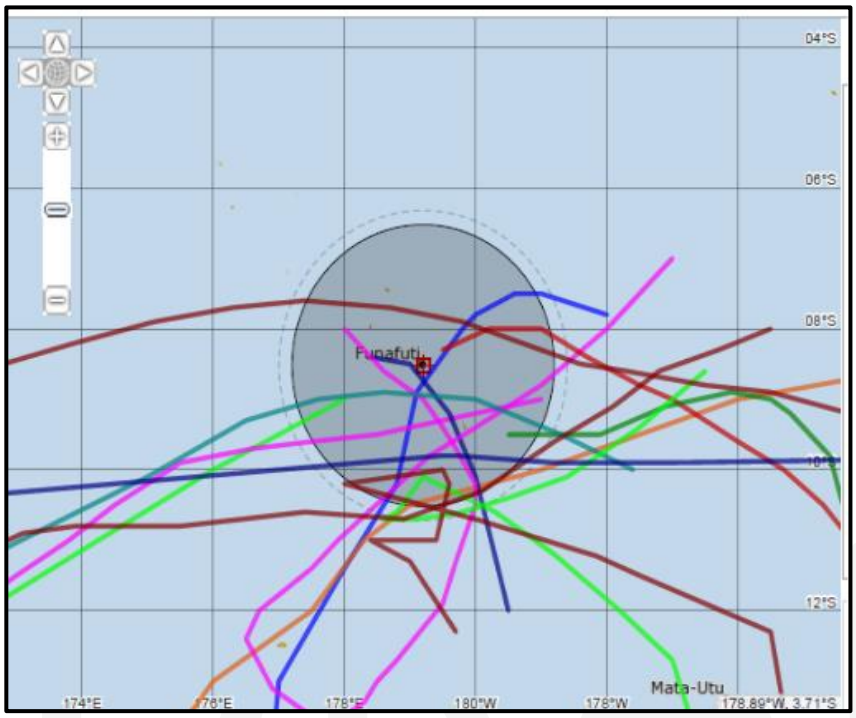


Figure 13 Cyclone tracks within 100 km of Tuvalu over the last 30 years

The following summarizes the impacts of disasters on Tuvalu over the past decades. Damages done to fisheries are not comprehensively stored for later analysis.

- During **Cyclone Bebe**, (19 – 26 October 1972 - 7 days) caused severe damage and impacted mainly on Funafuti. Cyclone killing 5 persons, made 800 residents homeless and destroyed thousands of coconut trees, wrecked 4 ships, damaged food crops, and caused extensive erosion. Most of the damage was caused by hurricane-force winds and an ocean surge that covered half of the island. Reconstruction costs exceeded US$1 million.

- During the 1982 to 1983 cyclone season, **Cyclone Kina** caused considerable damage was suffered by buildings and crops. The newly built wharf on Vaitupu island collapsed under heavy swells, and severe coastal flooding and erosion took place. Widespread damage was also incurred by local crop plantations on several outer islands.

- During **Cyclone Raja**, 22 Dec 1987 – 1st Jan 1988 (10 days) unleashing extensive damage to crops, coastal installations, and buildings because of strong, gusty winds, severe wave action, and flooding of low-lying areas.

[23] Sourced from: http://www.bom.gov.au/cyclone/tropical-cyclone-knowledge-centre/history/tracks/. Please note that this does not include Cyclone Tino which happened in the 2019/ 2020 season.

- During **Cyclone Ofa**, 30 Jan – 7th Feb 1990 (8 days), all nine islands were severely affected, with most local thatched-houses having their roof blown off and/or tumbled. One supermarket building collapsed because of heavy swells. Staff housing and a chapel on Vaitupu island were also lost its roof. Emergency Food Aid and other humanitarian relief assistance were received from donors and the Red Cross. About 60 households were affected and more than 500 people were affected. Reconstruction costs exceeded US$1 million.

- **Cyclone Val** Season 1991 / 1992. No data available in Tuvalu.

- During **Cyclone Joni**, 6 – 13 Dec 1992 (7 days), considerable damage was inflicted on local housing and local crops, and coastal erosion intensified.

- During **Cyclone Gavin** and **Cyclone Hina**, March 2 – 12 March 12 – 17 1997 (15 days) serious damage was incurred by houses, vegetation, and public buildings, accompanied by intensified coastal erosion. Large numbers of houses and outdoor kitchen areas were completely or partially destroyed. Most pit crops were flooded with sea water. Two Primary School classrooms were damaged. A classroom and a dormitory on Vaitupu island were also severely damaged. Reconstruction costs exceeded US$2 million.

- During **Cyclone Keli**, 10 – 15 June 1997 (5 days), most households, gardens and low-lying coastal areas were severely affected. Emergency food aid and other humanitarian relief assistance from donors were also received. Reconstruction costs exceeded US$60,000.

- **Cyclone Zoe**, Season 2002 / 2003. No data available in Tuvalu.

- During **Cyclone Percy**, 25 Feb – 3 March 2005 (7 days), the MV Manu Folau had to sail to the Northern Island group with food provisions before Cyclone Percy reached Tuvalu. The ship had to face gusty winds and very rough seas, and almost capsized.

- During **Cyclone Tino,** January 15th – 24th (11 days). All 9 islands in Tuvalu were affected with damage incurred by all sectors. In the Fisheries sector, dinghies, canoes, fishing equipment were damaged or lost and damage to the Fisheries Communities centers on Nanumea, Niutao and Nui.

5.6 Vulnerability Mapping

Tuvalu's high exposure to a variety of natural hazards has been amply recognized by the United Nations. The National Biodiversity Strategy and Action Plan 2010 – 2015 (May 2010) lists the following 7 climate-related hazards as describing the context of high environmental vulnerability Tuvalu is facing.

HAZARDS	DESCRIPTION	IMPACT ON FISHERIES SECTOR
Sea Level Rise	Sea level rise in coastal areas means that the sea is increasingly encroaching higher ground on already eroded and vulnerable coastlines. This increases the extent of coastal areas subjected to erosion and flooding	Will impact coastal infrastructure such as wharfs, ramps, and all families in Tuvalu
Saltwater intrusion	Sea level rise and the porous nature of soils (atoll islands) create ideal conditions for inland intrusion of salt water and increasing salinity of groundwater lenses.	Low sanitation for washing and cleaning and for fish processing
Inundation	Sea level rise pushes water onto the land surface, thereby causing up swelling in low-lying inundation at pulaka pits (pulaka is a root crop and an important source of carbohydrates for Tuvaluans; it is grown in pits dug into the limestone atoll and fertilized by adding leaves from different plants; the cultivation of pulaka is threatened by inundation; the plant does not thrive in the salt water which seeps into the pits.	Wash away fishing gear, sheds and damage to tool, boats, and engines
Drought	2011 has dramatically reinforced the fear of an increasing frequency of rainfall deficits associated with the El Nino/ La Nina southern oscillation phenomenon, a quasi-periodic climate pattern occurring across the tropical Pacific Ocean roughly every five years. In Tuvalu, drought quickly leads to household water shortages and stress on ground water lenses, which affects all biomes depending on ground water resources.	La Nina conditions affects coral growth which then affects fish populations.
Cyclones	Tuvalu is not spared by the risk of cyclones, which can severely destroy coastal areas, crops, vegetation, and vital infrastructure. Given the unique, low-lying nature of the islands, cyclones lead to flooding, which increases breeding areas for vector-borne diseases in addition to inundation effects	Damage to infrastructure, roads, wharfs, ramps. Also prevent fishermen from fishing especially those reliant on subsistence fishing

HAZARDS	DESCRIPTION	IMPACT ON FISHERIES SECTOR
Rising sea surface temperatures	Rise in sea surface temperatures has had (and will continue to have) coral bleaching effects. It decreases the productivity of near-shore coral reef ecosystems, thereby affecting communities.	Can cause entire fish populations to shift, affecting fisheries traditional knowledge.
Coastal Erosion	Studies of land loss in Tuvalu have revealed that, while coastal erosion closely relates to sea level rise, it is also to a large extent human-induced[24].	Impacts on landing sites functionality

Table 8 Climate related hazards in Tuvalu[25].

Figure 14 Cyclone Damage from TC Tino on Nanumaga Island. | Photo Credit: Kaupule of Nanumaga.

[24] A 2005 research paper by Chunting Xue stated that "the land loss in Tuvalu is mainly caused by inappropriate.

[25] *Source: adapted from (1) Tuvalu National Biodiversity Strategy and Action Plan, prepared for the Government of Tuvalu with the assistance of UNDP, May 2010, p. 59; and (2) various academic studies.*

6 DISASTER RISK REDUCTION ANALYSIS

6.1 Analysis of interviews with NDMO

Disaster Risk Reduction is one component of the Disaster Risk Management Cycle and can be described in different phases of (1) Before a disaster; (2) During a disaster and (3) After a disaster.

Historically Tuvalu has always responded to a disaster and has rarely taken any proactive initiatives. The recommendations section considers the different phases of the Disaster Risk Management cycle.

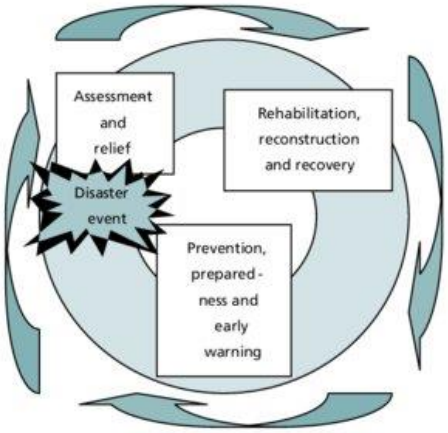


Figure 15 Disaster Response and risk management in the fisheries sector

The NDMO predominantly investigates post disaster responses. This is currently done by the RAT team working in tandem with the Island Disaster committee members. This has been the basis of their work which is more into reactive responses rather than looking into preventive or disaster risk reduction. The National Disaster Management Act 2008 provides the legal framework for action by the NDMO.

The above Act also provides for the management of pre and post effects of natural disasters in Tuvalu and other disaster related matters. It sets out the powers of the Minister responsible for Disaster management in times of disasters. The Act, in its entirety, looks more into preparations after a disaster has struck, with preparations and responsibilities of disaster committees at such both National and Island levels.

However, the current office is poorly manned with a director and two other officers. The lack of staff impedes the effective delivery of services by the Department. The NDMO does not have a National Disaster Plan, which under section 20 of the National Disaster Management Act 2008 mentions that the Plan is to:

(1) define the actions to be taken to deal with disasters in Tuvalu covering all national land and sea areas.
(2) cover requirements for disaster mitigation, preparedness, response, and recovery and,
(3) set out the roles and actions to be taken by government and non-government agencies.

The weakness of the NDMO is directly due to the lack of personnel to adequately fulfill the role of the NDMO as prescribed under the National Disaster Management Act 2008. A poorly resourced office would not be able to effectively deliver the requirements as envisaged under the National Disaster Management Plan.

A Tuvalu National Disaster Risk Management Arrangements was drawn up in 2012 after extensive consultations with the government, non-governmental organizations, civil societies, and other partner organizations. This was established to provide a framework for effective disaster planning. It also provides to firmly accommodate and mainstream disaster risk reduction into government planning and budgeting. The document is quite comprehensive in its approach, and it is divided into 3 parts. Part 1 contains the context and structure, Part 2 deals with the Disaster Management Operational Plan and Part 3 is the Audit/Good governance.

From the analysis of the interviews with the NDMO, the office is still very much handicapped by its capacity to satisfactorily work towards achieving its goal of managing pre and post effects of natural disaster in Tuvalu and other disaster related matters.

The Office does not provide for sectoral approaches in terms of looking into sectors such as Fisheries or Agriculture in times of disasters or looking into disaster risk reductions in these sectors to minimize potential risk that may be encountered by these sectors. These sectors are investigated, together with all other sectors that are affected by disasters. These damages are all reported in the RAT team report.

6.2 Analysis of interview with Tuvalu Meteorological Service

The Office does not have a strong working relationship with the Fisheries sector. This is crucial in terms of early warning systems that could have provided to the Fisheries sector for the benefit of the Fishermen across the country. Apart from their own daily weather bulletins that go over the Radio about weather forecasts, they do not have structured operational plans for data's requirements to the Fisheries sector. According to information sourced from the Tuvalu Meteorological Office, the Fisheries Department sources their own weather and climate information from the Secretariat of the Pacific Community (SPC) and the Forum Fisheries Agency (FFA). The Department further provides advisories to outer islands in cases of cyclones and other hazards that may pass through the nation.

The Department has a lot of data's that the Fisheries Department, fishermen and Kaupule(s) may be able to use. These data include sea temperatures as measured by their Tidal Gauge that was installed a few years back.

Although there is no direct link between the Tuvalu Meteorological Service and the Tuvalu Fisheries Department for early warning delivery to fishermen across the nation, it appears the daily weather bulletins that are broadcasted daily on Radio Tuvalu is sufficient to disseminate

strong wind warnings and put fishermen on alert for such scenarios such as rough seas and strong wind warnings for sea and land areas in Tuvalu.

The climatic conditions of El Niño and La Niña is one phenomenon that have a strong effect on marine life in the Pacific and depending on the season the abundance of marine life is also associated with it.

During El Niño, the upwelling that brings nutrients important for the marine food chain weakens or stops impacting the feeding of important marine species. The warmer water affects tropical species like Yellowtail tuna and Albacore which search for better feeding conditions by moving to cooler waters.

The La Nina 2021: Anticipatory Action for Food Security & Livelihoods in the Pacific Islands report details that during La Niña trade winds are strong, pushing warm water towards Asia. The waters off the Pacific are colder and contain more nutrients, which supports marine life. La Niña increases the risk of rainfall and flooding in some parts of the Pacific and other parts experience drought through reduced rainfall as experienced in Tuvalu in 2011[26]. (Pacific Food Security Cluster & SPREP, 2021) at page 2.

These conditions however are natural conditions that affects marine life in this part of the world.

Figure 16 Tuvalu Meteorological Service Community Early Warning Board

6.3 Analysis of interviews with the Tuvalu Fisheries department (TFD)

Although the Department has not formulated any plans relating to disaster risk reduction in the fisheries sector, some of their activities have been geared towards efforts of minimizing potential damages to fisheries activities. There is a lot of concerns shown by the Department on the damages caused by these hazards such as cyclones, storm surges to fisheries equipment such as boats and community fishing centers.

With the latest tropical cyclone TC Tino of 2020, the Department sent its fisheries personnel to assess the damages done to the local fisheries on the Island and the Community Fishing Centers. The Government have handed the community fisheries centers to the Kaupule on each Island to run. The Report produced a lot of useful data on the damages incurred by Fishermen with their boats, canoes and even their fishing equipment. The report further mentions damages to Fishing Community Centers. Some of these Centre's from the Report appears to be facing the Westerlies which normally brings with it strong winds during the rainy season from October to March annually. For the future consideration should be given re-locating the CFC due to their exposure to the constant Westerly winds.

The TFD have further made proposals with the Fishermen on Funafuti on a plan to construct a Marina to shelter boats from the Westerlies and be lifted out from sea to dry Land. The idea of a Marina suits the lagoon of Funafuti as it is the lagoon side that faces to the westerlies and hence it would be an idea place to shelter the boats from the strong winds.

With Tropical Cyclone Pam in 2015 the Fisheries Department received a grant of $370,000 from the New Zealand Government. The funds were to repair boats, canoes, FADs, and fishery related infrastructure in Funafuti and the outer islands damaged by heavy swells brought about by TC Pam.

There were similar activities done for the recent Cyclone Tino in 2020. According to the TC Tino recovery and Vulnerability reduction plan, the fisheries sector requires some **AUD$851,854.00** to provide for repairs to canoes, boats, purchase of gear and equipment to renovation of CFCs in some of the outer islands.

The damages to the Fisheries sector emphasize the importance of looking into preventive measures where hopefully the damages caused by cyclones could be minimized. In discussions in the outer islands, there were views expressed about the shortage of time to adequately cover important issues on fisheries matter in one day.

The Department in fact offered that they may have a trip to all outer islands conducting surveys and that might be an alternative to the one-day sojourn as planned. The fisheries activities help in community resilience, enhance food security and further strengthening the overall goal of the Tuvalu Fisheries Support program which is ongoing.

6.4 Analysis of interview with FOFA

The President of the Fishermen of Funafuti Association (FOFA) mentioned that they have current plans for construction of a Marina to enable boats to come in and shelter. The location of the FOFA Fish-market is situated near the lagoon and it is near a deep area of the lagoon and this site is an ideal area to construct a marina for boats to come in and at the same time either be lifted out of the water or just anchor in the Marina.

This would also serve the fishermen in terms of coming into the marina to obtain ice-cubes for their catch from the Ice making machine before going out to fish. The Fish market is also where these fishermen could always sell their catches.

The location of the Fish market is sheltered from the westerlies, so construction of a Marina would be an ideal project for the Association to look after its members who are all fishermen.

The Association voiced their agreement with the project, and they see it as especially important that we also investigate ways to minimize the damage from stronger hazards. The small islands do not lend us with much natural defense against strong winds and extremely high seas. So, they agreed that preparations of this sort are important to safeguard the fishermen and keep their gears safe in times of natural hazards.

The members of the Association are around 80 fishermen, and all have boats of various kinds: aluminum boats, fiberglass boats and those made of plywood,

The general feeling that I got from members of FOFA is that they do support what the project is looking into as they are confident that such a perspective will support members of their Association.

Figure 17 **Participants entering consultation meeting Funafuti. Photo credit: Isala Tito Facebook Page.**

They were also encouraged that women and youth are included in the studies as they are also very much involved in fishing. As they mentioned, when the man comes back from fishing, the woman takes over, selling the fish which involves sitting by the roadside for exceptionally long hours trying to sell as much as she could. She would also do other chores such as making salted fish to keep the fish instead of throwing them away.

Apparently, they have also seen the effects of droughts in which they witnessed that it affects their catches with less fishermen coming in to sell their fish as opposed to the good fishing days. In fact, they have somehow noticed from their experience that fishing becomes difficult during drought.

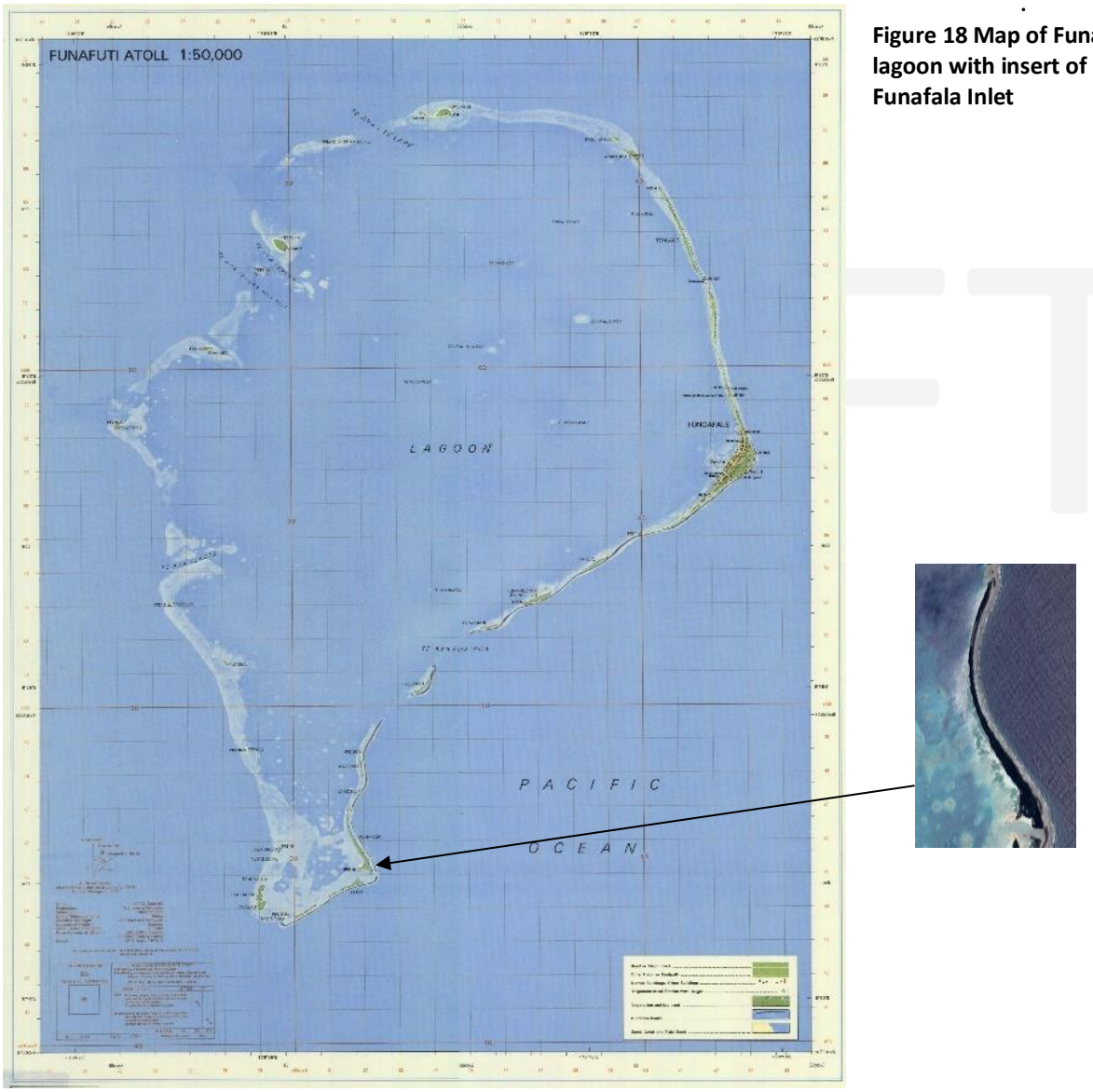


Figure 18 Map of Funafuti lagoon with insert of Funafala Inlet

6.5 Analysis of interview with Kaupule of Funafuti

The Funafuti Kaupule were not hesitant in agreeing with the idea of looking into ways of prevention, minimizing the potential damages caused by cyclones or other disasters. The importance of fishing is more apparent here as it is the capital island of Tuvalu, `and the population is far bigger here to any other Island. Therefore, there is a lot of pressure on fishing as many people in the capital island are somehow involved in fisheries of some sort of manner. This is especially true with reef fishes as the population of the capital is steadily growing.

Like the requirements echoed by the Fisheries Department and the FOFA Association, the Funafuti Kaupule are also looking into construction of a Marina for Fishermen's boats in times of strong winds and especially during tropical cyclones.

The Funafuti Kaupule were not hesitant in agreeing with the idea of looking into ways of prevention, minimizing the potential damages caused by cyclones or other disasters. The importance of fishing is more apparent here as it is the capital island of Tuvalu, `and the population is far bigger here to any other Island. Therefore, there is a lot of pressure on fishing as many people in the capital island are somehow involved in fisheries of some sort of manner. This is especially true with reef fishes as the population of the capital is steadily growing.

Below are the requirements from the Funafuti Kaupule. They have also made fisheries development on this islet called Funafala where quite a few of the Funafuti people are living as some have rented out their homes or simply opted to live in Funafala with lesser people than Fogafale where the seat of the government is situated.

The following table shows the various projects for Funafuti proposed during the consultations with the Kaupule of Funafuti. The following table lists the projects proposed by the Kaupule

	PROJECT	PROJECT SITE	DESCRIPTION OF PROJECT
1	Marina	Funafala	Large enough to accommodate 20 – 50 local fishing boats, size of fishing boats from (15ft – 30ft) in length
2	Solid Ramp	Funafala	Length (10m), Width (6m) To be used for a 12.6m length and 4m width barge
3	Solid Ramp	Fogafale (mainland)	Length (12m), Width (6m)
4	Crane	Funafala	10 tonnage capacity that can lift boats together with engines, cars, and other heavy objects
5	Trailer	Funafala Fogafale	A trailer for a barge of 12.6m (length) and 4m (width) in dimension and be used also for smaller boats
6	Beacons	Funafuti lagoon	12m length to fix on all edges of all boat passages, and on shallow coral reefs in the lagoon.
7	Rescue Boats	Kaupule of Funafuti	Designed to withstand rough seas

Table 9 List of projects proposed by the Kaupule of Funafuti.

Figure 19 Fish for sale at the FOFA Fish market. Photo credit: FOFA Facebook page

6.6 Analysis of interviews with Kaupule of Outer Islands

Table 9 below shows a summary of the opinions of the Kaupule(s) in the outer islands in relation to how they thought to reduce risks in disasters and the preparedness required for disaster risk reduction.

OUTCOMES	NANUMEA	NANUMAGA	NIUTAO	NUI	VAITUPU	NUKUFETAU	NUKULAELAE	NIULAKITA
Grab-Bags	Nanumea have also requested to include lifejackets, raincoats and hats to protect fishermen from the elements	Insufficient numbers of grab bags for all fishermen and fishing boats	Limited number of grab bags available on the island and cannot cater for all the Fishermen.	Not all fishermen on the island have access to grab bags.	Insufficient number of grab bags on the island. Also fishermen are requesting for a VHF repeater station to be installed on Vaitupu for greater VHF coverage	Insufficient grab bags on island	Grab bags have proven to be very useful on the island, however there is only a limited supply. Life-Jackets is also another essential item that Fishermen on the island must have	Passage to and from Niulakita is very rough, thus, the need for additional grab bags for fishermen on the island. Currently, there is only one grab-bag that was given by the Tuvalu Department of Fisheries.
Ramp	Need to increase number of ramps and to improve condition of existing ramps to facilitate easier hauling of boats ashore	Additional ramp at a different location on the island	Construction of a ramp on the eastern side of the island that is sheltered away from strong Westerly winds	Assist fishermen in paulling boats ashore	Construct a ramp and harbour at Motufoua as the channel is very rought		Assist fishermen on the island to haul boats ashore for a sudden onset hazard	The island has no ramp, and the beach ridge is quite steep making it difficult to haul boats ashore. A ramp will assist fishermen on the island in sheltering their boats in adverse weather.
Boat Trailer and Winch	Facilitate easy movement of boats ashore in times of disaster	Boat trailer and winch to facilitate easy movement of boats ashore in times of disaster	A Boat trailer is needed on the island to assist fishermen with pulling of boats prior to sudden onset hazards		Assist fishermen in hauling boats ashore		Assist fishermen on the island to haul boats ashore for a sudden onset hazard	A Boat trailer will assist fishermen on the island in sheltering their boats in adverse weather
Shed/ Shelters for all boats on the island		Boat shed for safe storage of all boats on the island in times of cyclones. Also a locked storage room for valuable fishing gears	TC Tino report shows that boats damaged include boats that were hauled ashore. This demonstrates that even when ashore, risks to boats is high.	Storage of boats during bad weather and cyclone season. Also recommend to have a locked room to store fishing equipment and have the shelter fenced.	To shelter all boats and canoes in times of strong winds and storm surges	For storage of boats and fishing equipment in times of bad weather		A shed to house boats on the island during Cyclone Season and a locked room for Fishing gear
Ice making machine	Continuous supply of ice on the island for preservation of fresh fish	Ice making machine needs maintenance, as the machine is not working as well as it used to	Ice making machine at the CFC is not working. Most fishermen on the island rely heavily on this.	To ensure fishermen have sufficient ice to maintain freshness of fish		Ice making maching to ensure sufficient ice to maintain freshness of catch		The island has limited electricity, thus, imposing a huge challenge for the community in maintaining the freshness of their daily catch
Increse waer storage capacity at CFC		Insufficient water storage capacity at the CFC for fish processing	Insufficient water storage for processing of fish at CFC	Insufficient water storage for processing of fish at CFC			Additional water storage to assist with fish processing.	The current water storage capacity can sustain the community for 3 weeks with no rain. During droughts, fish processing becomes very difficult
Equipment for Boat Repair		Welding machine to repair damaged boats on the island. There is no capacity to fix aluminium boats on the island.	Aluminium boats specifically, can only be repaired in Funafuti as the Niutao Kaupule workshop does not have the necessary equipment to carry out repair work	Welding maching, oxygen cylinder and welding tools to fix aluminium boats on the island			There are 50 aluminium boats on the island, and the need to have equipment to repair them is high considering there is not equipment on the island	
Solar Powered equipment	To assist with cold storage of fish at CFC as electricity is limited. Solar powered freezers and/ or generators will help maintain cold storage of fish	To assist with cold storage of fish as operational costs are quite high for normal freezers.	High operational costs due to high utility bills for the CFC in Niutao			Supplement power supply as electricity on the island is unstable due to lackof capacity to carry out repair work on the island.		

OUTCOMES	NANUMEA	NANUMAGA	NIUTAO	NUI	VAITUPU	NUKUFETAU	NUKULAELAE	NIULAKITA
Fish Aggregating Devices (FAD)		Installation of a FAD as the current FAD was installed incorrectly and is of no use to the island					Assist fishermen on the island not to go further out to sea	To assist fishermen and to avoid going out further to sea
Inland Fish Pond (Milk Fish)		To replicate the successful milk fish poind in Vaitupu at Haapai,	Replicate the succesful milk-fish pond in Vaitupu. There are 24 existing inland ponds in Niutao, in which some can be utilized to build a fish pond					Priority identified during TC Tino
Sea Beacons		Install beacon lights at passages for fishermen returning at night at all ramps			Installation of beacon lights to guide fishermen home safely		Specifically requested for 4 light sea beacons to assist in guiding fishermen ashore	
Fish Cutting equipment	To ensure easier processing of fish for more efficient cold storage			Assist fishermen with easier processing of fish		Fish cutting machine will assist in fish harvesting and preservation		
Post harvest training	Nanumea fishermen and women have expressed interest in increasing capacity in other post harvest trainings						Women present at the meeting expressed their interest in continuous training on various post-harvest methods of food preservation	
Increase cold storage capacity				Increase cold capacity on the island		Need for additional storage capacity on the island, to ensure there is sufficient fish in times of bad weather		
Fish Drying Equipment	Essential for preservation of fish by either drying or smoking.		Current fish drying equipment is slow and cannot cater for the Island's demand for dried-salted fish.			Need for better materials to cover fish while being sun-dried as screens are not suitable. Use of glass has been suggested		
Crane Truck				Assist with pulling boats ashore				
Fish Smoking Equipment			Niutao responded positively to smoked fish and the trainings provided by the Tuvalu Fisheries Department. Fish smoking also provides an alternative protein source for the island besides the traditional salted dried fish					
Rescue Boat	Designed to withstand rough seas				Resue boat and drone for search and rescue purposes	Rescue boat needed to rescue missing fishermen		
Sea Buoy						To provide an anchor for inter island ferry on the island		
Fishing Equipment				Procure fishing nets that comply with Nui By-Laws				
Evacuation Centres	For safe evacuation of everyone in the event of a disaster							

Table 10 Summary of outcomes of consultations with Kaupule of all outer islands related to needs to reduce risks in disasters***7***

7 SWOT ANALYSIS

DESCRIPTION	STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
Intersectoral Coordination	Existence of National Disaster Committee and Island Disaster Committee(s)	There is no coordination in peace times. Coordination only occurs post disaster.	Fisheries assessment to be incorporated into National Assessment(s) and Reporting systems Development of a Continuous Marine Broadcast (CMB) frequency where fishermen and marine vessels can access up to date weather information.	No formal policy or legislation available to support coordination. Leading to lack of preparedness in disasters
Early Warning Systems	Tuvalu Meteorological Service has Early Warning Systems products in place	Fishers rarely uses any of the Early Warning Products	Tuvalu Fisheries Department to work with Tuvalu Meteorological Service on how their services can be utilized. Training with Fishermen Association on how they can use Early Warning systems products	Fishermen do not use the Early Warning products
Infrastructure Protection	None	- Lack of infrastructure to shelter boats during a cyclone/strong winds. - CFCs are in high disaster risk areas.	- constructing of proper infrastructure to shelter boats during cyclone season.	- High cost of building a shelter that will only be used during cyclone season.

DESCRIPTION	STRENGTH	WEAKNESS	OPPORTUNITY	THREAT
			- external assistance (TDF) to invest in Fisheries DRR.	
Protection of life	- Grab bags (sea-safety bags)	- insufficient grab bags for all fishermen on the island - lack of PPEs, e.g., life jackets,	- continuous sea-safety training - mandate minimum safety equipment list for all fishermen who go out fishing	- Tuvaluans general attitude towards personal safety.
Food Security	- Abundant fisheries resources -establishment of LMMAs and MPA - Community Fishing Centers - Traditional method of food preservation	- Insufficient cold storage capacity - unreliable energy supply	- continuous training on post-harvest fish processing, fish-smoking, bottling, - exploration of other sources of power e.g., Solar Incorporate Disaster Risk Reduction measures into Fisheries Department planning	- Over-fishing - Pollution leading to ciguatera fish poisoning

Figure 20 Photo of Consultation with Tuvalu Fisheries Department staff. Photo credit: Vitolia Famasino

8 RECOMMENDATIONS

	RECOMMENDATIONS				
	TUVALU FISHERIES DEPARTMENT	**KAUPULE (s)**	**FISHERMEN'S ASSOCIATION**	**NATIONAL DISASTER MANAGEMENT OFFICE**	**TUVALU METEOROLOGICAL SERVICE**
Prevention of events and processes that could result in disasters	Information on and understanding of disasters and their impacts on the Fisheries Sector need to be improved and disseminated	. 1. Consider prioritising recommendations from Fishermen.	1. Work in collaboration with the Tuvalu Fisheries Department to improve safety at sea guidelines. 2. Work in collaboration with Tuvalu Red Cross to learn First Aid at sea.	To ensure that the Department of Fisheries preparedness, response and recovery actions are incorporated into the revised National Disaser Risk Management Arrangements and National Disaster Management Plan	Provision of early warnings based on climate forecasts specifically for Fishermen Development of a Continuous Marine Broadcast (CMB) frequency where fishermen and marine vessels can access up to date weather information.
Preparedness to respond rapidly and effectively if disaster occur	1. Ensure that all baseline information is up to date. 2. Develop a holistic Fisheries Damage Assessment form. 3. Ensure that there is a Fisheries rep on the Rapid Assessment Team. 4. All Fisheries reps on outer islands are trained on how to collect data to fill out the Fisheries Damage Assessment forms 5. Develop Contingency Plans for different hazards	1.Ensure that the Fisheries Sector is represented at the Island Disaster Committee level or ensure that someone on the IDC is responsible for the Fisheries sector	1. Ensure that all fishermen have the recommended minimum equipment before going deep sea fishing. 2. Ensure that all fishermen know how to use all equipment on their boat/ grab bags etc	1. Fisheries Damage Assessment form is reflected in the Island Disaster Committee Situation Report document 2. Develop Fisheries risk and vulnerability profile in collaboration with the Tuvalu Fisheries Department 3. Community awareness on hazards and associated risks/ impacts	1. TMS works in patnership with TFD, NDMO, Kaupule(s), Fishermens Association to contextualize all Early Warning products available in Tuvalu to Fishermens needs. 2. TMS works in partnership with TFD, NDMO, Kaupule(s), TPS and Funafuti Port Service to provide awareness to all Early warning products mentioned above.
Early Warning to provide information before potentially disastrous events and as soon as possible immediately afterwards	1. Ensure that Contingency plans are activated at the right triggers/ thresholds	Dissemination of warnings to general public and Fishermen's Assocation on CFC sign board	Construction of sign-board at CFC	Coordination with all stakeholders to ensure that all early warning activities are completed/ complied with.	Dissemination of warnings via Radio Tuvalu and to relevant stakeholders

	RECOMMENDATIONS				
	TUVALU FISHERIES DEPARTMENT	**KAUPULE (s)**	**FISHERMEN'S ASSOCIATION**	**NATIONAL DISASTER MANAGEMENT OFFICE**	**TUVALU METEOROLOGICAL SERVICE**
Impact and Immediate Needs Assessment following a disaster	Ensure that Fisheries reps (RAT team) and Fisheries reps on each island work together to collect all relevant data	Collaborate in collection of data for Fisheries Damage Assessment	Assist in collection of data for Fisheries Damage Assessment	Collaborate in collection of data for Fisheries Damage Assessment	Dissemination of warnings via Radio Tuvalu and to relevant stakeholders
Relief or Emergency Response to address immediate humanitarian needs and to protect livelihoods following a disaster	Coordination with NDMO and SPC/ FAO in disaster response needs and appropriate budgets to support NDMO.	Coordination with NDMO in disaster response needs	Coordination with relevant Kaupule	Coordination with Tuvalu Fisheries Department in disaster response needs	Dissemination of warnings via Radio Tuvalu and to relevant stakeholders
Rehabilitation to initialize the restortion and rebuilding of livelihoods	Coordination with national and regional partners to develop budgets and proposals to kickstart rebuilding of livelihoods	Development of Fisheries sector priority needs for submission to Tuvalu Fisheries Department and NDMO	Development of Fisheries sector priority needs for submission to Tuvalu Fisheries Department and NDMO		Conduct refresher awareness activities on early warning messaging
Reconstruction for replacing destroyed infrastructure	Coordination with national and regional partners to develop budgets and proposals	Coordination of construction efforts on the islands	Coordination with relevant Kaupule on construction efforts	Develop Institutional mapping to review responsbilities within the Fisheries sector	Conduct refresher awareness activities on early warning messaging
Sustainable Recovery for longer-term re-establishment and enhancement of livelihoods and livelihood support systems	1. Identify vulnerability reduction initiatives or strategies for inclusion in national strategy plans and annual budget submissions. 2. Strengthen Fisheries Sector Management and Conservation capacities.	Consider other alternatives for fishing such as fish ponds on the island	Engage in capacity building programmes offered by Tuvalu Fisheries Department and NDMO	Review response mechanisms in Contingency Plans	Conduct refresher awareness activities on early warning messaging

9 FINANCIAL IMPLICATION

Product	Specification	Unit Cost	Nanumea	Nanumaga	Niutao	Nui	Vaitupu	Nukufetau	Funafuti	Nukulaelae	Niulakita
Rolled-up Ramp		$ 78,868.55	$78,868.55	$ 78,868.55	$ 78,868.55	$ 78,868.55			$ 78,868.55	$ 78,868.55	$ 78,868.55
In-land fish pond	Outdoor fish tank incl. filter and pumps (5000L)	$ 5,909.98		$ 5,909.98	$ 5,909.98						
Sea beacons buoys		$ 50,000.00		$ 250,000.00			$ 50,000.00	$ 50,000.00	$ 300,000.00		
Rescue boat	Inflatable (Defender RIB 430 Rigid Hull Inflatable (RIB w/Honda BF40	$ 18,995.00	$ 18,995.00				$ 18,995.00	$ 18,995.00	$ 18,995.00		
Drone	DJI FPV Combo	$ 2,099.00									
Ice Making Machine	1 ton ice flake machine (Brand: Ali)	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00				$ 4,800.00	$ 4,800.00
Grab bags		$ 1,724.54			$ 51,736.20	$ 51,736.20	$ 86,227.00	$ 43,113.50		$ 25,868.10	$ 5,173.62
Water-tanks	10,000 ton water tank	$ 3,150.00		$ 15,750.00		$ 3,150.00				$ 15,750.00	$ 12,600.00
Boat-repair equipment	welding equipment	$ 3,095.00		$ 3,095.00	$ 3,095.00	$ 3,095.00				$ 3,095.00	
Fish Aggregating Devices	Materials and shipping only (excl labor cost) (both offshore and inshore FADs)	$ 1,941.30		$ 3,882.60						$ 3,882.60	$ 3,882.60
Boat Shed		$ 75,000.00		$ 75,000.00	$ 75,000.00	$ 75,000.00		$ 75,000.00			$ 75,000.00
Boat Trailer	S520, Length 5200, Width 2050	$ 2,100.00	$ 2,100.00	$ 2,100.00	$ 2,100.00		$ 2,100.00		$ 2,100.00	$ 2,100.00	$ 2,100.00
Winch	3200LBS Hand Winch Synthetic Strap 2-Speed Manual Car Boat Trailer	$ 109.00		$ 109.00						$ 109.00	$ 109.00
Solar-power	10KW system	$ 50,000.00	$ 50,000.00		$ 50,000.00			$ 50,000.00			$ 50,000.00
Fish drying equipment	Stainless Steel, Semi Automatic DELLMARC (100kg)	$ 4,443.65			$ 4,443.65			$ 4,443.65			
Smoke fish equipment	Meat smoking machine	$ 500.00			$ 500.00			$ 500.00			

Product	Specification	Unit Cost	Nanumea	Nanumaga	Niutao	Nui	Vaitupu	Nukufetau	Funafuti	Nukulaelae	Niulakita
Fish cutting equipment	Fish slicing machine	$ 1,241.02	$ 1,241.02			$ 1,241.02		$ 1,241.02			
Post-Harvest Training	Travel fare, allowances & meeting costs	$ 13,840.00								$ 13,840.00	
Evacuation Centers	high-ceiling hall, washroo, kitchen, store-room	$ 250,000.00									
VHF Radios	Barett 2050 HF Transceiver	3,259.00	3,259.00			3,259.00	3,259.00				
Fish cooler		$ 220.87	$ 220.87		$ 220.87					$ 2,208.70	
Waterproof Protective Rain Suit		$35.34	$35.34								
Chainsaw	12-Inch 40V Cordless Chainsaw, 2.0 AH Battery and Charger included	$ 784.90	$ 784.90								
Freezers	17.7 Cubic Feet	$1,240		$2,480	$1,240	$1,240		$6,200		$3,720	
Water Cistern		$ 100,000.00			$ 100,000.00						
Boat Channel		* no quote			no quote		no quote				
Crane Truck		$50,000				$50,000			$50,000		
Fishing Net	5" x 10" Commercial Fish Netting	$520				$10,400					
Drone		$825					$825				
Fish Tackle Shop		*no quote					* no quote	* no quote			
Aluminium Boat		$ 5,000.00									5,000
Outboard Motor	40HP motor	$ 4,000.00									4,000
Marina (35 boats)									2,725,000		
Sub Total per Island			**$160,304.68**	**$441,995.13**	**$377,914.25**	**$282,789.77**	**$161,406.00**	**$249,493.17**	**$ 3,174,963.55**	**$154,241.95**	**$241,533.77**
Total for Whole of Tuvalu			**$5,244,642.27**								

10 CONCLUSIONS

It is the expectation that once the requirements of the reports are realized as per Island requests, the Islands should be in a better position to minimize the damages that normally occurs during disasters.

Currently local knowledge plays an important part during the cyclone periods in all Islands of Tuvalu. Some of the Fishermen take their boats ashore, a few ties their boats to whatever tree strong enough along the coast to anchor their boats where they normally moor their boats on the shore.

It is the envisaged that a plan would result in a stronger working relationship and a more structured link between the Fisheries Department, the NDMO, TUVALU METEOROLOGICAL SERVICE Department and the Kaupule(s) in all outer islands looking particularly into aspects of prevention, how to mitigate the destructions that disasters may bring to the Islands. Disaster Risk Reduction to be considered a priority in their preparations for natural hazards instead of post disaster activities which have proven expensive and destructive for small island developing countries like Tuvalu.

The importance of Disaster Risk Reduction is reflected in a study by UNISDR in that a dollar ($1) spent on Disaster Risk Reduction saves ($15) in building back. This is a particularly important issue for the government to consider in their aspirations for sustainable development. This shows that the mandate for Disaster Risk Reduction does not lie solely with NDMO but should be everyone's concern.

Although we cannot guarantee that we can reduce disaster risk completely, we can use our past experiences, to determine best practices which we can use to implement disaster risk reduction measures. This can be done in the form of developing contingency planning at all levels, and if they exist, reviewing them.

Equipping our people in the Fisheries sector with the best tools available in Tuvalu which incorporates technological innovations such as mobile platforms, satellite phone, GPS, beacons with traditional knowledge acquired over the years with best practices, proactive planning and taking a holistic approach which takes a whole-of-sector approach. **Disaster Risk Reduction is everyone's business**.

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ANNEXES

Annex 1. General information in fish markets and prices

Island	Fish Market	Type of Fishing Products Sold	Price of Fish
Nanumea	Nanumea CFC	Tuna (fresh & salted) Flying Fish (fresh & salted) Oily Fish (salted & dried)	Fresh Tuna: $2.50 - $3 per kilo Salted & Dried Tuna: $14/kg. Salted & Dried Oily Fish: $12/kg. Fresh Oily Fish: $10/kg. Fresh Flying Fish - $1/pc Salted & Dried Flying Fish - $2/pc
Nanumaga	Nanumaga CFC	Tuna Flying fish Wahoo Oily Fish (salted & dried)	Fresh Tuna: $2.50 - $3 per kilo Salted & Dried Tuna: $15 Salted & Dried Oily Fish: $12/kg. Fresh Oily Fish: $10/kg Fresh Flying Fish: $1/pc Salted & Dried Flying Fish: $2/pc
Niutao	Niutao CFC	Tuna Flying fish Oily Fish (salted & dried)	Fresh Tuna: $2.50 - $3 per kilo Salted & Dried Tuna: $13 Salted & Dried Oily Fish: $12/kg. Fresh Oily Fish: $10/kg Fresh Flying Fish: $1/pc Salted & Dried Flying Fish: $2/pc
Nui	Nui CFC	Tuna Flying fish Oily Fish (salted & dried)	Fresh Tuna: $2.50 - $3 per kilo Salted & Dried Tuna: $15/kg. Salted & Dried Oily Fish: $12/kg. Fresh Oily Fish: $10/kg Fresh Flying Fish: $1/pc Salted & Dried Flying Fish: $2/pc
Vaitupu	Vaitupu CFC	Tuna Flying fish Oily Fish (salted & dried)	Fresh Tuna: $2.50 - $3 per kilo Salted & Dried Tuna: $15/kg. Salted & Dried Oily Fish: $12/kg. Fresh Oily Fish: $10/kg Fresh Flying Fish: $1/pc Salted & Dried Flying Fish: $2/pc
Nukulaelae	Nukulaelae CFC	Tuna Flying fish Red snapper Grouper Oily Fish (salted & dried)	Fresh Tuna: $2.50 - $3 Red Snapper & Grouper: $2.50 - $3/kg Salted & Dried Tuna: $14 Salted & Dried Oily Fish: $12/kg. Fresh Oily Fish: $10/kg Fresh Flying Fish: $1/pc Salted & Dried Flying Fish: $2/pc
Funafuti	FOFA Fish Market	Tuna Flying fish Oily Fish (salted & dried) Red Snapper Grouper	Fresh Tuna: $4.50 - $5 per kilo Salted & Dried Tuna: $16 Salted & Dried Oily Fish: $12/kg. Fresh Oily Fish: $10/kg Fresh Flying Fish - $4.50 - $5/kg Salted & Dried Flying Fish - $2/pc. Red Snapper /Grouper: $6 - $7/ kg
Niulakita	None	N/A	N/A

Table 11 Fish Prices by species and by main markets

Annex 2. Minutes of consultations with communities

FUNAFUTI CONSULTATION

DATE & TIME: 30TH March at 9.30am.
VENUE: Kaupule Office & FOFA Fish Market

The consultation with Funafuti was quite simple as it did not require travel. Due to this, separate meetings were organized for the Kaupule as well as the Fishermen on Funafuti Association (FOFA). The meeting with the Kaupule of Funafuti was held at the Kaupule Office, whereas the FOFA meeting was held at the FOFA Fish Market.

The outcome of the meetings with the two groups are as follows:

Outcome of Meeting	Additional Comments
Marina	Marina to be located at Funafala and large enough to accommodate 20-50 boats.
Solid Ramp	Recently, a lot of Funafuti residents have moved to Funafala (an islet). There is no ramp at Funafala and there is a need to assist fishermen on the islet to pull their boats ashore. Currently there are around 60 houses in Funafala.
Crane	There is a need for a crane to be fixed on the solid base on land next to the marina. This crane will enable lifting of heavy objects such as a 10-tonnage boat with engine and others.
Trailer & winch	The trailer will assist in transporting boats to and from the sea. Currently, most fisherman usually look for help in pulling the boat ashore. A trailer will make this process quite easy.
Beacons	12m length beacons to be fixed on edges of all boat passages, and on shallow coral reefs in the lagoon as a marker.
Rescue boats	Assist the Kaupule in its Search and Rescue activities.

The meeting ended at around 12.30p.m.

NANUMEA CONSULTATION

DATE & TIME: 7 April 2021 at 2pm
VENUE: Nanumea Falekaupule

Nanumea was the first island that the team visited. After a courtesy briefing with the Kaupule and all the other visiting officers to Nanumea, the Kaupule divided consultation slots for the visiting team as there were 8 visiting teams that arrived on Nanumea. Our team was fortunate enough to be slotted on the first day. Prior to the meeting, the team took a tour to the Nanumea CFC, took pictures of fishing boats, and used the opportunity to interview two members of the Nanumea Fishers' Association and their spouses. At 2pm, the team then proceeded to the allocated venue for the consultation.

The following matrix captures the discussion on Nanumea.

Outcome of Meeting	Additional Comments
Evacuation Centre	Nanumea's main settlement is exposed to the Westerly winds thus the need for an evacuation center. Currently the main evacuation center is the school on the island, but it lacks the necessities.
Sun-drying equipment	Improve the current design of sun-drying equipment on the islands.
Solar-Powered freezers, invertor (generator) and Lantern (Camping type)	There are insufficient storage facilities to stockpile fish in time for the cyclone season. Additional freezers are needed for this particular purpose.
Tarpaulins	Assist households to put up extra tarpaulins to shelter their homes during strong winds.
Rescue Boat	Assist the island in its search and rescue mission.
Plastic Drums	Assist with food storage/stockpiling in preparation for the Cyclone season.
Fish Cutting machine	Assist with post-harvest fish processing
Ramp	Additional ramp to be constructed at the side of the island that is sheltered during strong winds. Fishermen can use this ramp to pull up their boats.
VHF Radios	Assist with communication when fishermen are out at sea. There is a need to set-up a Command post where Fishermen can report their whereabouts.
Ice-making machine	Assist with pre- and post-harvesting fish processing. Also important for fishermen to have ice when trolling for tuna during the day. The ice will help in keeping the fish fresh.

Outcome of Meeting	Additional Comments
Generator	Power outage decreases the freshness of fish stored in freezers. A generator as a backup power for the fish market will ensure that freshness of fish is maintained.
Coolers	Proper fish storage is required to maintain the quality of the catch.
Raincoats	During a disaster, members of the Island Disaster Committee patrol the island and raincoats will be agree asset.
Trailer + winch	Assist fishermen in pulling boats ashore.

Figure 21 Holding community consultations on Nukulaelae island. Photo credit: Vitolia Famasino.

NANUMAGA CONSULTATION

Venue: Nanumaga CFC
Date: 9 April 2021 at 9am.

All touring officers were called to the Falekaupule where they introduced themselves and what the purpose of their visit is to the Island. There were 6 groups of touring officers all vying for the presence of the Falekaupule members for their consultations. There are 6 Kaupule members on the Islands, unfortunately none attended our consultations however we went on to consult with those who attended.
I then went on to introduce the topic of discussions and how do they see what could be done to protect their fishermen from disasters such as cyclone, droughts just to mention two of the hazards.

They were happy with the idea as this time they are not waiting for the cyclone to struck, but what could be done to help them prepare before a cyclones strike.
Nanumaga Island has no lagoon where boats could shelter in, so they see the construction of an additional Ramp at a different location on the island as a useful idea where fishing boats could be hauled ashore to be protected from the cyclone. Now they have only one Ramp where the island uses when the inter – island cargo vessel comes around on its trips to bring in supplies for the island and for the traveling public.

They further mentioned boat Trailers to assist in the above purposes. That these Trailers could be kept at the CFC premises until such an event and then utilized to assist the Fishermen. They asked that if they can get 2 Trailers to assist with the Fishermen's boat's to be hauled in and to transport boats around the island for easy handling by fishermen.

Besides the Ramp, they have also asked for a boat shed where they can store their boats in during cyclone seasons and be readily available for the fishermen to go back to sea as soon as seas are back to normal. This as they mention is critical to their activities as fish is their daily protein and it is almost a must for them to go back to sea as soon as conditions improve.

To be built in the boat shed is a storeroom for fishing gears could be stored under the supervision of the CFC to avoid any loss whilst kept within the storerooms.
An item that they see which will help their Fishermen on the island is a welding machine where they will be able to repair their boats damage during cyclones and other strong winds. Most boats on the island are aluminum boats and several of them are damaged. In the meantime, they are taken to Funafuti for repairs which involves extra cost to them. A machine on their island will be most useful to them to repair their boats and cheaper for them.

Their ice making machine in the CFC is not working as well as before, in constant need of maintenance, hence their inability to serve fishermen with ice for their fish has also been hampered. Besides Ice making machine are actual freezers to store their fish in and the expectation is if they can 2 new freezers (big ones)
In terms of drought, the CFC has only 2 (2000 liter) water tank for their operations. The see this as insufficient to cater for the needs of the CFC when dealing with fish processing. They would like to secure another 5 water tanks of 2000 liters, or a water cistern of similar capacity would enable them to last longer with what they currently have.

With the current passage they would also like to install beacon lights for fishermen returning in the night. With the new Ramp that they have in mind for Fishermen, they would like to install beacons to make it easy for Fishermen's return at night after fishing. Grab bags is also an item that was mentioned by the President of the Fishermen's Association for their members.

FADs are also mentioned as one of their current fads was installed wrongly at a depth much deeper than what they had anticipated. So, it is under water and of no use to them.

Nanumaga has an inland pond called Haapai in which they would like to grow milk fish in. The only fish that is there is the Tilapia, and they would prefer milkfish which they suggested could be transported from Vaitupu where I; milkfish grows in their lagoon. This could help the islanders during bad days when they could not go out and fish.

Figure 22 Ramp going to Nui Island. Photo credit: Taukelina Finikaso

NIUTAO CONSULTATION

Date: 10 April 2021 at 9am
Venue: Niutao Falekaupule

The Niutao Consultations was different in approach. Like Nanumea and Nanumaga, all touring officers were invited to the Falekaupule to introduce themselves and to inform the Pule Kaupule and its Kaupule members and those attending the consultations on the purpose of their visit to the island prior to breaking up to each individual grouping.
However, instead of breaking up into groups, each touring party was to deliver their presentation to all attendees present at the meeting hall. The DRR Plan (Fisheries Sector) consultation was number 2 on the list.

The team explained the purpose of the consultation, and that it is looking at preparation at the island level to minimize the risks of hazards. The Islands are quite familiar with the activities carried out by the Rapid Assessment Teams (RAT) from the Government that visited the island post-Disaster to take stock of the extent of the damage.
The team further explained, that the DRR Plan aims to minimize the risk of damage prior to a Disaster with a focus on Fisheries-related activities, and what could be done to protect fisheries activities from such hazards.

The Niutao community also shared that Government has not provided any support for boats and canoes damaged during TC Tino.

The Island of Niutao is one of the most difficult Island in Tuvalu to travel to in terms of getting to and from the boat. The passage is very narrow and small and if the sea is choppy, it is quite a difficult task for a boat to maneuver itself ashore and back to the boat. The island itself does not have a Ramp for people to walk on or even cargoes to be taken from the boat to shore. The makeshift ramp is made up of thick rubber-mats laid out on the beach for the Tractors to pull the cargoes from the boat.

Due to this, the main concern of the Niutao community was food security and this is reflected in the responses provided during the Consultation.

Meeting Outcome	Additional Comments
Equipment for boat repair.	Aluminum boat specifically, can only be repaired in Funafuti as the Niutao Kaupule workshop does not have the necessary equipment to carry out repair work.
Grab bags (Sea-safety)	Limited number of grab-bags on the island and cannot cater for all Fishermen.
Inland Fishpond (Milkfish)	Replicate the successful milk-fish pond in Vaitupu. There are 24 existing inland ponds in Niutao, in which some can be utilized to build a fishpond.

Meeting Outcome	Additional Comments
Solar-Powered Electricity at the Community Fishing Center (CFC)	High operational costs due to high utility bills for the CFC in Niutao.
Increase Storage space: - Reefer to store frozen fish in times of Disaster. - Coolers – post harvest handling - Vacuum Storage Pods for post-harvest fish processing	Storage at the CFC and on the island is limited and cannot cater for the whole island for more than a week.
Ice-making machine	Ice making machine at the CFC is not working. Most fishermen relied heavily on this.
Fish Drying machine	Current fish-drying technology is slow and cannot cater for the island's demand for dried-salted fish. Demand is especially high during the cyclone season.
Fish Smoking Technology	Niutao on the island have responded positively to smoked fish and the trainings that were conducted by the Fisheries Department. Fish-smoking also provides an alternative protein source for the island in addition to the traditional salted-fish.
Water Cistern	Insufficient water storage system for processing of fish at the CFC.
Shelter for Boat/Canoe Storage	TC Tino report provided by Fisheries showed that boats damaged by TC Tino included boats that have been pulled ashore. This demonstrates that even when ashore, risk to boats is high.
Boat Trailer	Assist Fishermen with pulling up of boats prior to sudden onset hazards.
Passage at CFC to be excavated deeper	
Ramp at the East side of the island.	Ramp located at a sheltered area that is away from strong Westerly winds.

NUI CONSULTATION

Date and Time: 28 May 2021 10.30am
Venue: CFC Workshop

The meeting began with me explaining what the purpose of the visit, and the kind of information gathering that the project requires. I mention the fact that government during disasters has a RAT team that goes around the nation assessing the damages and if there any imminent needs for urgent humanitarian assistance.

This has been going on for years and we are not yet, it seems prepared for cyclones and other natural hazards. The focus has always been after the hazard has struck and damages are caused and then the RAT team comes in. The project is NOT to assess the damages and what may be needed to rebuild after disasters, but to think ahead.
The focus of this project is to investigate ways where we can mitigate, prevent, or lessen the impact of damages incurred by hazards such as cyclones, storms and wave surges that affects the nation and especially this Island. The focus however is on the fisheries sector and how can we prevent the sector from the damages of these hazards.

The Island of Nui was severely affected during Cyclone Pam of 2015 where damages done to the Island was quite substantial compared to that done to other islands. So, this Island has experiences with damages by strong winds storms, wave surges and tropical cyclones.

Their very first reaction is to construct a Ramp for the fishermen. With this Ramp they also requested for a Crane Truck the purpose as they mention is to lift boats from the Ramp onto Land where they could take them to a boat house to be constructed to house the fishermen's boat during cyclone times. They further requested if the boat house/shed could be built and fenced to keep the fishermen's equipment safe. In the boat shed they have requested if there is a storeroom within it where they the fishermen could store their equipment during strong winds and cyclones.
They would also like boat repair equipment welding machines to repair their Aluminum boats with oxygen cylinders and welding tools, in cases where their boats are damaged by cyclones.

In the boat shed they would also require sufficient space for repairing their boats or for servicing their out-board engines. Also, within this boat shed they would like to have a machine capable of cutting fishes. Where the Ramp and the shed are to be constructed, they shed if the lease could be handled elsewhere.

They also went on to request for grab bags for the fishermen's boats. They mentioned that just last week one of their boats got hit by a wave at the entrance of passage to return

ashore and capsized. The fishermen after trying to rescue their boat just could not get their boat up, they left the boat and swam ashore. The boat was never recovered. They did not have a grab bag to alert people ashore of the problem that they are facing and end up with leaving the boat and all swam ashore for safety.

They further mentioned a radio station hub where this could be installed in the boat shelter for working together with the fishermen and especially when they are out at sea.
They also mentioned Ice-making machine and freezers for their CFC. As an option for food security during bad weather, they requested fishing nets for the Fishermen where during the bad days when their fishing boats could not get out to sea, for fishermen to fish in the lagoon instead with fishing nets. Because of their fish bye laws, the width of the fishing net must be two and half inch to three inches.

The Women requested for additional water tanks to all households in Nui, that they will give us the number of the households at a later period.
The meeting ended at around 11.30am

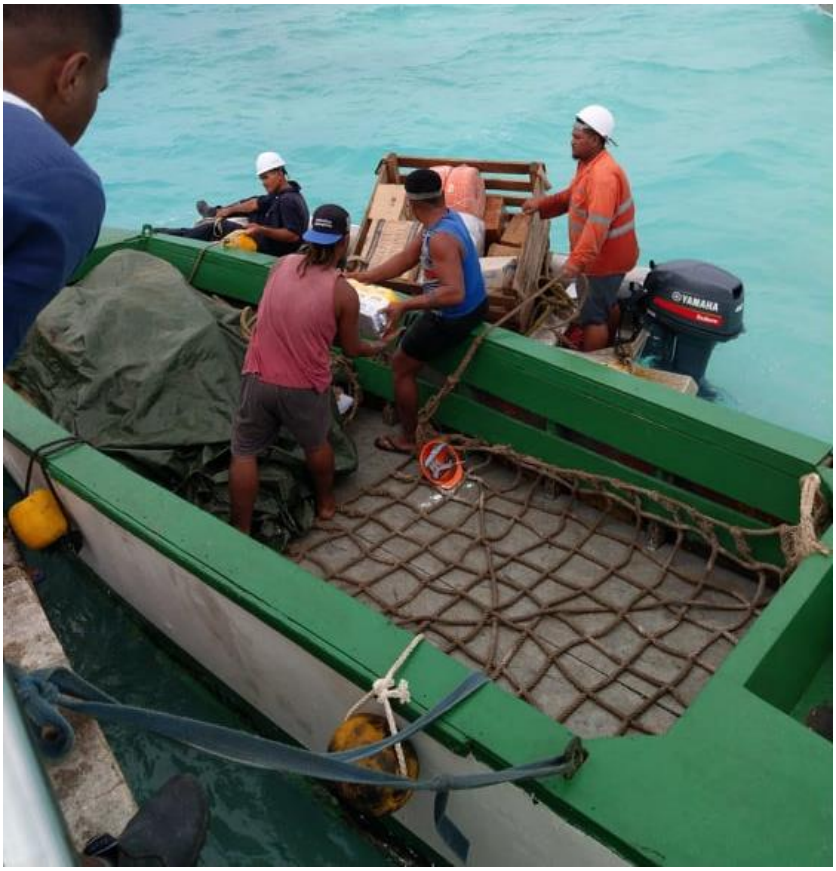

Figure 23 Loading cargo ashore on Nukufetau Island Photo credit: Taukelina Finikaso.

VAITUPU CONSULTATION

The Vaitupu Consultation was done via Zoom Video Call. Two meetings were organized, where the first meeting comprised of 10 members of the Vaitupu Fishers' Association and the second meeting comprised of representatives from the Kaupule (Local Government), the Falekaupule (Local Assembly), Youth Group and Women's Group.

The first meeting was held on the 15th of April 2021 at 2pm. Whereas the second meeting to verify and confirm outcome of the first meeting was held on the 21st of April 2021 at the Kaupule Office.

The outcome of the first meeting was tabled to the second meeting for verification and confirmation. The outcome of the meeting is detailed below.

Meeting Outcome:

Question 1: What preparatory measures do Fishermen take prior to a hazard.

Strong Winds:

- Fishers' Association, Youth Group on the island, Kaupule collaborate to pull up all dinghies ashore and move to a sheltered area.

Drought:

- Fishermen use coconut leaves to shelter dinghies/canoes from scorching sun.
- Communal owned water cisterns are opened to the public to be used for cooking and fish processing.
- Underground well water is used for bathing and washing.

Flooding:

- Dinghies moved from the boat-harbor ashore.

Question 2: What assistance do fishermen require to prepare for a hazard.

Meeting Outcome	Additional Comments
Shelter to house dinghies and canoes.	With the dinghies pulled ashore, there is still a high risk of dinghies getting damaged by strong winds.
Trailer	Assist fishermen in pulling up dinghies.
Improve the channel at Motufoua	During cyclone season, the main boat harbor is not used due to bad weather. Fishing boats use the Motufoua harbor to go to and from shore. Fishermen sees this as a priority due to rough channel at Motufoua.
Grab bags	Grab bags have become an essential safety item to fishermen in Tuvalu.

Meeting Outcome	Additional Comments
Sea beacon light, light reflector to be installed at wharf	Guide fishermen ashore at night.
Improve communication at sea.	Short range of current handheld transceiver that come in the grab bags. Fishermen is requesting for antenna support to increase the range.
Rescue Boat	House at the Vaitupu CFC, assist with rescuing of stranded fishermen.
Drone	Assist with Search and Rescue of stranded fishermen.
Fishing Tackle Shop	

Question 3: Impacts of COVID-19 on Fishermen on Vaitupu.

Tuvalu now is still COVID-19 free, however the impacts can be felt through border closure and the delay and uncertainty of shipping schedules to Tuvalu.

- Increase in the price of fuel. Prior to COVID-19, fuel was $2.00 per liter, now its $2.50 per liter.
- Fuel usually runs out on the island; thus, Fishermen are forced to buy in bulk to ensure that there is enough fuel for fishing.
- Marine plywood has been out-of-stock in hardware shops in Funafuti, thus, ordering directly from Fiji.
- Supply of fishing lures, fishing lines and other fishing equipment usually ordered from Fiji, takes a long time to arrive by boat.

NUKUFETAU CONSULTATION

Date and Time: 31 May 2021
Venue: Nukufetau Kaupule Conference Room

The meeting started with the explanation of the project and what it aims to achieve. The team went on to explain what Government has done so far in relation to Disaster. Part of Government actions is to dispatch a RAT team to assess the damages that was caused by a natural hazard. The aim of the current consultation is to take a more proactive approach in island's response to Disaster.

The consultation will focus on what can be done to lessen the impacts or reduce the damages caused by hazards such as strong winds, storms, cyclones, or wave surges and particularly the impacts on the Fisheries sector.

The following captures the discussion on Nukufetau.

Meeting Outcome	Additional Comments
Storage facilities (freezers).	There is a need for additional storage capacity for the island, to ensure enough fish is preserved for bad weather. Due to insufficient food storage, people consume high amount of imported canned meat for daily protein need. An additional 5 freezers will be sufficient for the island.
Back-up generator (Solar-powered)	Electricity on the island has been unstable lately, and Tuvalu Electricity Corporation has stated that the reason for the power outages is the lack of capacity to carry out repair work. With COVID-19 and closure of borders, the engineers that are supposed to carryout period maintenance of power systems are unable to travel to Tuvalu.
Ice-making machine, fish cutting machine	Ice to maintain freshness of catch when trolling during the day and for fish processing. Fish cutting machine will greatly assist in fish-preservation.
Fish-drying technology	Current fish-drying technology uses screen to cover the fish being sun-dried from flies, birds, and the like. Screens are not effective, thus the need for better materials to cover the fish while being sun-dried. Fishermen on Nukufetau has mentioned the use of glass material for sun-drying.
Boat shed/shelter	The main settlement on Nukufetau is well sheltered from cyclones. However, there is still a need for a shed to safely store boats and fishing equipment during Cyclone season.
Rescue boat & Grab-bags.	In the past 5 years, two Nukufetau fishermen were rescued after activating Personal Locator Beacon in the grab-bags. However, the rescue was carried out by the patrol boat,

Meeting Outcome	Additional Comments
	which responded to the distress call. A rescue boat will assist the Kaupule/ Fishers' Association in carrying out rescue mission. Grab-bags are needed by all fishermen, not only a few.
Fishing equipment such as lines, fishing nets & hooks. Spare part for outboard motor.	Upon closure of border due to COVID-19, it has been difficult for fishermen to buy fishing equipment including spare-parts for outboard motor. Importers are mostly diverting resources to stockpiling imported food due to irregular cargo vessel schedule to Tuvalu.
Sea-buoy	To provide an anchor for the inter-islet ferry on the island. Currently, the ferry uses the reef as an anchor.

Figure 24 Smoking fish training in Tuvalu. Photo credit: Petesa Finikaso

NUKULAELAE CONSULTATION

Date and Time: Saturday 24 April 2021 at 11.30 am
Venue: Nukulaelae Falekaupule

The meeting began with introductions and explanation on the purpose of the visit to Nukulaelae. Building on the communities' knowledge on the Rapid Assessment Team that visits the island to carry out an assessment on the damages incurred post-hazard. It was briefly explained that the purpose of the visit was to develop a plan focusing on enabling the Fisheries sector to prepare for hazards such as cyclones, storm surges, droughts and so forth.

On this Island, a Boat Harbor is being currently being constructed and it is almost completed, and this is basically for the inter-island vessel carrying cargoes and passengers to and from the boat.

Outcome of the consultation are as follows:

Meeting Outcome	Additional Comments
Ramp, trailer, and winch to pull boats ashore.	Assist fishermen on the island to pull all boats ashore for a sudden onset hazard.
Grab-bags (Sea-safety) and lifejackets	The Nukulaelae fishermen and their spouses have mentioned that the Grab bags provided by the Department of Fisheries are particularly useful. However, not all fishermen have grab-bags. Lifejackets are also another essential item that Fishermen on the island must have.
Increased Storage spaces (coolers & baskets)	Insufficient storage space for post-harvest catch.
Tools for Community Fishing Centers including: - Tables - Ice making machine. - Freezers	CFC on the island cannot cater for community needs, as it has insufficient number of tables and freezers. Ice-making machine which the community have been heavily relying on is not operational. The spouses of fishermen are forced to salt & dry excess catch to maintain its edibleness.
Post-harvest training	Women present in the meeting have expressed interest in continuous training on various post-harvest methods.
Sea beacon	Specifically requested for 4 light sea-beacons to assist in guiding fishermen ashore.

Meeting Outcome	Additional Comments
Fish Aggregating Devices (FADs)	Assist fishermen on the island not to go further out to the sea.
Meeting Outcome	**Additional Comments**
Additional water storage for the Nukulaelae CFC	Additional water tanks to assist with fish processing. The Nukulaelae women shared that if does not rain for 2 weeks, the current water capacity of 4 water tanks is insufficient to process fish stored at the CFC.
Equipment for Boat Repair	There are 50 aluminium dinghies on the island, and the need for proper equipment to carry out repair work on the aluminium dinghies is high.

Figure 25 Passage at Nukufetau Island at dusk. Photo credit: Taukelina Finikaso

NIULAKITA CONSULTATION

DATE & TIME: 22 April 2021 at 9.30 am
VENUE: Niulakita Falekaupule (Salamanu 2)

There were only two touring teams due mainly to the difficulty in getting ashore to this Island. It has no ramps and the passage for the boats to bring in passengers and cargoes from the vessels ashore can be very rough. It is also the smallest Island in the Tuvalu group, and it is administered and settled by the people of Niutao, and a few families live on the island with about 14 -15 families on the island. Niulakita has a population of less than

50 people and at its most populated they will be around 70 or so people.

Both meetings were held in the same venue, the other touring team had their meeting first and our team followed. The meeting began with introductions and explaining the purpose of the visit to the island. Like all the other islands that the team has visited, there was a positive response from the community as the fisheries' sector constitutes 60% of the communities' food source.

Niulakita, similarly to the other islands of Tuvalu has battled strong winds, cyclones, and droughts. Niulakita is a small island of some 40 hectares in size. The seas surrounding the island can be very rough, and the passage for boats to come ashore can also be dangerous. Due to this, most touring officers usually forego the island.

The outcomes of the meeting are as follows:

Outcome of Meeting	Additional Comments
Grab-bags	Passage to and from Niulakita is very rough, thus, the need for additional grab bags for fisherman on the island. Currently, there is only one grab-bag that was given by the Department of Fisheries for the island. Technology such as handheld transceiver that comes with the grab-bag provides a lot of security for fishermen that go out to the sea.
Increase water storage capacity in the form of a communal water cistern.	The current water storage capacity on the island can sustain the community for a maximum of three weeks without rain. During droughts, fish processing becomes difficult.
Ramp and trailer	The island has no ramp, and the beach ridge is quite steep making it difficult to haul boats ashore. When boats are pulled up, it is done manually. A ramp and trailer will assist fishermen on the island in sheltering their dinghies during bad weather.

Outcome of Meeting	Additional Comments
Shed/Shelter for all boats on the island.	A shed to house all boats on the island during Cyclone season and a locked room for fishing gears.
Ice-making machine, solar-powered freezers, or a generator	The island has limited electricity, thus, imposing a huge challenge for the community in maintaining the freshness of their daily catch.
Fish Aggregating Devices (FAD)	The Tuvalu Fisheries Department has yet to deploy FADs in Niulakita. The community has requested for FAD to assist fishermen and to avoid going further out at sea.
Aluminium Boat and Motor	Currently, Niulakita has two boats on the island. One is still operational, whilst the other is beyond repair. An additional boat will assist the community to increase its food security.

In listening to the elders of the island relaying their stories of life on the island, one can see the importance of building the resilience of the Island to provide preventive measures against the hazards that the island has encountered. The sustainable utilization of fishery resources and the building of agricultural products on the island should be duly considered in disaster response and in preparation for cyclone seasons as people know these probable times and hence preparedness is one aspect that the people of the islands should be encouraged to take into considerations.

The meeting ended at around 12.30p.m.

Annex 3. List of persons interviewed.

	Title	Name	Designation	Organization/ Island
1	Mr.	Samasoni Finikaso	Director	Tuvalu Fisheries Department
2	Mr.	Michael Batty	Fisheries Advisor	Tuvalu Fisheries Department
3	Mrs.	Malifaga Niukena	Head of Operation & Development Officer	Tuvalu Fisheries Department
4	Mr.	Tala Simeti	Fisheries' Economist	Tuvalu Fisheries Department
5	Mr.	Nelly Seniola	Training & Development Officer	Tuvalu Fisheries Department
6	Mr.	Pafini Fepuali	Assistant Operational & Development Officer	Tuvalu Fisheries Department
7	Mr.	Paeniu Lopati	Resource Management officer	Tuvalu Fisheries Department
8	Mrs.	Vitolia Famasino	National Assistant Officer	Tuvalu Fisheries Officer
9	Mr.	Luka Selu	Acting NDMO	National Disaster Management Office
10	Mr.	Niko Iona	Acting Director	Tuvalu Meteorological Services
11	Mr.	Alamoana Tofuola	Meteorological Officer	Tuvalu Meteorological Services
12	Mr.	Ioapo Tapu	President	Fishermen on Funafuti Association (FOFA)
13	Mr.	Lota Pokia	Member	Fishermen on Funafuti Association (FOFA)
14	Mr.	Peleketa Kaino	Member	Fishermen on Funafuti Association (FOFA)
15	Mr.	Silafai Siona	Member	Fishermen on Funafuti Association (FOFA)
16	Mr.	Semi Vine	President	Kaupule Funafuti
17	Mr.	Teleke Lauti	Member	Kaupule Funafuti
18	Mrs.	Apiseka Fousaga	Member	Kaupule Funafuti
19	Mr.	Toma Liveti	Member	Kaupule Funafuti
20	Mr.	Karl Asaelu	Member	Nanumea Fishers' Association
21	Mrs.	Hamola Karl	Wife of a Fisherman	Nanumea

	Title	Name	Designation	Organization/ Island
22	Mr.	Vailahi Paolo	Member	Nanumea Fishers' Association
23	Mrs.	Pesita Vailahi	Wife of a Fisherman	Nanumea
24	Mr.	Vaelei Vaelei	President – Fishers' Association	Nanumea
25	Mr.	Tofinga Paitela	President – Kaupule	Nanumea Kaupule
26	Mrs.	Velemina Nakata	Women's Rep	Nanumea
27	Mr.	Falemalu Siaosi	Youth Rep	Nanumea
28	Mr.	Tonia Auala	Fisheries Data Collector	Nanumea
29	Mr.	Uoka Faleti	Kaupule – Fisheries	Nanumea Kaupule
30	Mrs.	Mola Pato	General Manager – CFC	Nanumea
31	Mrs.	Laumoe Litata	Women's rep	Nanumea
32	Mr.	Vaotogo F	Staff	Nanumaga CFC
33	Mr.	Iveni Lito	President	Nanumaga Fishers' Association
34	Mr.	Alvin Tumua	Staff	Nanumaga Kaupule
35	Mr.	Lotelika Tausi	General Manager	Nanumaga CFC
36	Mr.	Luka Teiaputi	Member	Nanumaga Fishers' Association
37	Mrs.	Malakei Alofagia	Women's Rep	Nanumaga
38	Mr.	Sililata Esekia	Youth Rep	Nanumaga
39	Mr.	Teinamasi Isopo	Member	Nanumaga Fishers' Association
40	Mr.	Malua Auega	Member	Nanumaga Fishers' Association
41	Mr.	Ioelu Hauma	Member	Nanumaga Fishers' Association
42	Mr.	Sikiga Kitasi	President – Kaupule	Nanumaga Kaupule
43	Mrs.	Taimoe Faitalia	Kaupule Planner	Nanumaga Kaupule
44	Mrs.	Talagi Makaili	Member	Niutao Community
45	Mr.	Pea Tupou	Member	Niutao Community
46	Mr.	Takamio Foilape	President	Niutao Red Cross
47	Mrs.	Sieni Tima	Member	Niutao Community
48	Mrs.	Patioko Kapua	Member	Niutao Community
49	Mrs.	Ila Folau	Member	Niutao Community
50	Mr.	Alusei Leota	Member	Niutao Community
51	Mr.	Mauatu Tepoga	Member	Niutao Community
52	Mr.	Nikoli Noa	Member	Niutao Community
53	Mr.	Fapupula Nofoala	Member	Niutao Community
54	Mrs.	Lose Telua	Member	Niutao Community

	Title	Name	Designation	Organization/ Island
56	Mr	Gatui Enosa	Member	Niutao Community
57	Mrs.	Gasote Sioni	Member	Niutao Community
58	Mr.	Tanei Talipoa	Member	Niutao Community
59	Mr.	Kapua Saluu	Member	Niutao Kaupule
60	Mr.	Tepaa Tautai	Member	Niutao Kaupule
61	Mr.	Taufala Nia	Secretary	Niutao Kaupule
62	Mr.	Tauee Teaukai	President	Niutao Kaupule
63	Mrs.	Paufi Tepaa	Member	Niutao Kaupule
64	Mr.	Pinoka Sailusi	Council Member	Niutao Community Council
65	Mr.	Lepaio Tauamatua	Council Member	Niutao Community Council
66	Mr.	Katoto Tepoga	Member	Niutao Community
67	Mrs.	Eseta Tau	Member	Niutao Community
68	Mrs.	Siniva Nikoli	Member	Niutao Community
69	Mr.	Katepu Lipua	Member	Niutao Fishers' Assocation
70	Mr.	Taliu Niukena	Member	Niutao Fishers' Assocation
71	Mrs.	Sina Vailele	Member	Niutao Community
72	Mr.	Malua Kilifi	President	Nui Fishers' Association
73	Mrs.	Saugali Neleta	Youth Rep	Nui Community
74	Mrs.	Violet Maatusi	President	Nui Women's Association
75	Mr.	Maselusi Boreham	Member	Kaupule Member
76	Mrs.	Tuluiga Neleta	General Manager	Community Fishers' Association
77	Mr.	Sikope Teasia	Vice President	Nui Fishers' Association
78	Mrs.	Eriaba Mataio	Youth Rep	Nui Community
79	Mrs.	Iaeli Penehuro	Women's Rep	Nui Community
80	Mrs.	Malae K Anoo	Women's Rep	Nui Community
81	Mrs.	Olive Taom	Vice President	Nui Community
82	Mr.	Kilisome Topai	Fisherman	Vaitupu Fishers' Association
83	Mr.	Manatoa Maio	Fisherman	Vaitupu Fishers' Association
84	Mr.	Tioni Talia	Fisherman	Vaitupu Fishers' Association
85	Mr.	Takataka Onosai	Fisherman	Vaitupu Fishers' Association
86	Mr.	Paitela Kelemene	Fisherman	Vaitupu Fishers' Association
87	Mr.	Fousaga Iuta	Fisherman	Vaitupu Fishers' Association
88	Mr.	Pokia Kolone	Fisherman	Vaitupu Fishers' Association
89	Mr.	Niutea L	Fisherman	Vaitupu Fishers' Association
90	Mr.	Sikaa Uea	Fisherman	Vaitupu Fishers' Association
91	Mr.	Teagi T	Fisherman	Vaitupu Fishers' Association
92	Mr.	Manu Peniamina	Fisherman	Vaitupu Fishers' Association
93	Mr.	Maputoka Kilisimasi	Youth Representative	Vaitupu Community
94	Mrs.	Kalosieta Teleke	Women's Rep	Vaitupu Community
95	Mrs.	Takeisi Danny	Women's Rep	Vaitupu Community

	Title	Name	Designation	Organization/ Island
97	Mr.	Tekaibo Philip	General Manager	Nukufetau CFC
98	Mr.	Makesi Lipua	Fisherman	Nukufetau Fishers' Association
99	Mr.	Letia Vaaia	Fisherman	Nukufetau Fishers' Association
100	Mrs.	Naomi Kiuti	Women's Rep	Nukufetau Community
101	Mrs.	Fuifui Afeega	Women's Rep	Nukufetau Community
102	Mrs.	Siata Mailagi	Women's Rep	Nukulaelae Community
103	Mrs.	Pua Koliano	Wife of Fisherman	Nukulaelae Community
104	Mrs.	Losa Viosa	Women's Rep	Nukulaelae Community
105	Mrs.	Sepoima Tafia	Youth Rep	Nukulaelae Community
106	Mrs.	Palanitina Saosaoa	Youth Rep	Nukulaelae Community
107	Mr.	Pule T	Fisherman	Nukulaelae Fishers' Association
108	Mrs.	Olalei Dan	Youth Rep	Nukulaelae Community
109	Mr.	Pouleta Uatea	Fisherman	Nukulaelae Fishers' Association
110	Mrs.	Lillian Tepaolo	Women's Rep	Nukulaelae Community
111	Mrs.	Peteli John	Women's Rep	Nukulaelae Community
112	Mrs.	Siliva Timo	Women's Rep	Nukulaelae Community
113	Mr.	Koliano Alama	Fisherman	Nukulaelae Fishers' Association
114	Mr.	Tavita Melita	President	Nukulaelae Fishers' Association
115	Mr.	Fatuvae Vaiuli	Island Head	Niulakita Community
116	Mr.	Fiti Manatu	Fisherman	Niulakita Community
117	Mr.	Tefau Peia	Island Pastor	Niulakita Community
118	Mr.	Malona Kauea	Youth Rep	Niulakita Community
119	Mrs.	Lynn Teiaputi	Women's Rep	Niulakita Community
120	Mr.	Fiatala Tuivaka	Member	Niulakita Community


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