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Summary/short description/key points:

This Paper provides an update to Heads of Fisheries on the work of FAME and its partners to assist its members with enhancing the technical information for adapting fisheries to climate impacts and capability support for negotiating climate action within national, regional and international fora.

Considerable work has been undertaken by FAME on estimating the impact of climate change on the level and distribution of the region’s four main tuna stocks. This work is ongoing and is currently undergoing refinement to examine EEZ scale changes as well as impacts at the stock level. Projections for EEZ scale analyses are expected to be completed in 2023-24 under current resourcing arrangements. FAME is also undertaking analyses to estimate how quickly the western and central Pacific is changing due to climate impacts and the cost-effective approaches to how this change can be easily monitored.

Coastal fisheries and aquaculture are already being negatively impacted by climate change through ocean acidification, habitat loss through bleaching, and extreme storm events. FAME is focused on assisting Members with developing evidence-based planning, policy and management strategies for more resilient and sustainable coastal fisheries and aquaculture development. However, even with sustainably managed coastal fisheries, continued declines in fish and shellfish abundance due to climate change impacts are expected to occur, increasing the gap between local fish demand and the sustainable supply. FAME is working on livelihood diversification options and increasing community access to tuna and other pelagic resources to maintain food security.

Recommendations:

Members and partners are invited to:

- Endorse FAME’s climate work programme described in Annex 1 and 3 of this report.
- Support the process outlined in Information Papers 7 and 8 on developing the essential research infrastructure at SPC to implement the climate work programme.

Updated climate projections

Projected impacts of climate change on the oceanic environment relevant to fisheries

1. The main changes that have occurred and are projected to continue to occur are as follows:
 - The current expansion of the Western Pacific Warm Pool is tracking the expectation of climate projections. Average sea surface temperature in the Warm Pool has increased by ~0.7°C since 1900 and is expected to continue rising by 1.2–1.6°C by 2050 relative to 1980-1999, and 2.2–2.7°C by 2100, under a continued high emissions scenario.
 - The climate models predict a reduction in the level of mixing between deeper water and the surface, reducing the productivity of surface waters and affecting the food web on which tuna depend.
 - Weaker trade winds and equatorial currents are predicted to reduce the westerly transport of primary and secondary productivity from the central equatorial Pacific into the Western Pacific Warm Pool, negatively impacting the abundance of tuna prey.
 - The ocean is absorbing a large proportion of the atmospheric CO₂ generated by human activity resulting in lower pH (higher acidity) and less available calcium carbonate (i.e. ocean acidification).
 - Sea level rises, under a high emissions scenario, projected to be in the range of 40–90cm by 2090

Projected impacts of climate change on tuna stocks and fisheries

2. The above changes in the ocean environment are predicted to impact the abundance and distribution of the tuna stocks. Projections indicate:
 - An easterly displacement of tropical tuna stocks from the western Pacific towards the central and eastern Pacific. The impact of this change in distribution is expected to reduce annual purse-seine catches in Pacific EEZs between 10–30% with a corresponding annual loss in regional tuna-fishing access fees between USD40M to USD140M, and reductions in government revenue between 8% and 18% for individual Pacific SIDS.
 - Projections for South Pacific albacore are very uncertain because of the sensitivity of albacore to sub-surface oxygen concentration and the considerable uncertainty of oceanographic model predictions in this regard. However, it is possible that ocean warming could expand the spawning habitat of albacore, with positive impacts on population size.

Coastal fisheries and aquaculture

3. Many of the coastal fisheries in the Pacific are already in decline and increasingly threatened by overfishing, coastal development, and land-based run-off and pollution. Healthy coastal habitats are critical for sustaining coastal fisheries. Habitat loss results in reduced fish abundance, diversity and availability, making coastal fisheries more susceptible to impacts

from climate change. The current degradation of coral reefs, mangroves and seagrasses, and the resources they support, will be further exacerbated by climate change through:

- more frequent coral bleaching due to increasing sea surface temperatures;
 - ocean acidification affecting coral growth, larval fish and shelled invertebrates;
 - higher frequency of extreme weather events;
 - increased rainfall causing greater runoff, erosion, nutrient loads and sedimentation; and
 - sea level rises increasing storm effects and erosion of shoreline habitats.
4. Coastal fisheries, including both fish and shellfish, are projected to decline in total production compared to the present, but with different rates of decline in the eastern and western Pacific.
 5. Aquaculture, especially mariculture, is also vulnerable to climate change. The mariculture of fish and shellfish face major uncertainties, in part, due to the potential effects of ocean acidification on larval fish and shells, and to stresses from high temperatures reducing growth and survival. The higher temperatures are also likely to increase the prevalence of pathogens, potentially increasing future disease risks. Modifications will be required to the pond culture of tilapia, milkfish and prawns to mitigate higher rainfall, increased flooding, increased sediment loads in water supply and warmer temperatures, however freshwater aquaculture is a potential beneficiary of increased surface water availability.
 6. The critical importance of coastal fisheries and aquaculture to Pacific Island communities has been recognised by the Leaders when they noted the links between coastal fisheries and communities, food security, health issues and in particular non-communicable diseases.
 7. The region has already agreed to the strategies to more effectively manage the region's coastal fisheries as laid out in "A New Song for Coastal Fisheries— Pathways to Change: The Noumea Strategy" and the coastal component of the "Future of Fisheries Regional Roadmap for Sustainable Fisheries". These are the focus of SPC's Coastal Fisheries and Aquaculture Programme. To minimise the impacts from climate change, immediate and concerted actions are required at the local, national and regional levels to ensure coastal fisheries are managed for sustainability, currently over-exploited species stocks are restored, and the degradation and decline of coastal habitats are reversed.
 8. However, even with sustainably managed coastal fisheries, declines in fish and shellfish abundance due to climate change impacts will widen the gap between the increasing demand for fish and invertebrates by growing island populations, and the levels of sustainable harvests. The diversification of livelihoods, and increasing access to tuna and other pelagic fish by coastal communities to maintain domestic food security will be increasingly important.

FAME's programme on climate

9. FAME's work programme on climate has been developed to support the implementation of climate-related work necessary to achieve the objectives of the FAME Business Plan and the needs of Pacific administrations as they adapt their fisheries to climate change. The programme is designed to be proactive so that administrations are able to provide regional

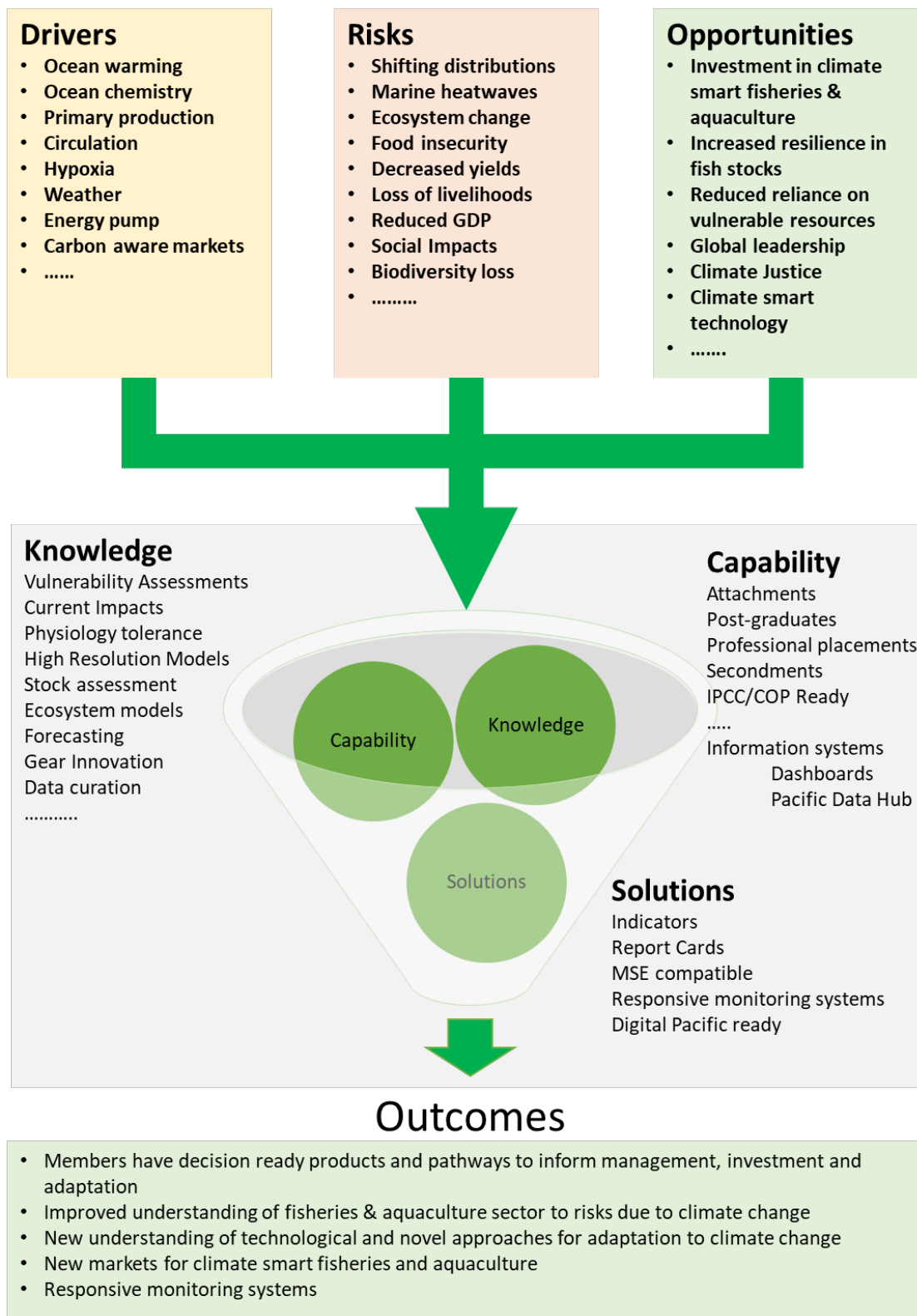
and global leadership to protect and enhance Pacific livelihoods and sustainable use of its fisheries resources under a changing climate.

10. FAME has developed the work programme to be integrated into wider CROP initiatives and within the Pacific Community and PCCOS. It supports the Pacific Data Hub and Digital Pacific Initiatives.
11. The work programme is divided into three theme areas:
 - Knowledge generation – this work area provides the region with the baseline information and tools necessary for evidence-based policy development and decision making towards resilient fisheries and aquaculture (e.g. how quickly is the environment changing, how vulnerable are species and ecosystems to this rate of change, how vulnerable are fishing households, modelled impacts on tuna at finer spatial/temporal scales, expected changes in coastal productivity, range shifts in species).
 - Regional and national capability – this work area increases the regional and national capabilities in fisheries and aquaculture through national attachment programmes and post-graduate and short-course training to interpret climate science and generate policy for climate resilience.
 - Solutions – this work area converts the current information available into decision ready tools and solutions for operationalising climate adaptation in fisheries and aquaculture policies, planning, and management such as climate-tuned control rules, national dashboards and regional report cards.

Together these themed areas are designed to deliver improved understanding and capability in the region and to facilitate proactive and evidence driven management. A summary is provided in Figure 1.

12. A detailed work programme describing current actions is provided in Annex 1 to this document with current, pipeline and future activities identified.
13. FAME's climate science is developed on the following regional initiatives
 - a. A USD70M application to the Green Climate Fund which will focus on ensuring access to tuna resources are maintained (and enhanced) for generation of national income as well as improving food security.
 - b. Monitoring and assessment of nearshore anchored FADS (no funding as yet but CFP is looking to do work in this space in collaboration with OFP)
 - c. GEF support across two separate projects to forecast the impacts of climate on bycatch and food security species and the potential changes in global supply chains.
 - d. A NZD1.8M investment to develop tuna-tuned climate indicators to measure the current impacts of climate on PIC resources.
 - e. EU-PEUMP support for risk profiling impacts on stock production, shifting distributions and ecosystem change.
 - f. Programme funds to prepare for and initiate GCF and GEF projects.

Figure 1. Climate programme overview



Infrastructure

14. Achievement of the work programme is dependent on:

- Ongoing replenishment of the Pacific Marine Specimen Bank and integration of its catalogue into international standards for specimen curation. The PMSB is the primary source of biological material for the estimation of baseline values to monitor the extent and pace of climate change in the region and its impact on fisheries.
- Expansion of the PMSB to include coastal reef fisheries specimen and sample curation
- Expansion of the FEMA analytical laboratory for genetic, trace element and isotope analyses.
- The commissioning of a dedicated research vessel. The continuing retirement of existing research and commercial vessels in the region is likely to severely compromise the ability to maintain ongoing research and monitoring to understand fisheries and ecosystem change due to climate change.
- Provision of adequate capacity for high-end/demand computing of big data. To facilitate computing FAME has established a Science Computing Working Group to ensure that computing requirements are met.

15. HoF Information Paper Number 7 and Number 9 provide identify current and emerging gaps in FAME infrastructure to support its capabilities.

Science excellence and global integration

16. Embedding FAME and PCCOS will increase the global reach of the Pacific in influencing climate policy and associated responses at both global and regional scales. This will be facilitated by:

- Secondments, Visiting Fellows and Resident Thinkers – this will provide opportunity for established experts in fisheries and climate science to undertake short term attachments with FAME to develop information and advice on emerging issues in the Pacific. Developing closer associations and networks with such experts will increase their championing of Pacific fisheries climate-issues in global conversations. It will also provide the opportunity for Pacific attachments mentorship by these experts thereby aiding capacity building within the region.
- Establishing new and enhancing existing partnerships – the breadth and complexity of work required to minimise the impacts of climate change on Pacific fisheries and livelihoods is considerable and beyond the capacity of FAME alone. FAME will continue to work closely with its regional and global partners to ensure efficient delivery of information without duplication of effort.

Integration across SPC and CROP

17. FAME's climate programme has been designed to be fully integrated with the needs of FFA and WCPFC to assist their members with implementation of national climate policies and the operationalisation of the WCPFC climate resolution (see Annex 2).

18. The SPC Climate Change and Environmental Sustainability programme (CCES) has the lead on co-ordinating climate change work across SPC. Climate change is clearly a cross-cutting issue and features as such in the SPC Transition Plan 2021. Impacts of climate change on fisheries and oceans are a key feature in this work.
19. For SPC, CCES continues regular engagement with PIFS, OPOC, and SPREP on climate change work. This is generally achieved through the CROP working group and task force processes, and regular direct interactions.
20. This co-ordination leads to joint input on briefs for members to the key global climate change processes, for example the brief for the annual United Nations Framework Convention on Climate Change (UNFCCC) annual Conference of Parties (COP).
21. Through these processes and interactions, FAME works to ensure the fisheries priorities of members are recognised and represented in the SPC and CROP work programme.

Resource mobilisation

22. The GCF Climate Investment Committee (CIC) endorsed the Concept Note for the regional tuna programme entitled 'Adapting tuna-dependent Pacific Island communities and economies to climate change, which has a USD70M budget. The evaluation by the CIC is the most important milestone for clearance of the Concept Note by GCF. This document will be submitted together with the Project Preparation Facility (PPF) application to GCF to develop the Funding Proposal. Priority studies needed to prepare the funding proposal are listed in Annex 3.
23. The GCF project is expected to become operational in 2024.
24. FAME will contribute to the Second Phase of the GEF ABNJ project through analyses of the likely change in supply of tropical tunas across all three ocean basins. Resources (approx. USD0.5M) are expected to become available in 2022.
25. FAME's work to understand the impact of climate on bycatch, ecosystem and food security species in oceanic ecosystems will continue in the GEF OFMPIII project. Resources (approx. USD0.9M) are expected to become available in 2022.
26. MFAT has agreed to support a NZD1.8M project to develop tuna-tuned climate indicators for the region and support capacity development, commencing July 2021.

Current resourcing gaps

27. FAME has been collaborating with CSIRO and CLS to evaluate seasonal and short-term forecasting capabilities. The results to date indicate that methods can capture sufficient ocean and tuna dynamics to forecast tuna distribution trends over a 2-week to 6-month time horizon. This capability would provide members with intelligence for MCS planning, coastal FAD deployment and VDS trading.

28. The alignment of interests from European, Australian and New Zealand partners to develop this capability coinciding with the “Decade of Ocean Science” may be an opportunity to initiate discussion with donors to support this capability for Pacific fisheries.
29. Lack of persistent collection of high-quality coastal fisheries data across the region continues to hinder progress in understanding the relationships between climate change, overfishing and resilience of coastal fisheries stocks.
30. Modelling efforts are concentrated on oceanic processes and lack the spatial resolution to capture larval dynamics of coastal fisheries species. Understanding patterns of dispersal and connectivity within and between island archipelagos is crucial to understanding and developing effective spatial management of coastal fisheries stocks disproportionately impacted in areas of high population density.

Annex 1. FAME Climate Work Programme (orange = underway, green = planned, grey = to be resourced)

Knowledge generation

Activity	Description	Programme Alignment	Available	Outcomes
Fishery vulnerability	<u>Coastal</u> 2011 vulnerability assessment update on coastal fisheries and aquaculture PROCFISH C Addendum for assessing vulnerability and risks from climate change and other disasters	DFAT CI-GCF-PPF	2023	<ul style="list-style-type: none"> Integration into dashboard for enhanced communications, regular revision and linked directly to climate monitoring Form part of baseline material for Climate Report Card 1-degree CMIP ensemble should provide for EEZ scale resolution for tuna fisheries
	<u>Oceanic</u> 2011 vulnerability assessment did not include yellowfin or albacore tuna and limited future scenarios Updated VA should: <ul style="list-style-type: none"> Apply CMIP6 ensemble and SSP1-2.6, SSP2-4.5 and SSP5-8.5 climate futures All 4 tropical species 	MFAT CI-GCF-PPF	2022	
Species vulnerabilities	Collation and Analysis of detailed life-history data for most important coastal fisheries species and oceanic food security species Analyses of current impacts of climate on fisheries resources	??	2022	<ul style="list-style-type: none"> Baseline information for biodiversity-focussed vulnerability analyses and climate projections Baseline data on the spatial scales at which life history parameters change Evaluation of adaptive potential Current impacts of climate change on Pacific Fisheries

Range shifts	<u>Coastal</u> Fishery-independent, Long-term monitoring of coastal fisheries populations across PICT's			<ul style="list-style-type: none"> Baseline information on current species distributions and changes expected under climate futures
	<u>Oceanic</u> Analyses of current catch data to estimate species distributions for food security and SOSI. Forecast range shifts based on future climate scenarios as predicted by CMIP6 ocean models	PEUMP	2022	
Marine heatwave impacts	Climate Chronology analyses of impact of marine heatwaves on growth using otoliths in the Pacific Marine Specimen Bank – joint programme with OFP and CFP	PEUMP UoM	2024	<ul style="list-style-type: none"> Provide baseline information on the impact of marine heatwaves (Coastal and Oceanic) on growth and production. Provide essential information for projecting impacts on coastal fisheries production
Adaptive capacity	<u>Coastal</u> Systematic biological sampling from coastal fishery populations for submission to tissue bank.			<ul style="list-style-type: none"> Will provide baseline material for assessment of future changes in coastal fisheries populations. Identification of adaptive loci to assess long-term vulnerability
	<u>Oceanic</u> Genome assembly for tuna species	DFAT PEUMP	2024	
Data systems	Archives and tools of regional climate information for fisheries management Archive includes oceanographic variables, human population parameters, and life-history details for all species of interest.	PEUMP DFAT GCF GEF MFAT	2027	<ul style="list-style-type: none"> Climate forecast Information in Pacific Data Hub and Digital Pacific Dashboards for climate evaluation Fisheries managers across the PICT's will benefit most from a central repository of

	Development of e-data systems for large scale data collection and reporting on a time scale appropriate for adaptive management			data relevant to assessing their fisheries. There are huge economies of scale to having a single point of reference.
Stock dynamics	Spawning structure Regime shifts	PEUMP ACIAR GCF	2027	<ul style="list-style-type: none"> • Stock (sub) structures and identification of recruitment vulnerabilities • Changes in SRR • Evaluation of spatial management
Fishery forecasting	Optimisation of SEAPODYM at 1 degree resolution and downscaling	MFAT PEUMP GEF	2023	<ul style="list-style-type: none"> • Identification of climate refuges in EEZ
	SEAPODYM code development	GEF	2024	<ul style="list-style-type: none"> • Improved climate uncertainty in projections
	Climate tuned EcoPath w EcoSim for WCPO	PEUMP GEF	2022	<ul style="list-style-type: none"> • Baseline estimates of biomass change in food security species and SOSI • Analyses to identify critical features of micronekton ecology at risk from CC
Ocean forecasting	CMIP6 ensemble	MFAT CI-GCF-PPF Mercator	2023	<ul style="list-style-type: none"> • Habitat forcings for climate projections with most recent IPCC models
	Bias Correction of CMIP6 models	PEUMP IRD	2024	<ul style="list-style-type: none"> • Accurate prediction of warmpool dynamics allowing improved western pacific forecasting at multiple scales
	Decadal	GCF	2025	<ul style="list-style-type: none"> • EEZ forecasting of climate impacts on oceanic habitats at a temporal scale of 1 to 10 years in the future
	Marine Heatwaves	PEUMP IRD	2024	<ul style="list-style-type: none"> • Improved capacity to include evolution of long-lasting heatwaves in oceanic habitats
	Seasonal			<ul style="list-style-type: none"> • Forecasting tuna biomass and fishing demand in coming season in EEZs • Forecasting performance of inshore FADs



Adaptation triggers	Predator Microbiome indicator using Pacific Marine Specimen Bank	PEUMP UC	2024	<ul style="list-style-type: none"> • Baseline biological indicator of changing ecosystem assembly
Gear innovation	In-situ climate monitoring by fishing gears			<ul style="list-style-type: none"> • Expansion of in-situ observations to establish baseline conditions
Food systems	Impacts on flesh quality for post harvest processing	DAFT	2025	<ul style="list-style-type: none"> • Baseline information on association between oceanic heatwave conditions and mushy flesh syndrome
<i>Add others</i>				<ul style="list-style-type: none"> •

Generation of regional and national capability

Activity	Description	Programme Alignment	Available	Outcomes
Information systems	Biodiversity & Virtual climate laboratory	MFAT	2024	<ul style="list-style-type: none"> • Ready access to climate change information for fisheries at regional and national levels • Information material developed for specific stakeholders and actors • Enhancement of climate information in the Pacific Data Hub • Enhanced fisheries information in the Digital Pacific
Attachments	Coastal fisheries departments across the PICT's are mostly under-resourced with lack of facilities, resources and personnel to adequately assess, monitor and manage their coastal resources	GCF	2024	<ul style="list-style-type: none"> • Increased capacity in appropriately trained and resourced coastal fisheries officers
	Targeted training of oceanic fisheries officers in climate monitoring and reporting necessary for operationalising WCPFC Climate resolution	MFAT	2022	<ul style="list-style-type: none"> • Increased capacity in appropriately trained and resourced oceanic fisheries officers • Enhanced inclusion of tuna fisheries in regional preparations for IPCC processes
Post graduate qualification	Professional education for Pacific Island Nationals Development of Pacific as focal area by international research agencies	PEUMP	2025	<ul style="list-style-type: none"> • Increased technical capacity for the Pacific region • Increased contribution and capacity within PCCOS
Short course curriculum	Development of Pacific focussed fisheries climate educational material			<ul style="list-style-type: none"> • Pacific fisheries Climate Champions
Partnerships	Conservation International	GCF	2023	

	MFAT Climate Initiative	MFAT	2021	Enhanced inclusion of fisheries in regional preparations for IPCC processes <i>Greater regional coordination of technical work in the region</i>
	MOU – SPC-CSIRO Pacific Climate Change Portal	DFAT	2020	
	MOU – SPC- Mercator International-IRD-CLS	PEUMP	2021	
Secondment, visiting fellows, resident thinkers	Current Lehodey – Current impacts of climate change of WCPO tuna stocks	DFAT	2021	<ul style="list-style-type: none"> • Increased technical capacity for the Pacific region • Expanded Pacific climate technical networks • Identification of merging fisheries-climate policy issues • Mentoring of developing Pacific technical experts • Increased regional capability • Enhanced scientific credibility
	Immediate Priorities impacts of climate on food security and bycatch species Impacts on OA and how they will synergistically impact fisheries production Micronekton validation Tuna dynamics are influenced by conversion of primary productivity into micronekton abundance which is the keystone trophic level/group for tuna prey. Errors in understanding the ecology of this group and its abundance manifest in error in CC projections. Brokering knowledge within Pacific Leaders			

Solutions

Activity	Description	Programme alignment	Available	Outcomes
Responsive monitoring systems	Development of Advanced Warning System and decadal forecasts	GCF	2026	Provision of information for pro-active management
Indicators	Current and immediate impacts of climate change on tuna fisheries	MFAT	2023	Annual report card
MSE compatible products	Climate derived exceptional circumstances for tuna fisheries	GCF	2024	Evaluation of future conservation measures within WCPFC Information to support WCPFC-IATTC joint initiatives for conservation of shared stocks
Economic forecasts	Harvest			Evaluation of current and future conservation measures on fishery derived income
	Post-harvest			FFA joint initiative
Decision ready products	Integrated information system providing management specific analyses	GCF		Validate model predictions and provide administrations with proactive triggers to implement adaptations to minimize economic and social impacts of CC changes
Small-scale tuna fisheries	Feasibility of scaling-up National FAD Programmes Review of current vessel design and use in small-scale tuna fisheries	GCF	2024	Information to support the design of national nearshore FAD programmes
Coastal pathways				
Alternate livelihoods				



Food security	<p>Description of existing conditions for distributing bycatch to urban and peri-urban areas</p> <p>Mechanisms to produce behavioural change in fish consumption by rural and urban communities</p>	GCF	2024	Information to enhance local seafood consumption
Coastal fisheries and aquaculture adaptation proposals	Development of climate change adaptation proposals for the coastal fisheries and aquaculture sectors in Tonga and Nauru, in collaboration with SPC's Climate Finance Unit.	GCF, AF (pending SPC accreditation)	2023	Climate change adaptation proposals for coastal fisheries and aquaculture developed and submitted to donors

Annex 2 Operationalising the WCPFC Climate Resolution (red = GCF, green = OFMP/III, orange = ABNJ, tan = MFAT, purple = PEUMP, blue = FAME Programme)

Climate Impact	Adaptation	FAME Climate Programme Outcome
Cumulative impacts on ecosystems	Healthy spawning stock biomass and resilient age structures	Climate resilient reference points
		Ecosystem triggers
		Annual Climate Report Card Decision Ready Climate Information Systems
		CROP Briefings
	Alternate food systems developed	Identify fishery development opportunities
		CROP Briefings
Current impacts of Climate	Global Commitments to greenhouse gas emissions targets	Existing impacts on tuna and tuna dependent economies
		Baselines for future monitoring Enhanced Global Advocacy for Pacific
Distribution shifts	Prepare for allocation challenges	Forecast distribution shifts and impacts on catches and economics in WCPO
		Rate of shift information
		Bycatch hotspots
	Prepare for changes in supply chain challenges	Forecast distribution shifts in all oceans
Reduced productivity	Explicitly include environment in assessments and risk policies	Include changes in productivity/time-varying parameters Implement indicator frameworks for tuna Dynamic management areas
	Explicit Risk Policies	Implement indicator framework for food security
		Integration of Oceanic and Coastal heatwave impacts into production estimates
Weakened management systems	Climate resilient management Link environment to decision rules	Management strategy evaluation Advanced warning systems



	Responsive monitoring systems Reduce barriers to adaptation	New frameworks (insurance, permitting)
Reduced economic performance	Value-chain enhancement Climate justice Reduce barriers to adaptation	Gear innovation Increase product value Market and product development

Annex 3 Priority studies to prepare the GCF Tuna Project funding proposal.

- Updating the vulnerability analyses of Pacific Island communities and economies to the effects of climate change on fisheries.
- Quantifying the advantages and disadvantages of different options for increasing the supply of protein for growing populations.
- Feasibility of scaling-up National FAD Programmes.
- Review of current vessel design and use in small-scale tuna fisheries.
- Operation and maintenance manual for FADs.
- Review of fisheries engagement in disaster risk reduction and management at the regional and national level.
- Description of existing conditions for distributing bycatch to urban and peri-urban areas.
- Mechanisms to produce behavioural change in fish consumption by coastal and urban communities.
- Modelling tuna redistribution from EEZs of Pacific Island countries to high-seas areas under a lower GHG scenario (RCP4.5) to inform the vulnerability analyses described above, and for use in designing the advanced warning system (AWS) to reduce uncertainty in climate-driven redistribution of tuna to be developed in Component B of the GCF regional tuna programme.
- Scope for data collection by industrial fishing vessels to inform climate/weather/fisheries models.
- Socio-economic policy background and analysis relevant to proposed interventions and comparison of proposed interventions against the 'business as usual' (BAU) scenario/
- Pathways to securing rights to redistributed tuna for Pacific Island countries based on the outputs of the AWS.
- Financing mechanisms and institutional arrangements needed to sustain operation and maintenance of, and benefits from, strengthened National FAD Programmes, and development of the AWS.
- Analysis of possible revenue generating options stemming from GCF investments and assessment of an alternative to an all-grant financial structure if warranted.