SPREP
Secretariat of the Pacific Regional Environment Programme

pacific climate change centre

PACIFIC CLIMATE CHANGE RESEARCH ROADMAP 2025 – 2030

pccc@sprep.org

JICA
NEW ZEALAND FOREIGN AFFAIRS & TRADE Manatū Aorere
Australian Government
Department of Foreign Affairs and Trade

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LIST OF ABBREVIATIONS

AF	Adaptation Fund
CCR	Climate Change Resilience Programme (SPREP)
Climate Services Roadmap 2024	Pacific Roadmap for Strengthened Climate Services 2017-2026/revised 2024-2033
CMIP	Coupled Model Intercomparison Project
COP	Conference of Parties to the United Nations Framework Convention on Climate Change
CORDEX	Coordinated Regional Downscaling Experiment
COSPPac	Climate, Oceans Support Programme for the Pacific Project
COVID-19	Corona Virus pandemic
CROP	Council of Regional Organizations in the Pacific
CSI	Climate Science and Information Programme (SPREP)
ENSO	El Niño Southern Oscillation
ESD	Empirical Statistical Downscaling
FRDP	Framework for Resilient Development in the Pacific 2017 - 2030
GCF	Green Climate Fund
GCM	Global Climate Model
GEDSI	Gender Equality, Disability and Social Inclusion
GEF	Global Environment Facility
IC-PAC	CORDEX Flagship study - Island Climate – Pacific
IPCC	Intergovernmental Panel on Climate Change
IPCC-AR	IPCC Assessment Report
IPO	Inter Decadal Pacific Oscillation
ITCZ	Intertropical Convergence Zone
FRLD	Fund for Responding to Loss and Damage
M&E	Monitoring and Evaluation
MJO	Madden-Julian Oscillation
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NIWA	National Institute of Water and Atmospheric Research (New Zealand)
NMHS	National Meteorological and Hydrological Services
OBNE	Organizations, bodies, networks and experts
PCCC	Pacific Climate Change Centre
PFM	Public Financial Management System
PICT	Pacific Island Countries and Territories
PIOAC	Pacific Islands Ocean Acidification Centre
PRP	Pacific Resilience Partnership
RCM	Regional Climate Model

Research Roadmap 2018	Pacific Climate Change Science and Services Research Roadmap 2018
Research Roadmap 2025	Pacific Climate Change Research Roadmap 2025-2030
SPC	Pacific Community
SPCZ	South Pacific Convergence Zone
SPREP	Secretariat of the Pacific Regional Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USP	University of the South Pacific
WG	Working Group
WISER AP	Weather and Climate Information Services Asia Pacific

EXECUTIVE SUMMARY

The preparation of the Pacific Climate Change Research Roadmap 2025 – 2030 was commissioned by the Secretariat of the Pacific Regional Environment Programme (SPREP), through the Pacific Climate Change Centre (PCCC). The new Roadmap is based on a desktop review and analysis of the research work conducted between 2018 and 2024 under the Pacific Climate Change Science and Services Research Roadmap 2018.

For clarity in this document, the Pacific Climate Change Science and Services Research Roadmap 2018 is referred to as the "Research Roadmap 2018" and this new Pacific Climate Change Research Roadmap 2025 – 2030 is referred to as the "Research Roadmap 2025".

Among the key findings from the review and analysis report were that progress had been achieved under the Research Roadmap 2018 including the preparation of new climate change projections for each country, sector-based impact case studies, a country-based climate change portal, write-shops and mentoring to build the capacity of Pacific Islanders to contribute to IPCC Assessment Reports, and new partnership frameworks.

It was noted that: (i) there was minimal uptake of the new research work by the climate change adaptation and mitigation communities; (ii) there was a significant overlap between the Research Roadmap 2018 and the Climate Services Roadmap 2017; and (iii) there was no monitoring or evaluation of the Research Roadmap 2018. These gaps and other issues are addressed in this new Research Roadmap 2025.

The Research Roadmap 2025 covers a 5 -year period 2025-2030 and the timeframe is linked with the Intergovernmental Panel for Climate Change (IPCC) framework for the preparation of Assessment Reports (AR) 7. The end date for the Research Roadmap 2025 was chosen to coincide with the PCCC Strategy and Business Plan 2025-2030.

The Research Roadmap 2025 focuses on priorities, coordination, and delivery of climate change science and services research. It helps guide and inform governments, partner organizations, and research institutions on how to address climate change impacts through research, particularly in vulnerable regions like the Pacific. These roadmaps often address research topics on adaptation, mitigation, traditional knowledge alongside scientific research, climate finance, impacts on ecosystems and human health to provide a holistic understanding of climate change impacts and solutions. While the Climate Services Roadmap 2024 focuses on the weather and climate variability (seasonal, annual and next few years) timescale. A mechanism is proposed to coordinate the two Roadmaps under Focus Area 1 of the Research Roadmap 2025.

OBJECTIVES

The objectives of the Pacific Climate Change Research Roadmap are:

1. To enable multi-disciplinary research to connect the communities responsible for delivering climate change research and for addressing climate change impacts to contribute to the improved safety, security and prosperity of the Pacific Islands Countries and Territories (PICTs) within the 2050 Strategy for the Blue Pacific Continent.
2. Describe the priority climate change related research needs of the Pacific.
3. Describe the scope of current and planned research conducted that addresses the identified priority research needs on climate change; and
4. Identify resources to better inform the implementation of the Pacific Climate Change Research Roadmap as these plans are implemented and as they evolve in the future.

FOCUS AREAS OF THE RESEARCH ROADMAP 2025

There are eight focus areas under the Research Roadmap 2025:

1. Climate Change Governance.
2. Climate change science and services.
3. Data and information management.
4. Traditional knowledge.
5. Sector impacts and risks.
6. Climate change adaptation and mitigation.
7. Climate finance.
8. Capacity development, knowledge brokerage and communications.

The Research Roadmap 2025 emphasises a multi-disciplinary approach throughout its implementation. This structure is essential to fully address climate change impacts. This approach is in line with the preparation of IPCC AR 7 in which a multi-disciplinary approach is being encouraged.

A people centred approach places people and their environment at the centre of all international research and development. The approach consists of four components: human rights, gender and social inclusion, Pacific culture and environmental sustainability. Such approach is in line with the preparation of IPCC-AR 7. Working Group II of AR 7 includes chapters on human settlements, infrastructure and industry systems; health and well-being; and poverty, livelihoods, mobility and fragility. Similarly, Working Group III of AR 7 includes chapters relating to sustainable development and integration across sectors and systems.

The areas of focus under the Research Roadmap 2025 are outlined below.

Focus Area 1 Climate Change Governance

Research on climate change governance is crucial for policies and practices that guides how institutions address climate change through its national adaptation and mitigation strategies. This focus area will support research on:

- Climate change governance that identifies challenges of fragmented policies, coordination, inadequate enforcements to promote coordinated action and enforcement across various levels of government and stakeholders.
- Research on governance for building the capacity of Pacific practitioners to implement climate policies and manage climate risks and impacts through strengthening institutional capacity, improving data collection and analysis and engagement.
- Governance that considers the perspective of grassroots and marginalised population to ensure climate policies and mechanisms do not exacerbate existing inequalities.
- Governance mechanism to foster Innovation and Transformational changes by creating enabling environments for the development and implementation of fit for purpose solutions.

Focus Area 2 Climate change science and services.

Research on climate change science and services are crucial for understanding and responding to the impacts of a changing climate. While climate science provides the knowledge base, climate change services provide for translating of the knowledge to climate change actionable information. This focus area will support research on
the physical processes of climate change, causes, impacts, and potential future scenarios, atmospheric science, oceanography, and climate modelling.
Climate change information and tools to inform decision-making in various sectors, such as agriculture, water resources, and disaster risk management.
Coordinated Regional Downscaling Experiment (CORDEX) to achieve application of high-resolution downscaled model outputs to sector impacts.
Further research into large-scale climate processes and drivers, especially the South Pacific Convergence Zone given its influence on rainfall.
extreme weather events and especially focus on the impacts on livelihoods, economics, and health ecosystem response to ocean acidification.

Focus Area 3: Climate Change Data and information management.

Research on establishing a robust data management system for collecting, managing, analysing, and sharing of climate change data and information are crucial to ensure accessibility promoting data sharing amongst researchers and stakeholders. The roadmap aims to support research on:

- Climate Change data quality including Audit of existing research information sources.
- Data on climate change impacts and development of data management plans
- Effectiveness of Climate Change Portals that are established as central hubs for climate change research information.
- collaborative research and promote data sharing with existing hubs and partners.

Focus Area 4 Traditional knowledge.

Research on the values of traditional knowledge in enhancing resilience to climate change, resource management and as climate change adaptation and mitigation solutions are crucial for the Pacific. This focus area aims to support research on:

- integrating traditional knowledge with scientific knowledge to develop more effective, culturally fit for purpose and appropriate solutions.
- Collection, documentation and publication of case studies relating to decadal and multidecadal traditional knowledge.
- Expand databases and applications to store the longer-term traditional knowledge.
- Merge the longer-term traditional knowledge and contemporary science to inform long-term adaptation options.
- Link long-term traditional knowledge and attribution science.

Focus Area 5: Sector impacts and risks.

The IPCC AR6 report confirmed that the impacts of climate change are expected to intensify in the coming decades, affecting sectors like health, agriculture, infrastructure, and more. This focus area aims to support research on:

- Direct and indirect economic losses including long-term economic impacts.
- User-friendly tools developed for risk assessment and training.
- Robust sector data sets.

Focus Area 6: Climate change adaptation and mitigation.

Research on adaptation and mitigation covers climate change impacts, developing and implementing adaptation strategies, and exploring mitigation options to reduce greenhouse gas emissions. This focus area aims to support research on:

- impacts of climate change on air quality, ecosystems, nature-based solutions.
- infrastructure, tourism, health, agriculture, and water resources
- research into energy efficiency, carbon pricing, renewable energy, and sustainable transportation.
- Building urban resilience and resilience towns.
- high-resolution downscaling research to projects and plans prioritised in National Adaptation Plans (NAPs).
- Advance research to support national applications to the Fund for Responding to Loss and Damage.
- Advance research into long term climate security.
- Enhance climate change mitigation monitoring and investigate the potential impact of oceanic carbon sequestration in the Pacific Ocean.

Focus area 7: Climate finance.

'Climate finance' is a multifaceted concept. It generally refers to finance for activities aiming to mitigate or adapt to the impacts of climate change. This focus area aims to support research on:

- Use of innovative insurance products for climate resilience (including parametric and micro insurance) reviewed, shared and published.
- Research conducted into ways in which national trust funds for climate resilience can attract scalable donor contributions.

Focus Area 8: Capacity development, knowledge brokerage and communications.

- Training in the incorporation of a people centred approach into research activities.
- Focused capacity development for adaptation and mitigation communities, Pacific youth and young professionals.
- Focused information sharing with policy makers, development partners and donors, community and development leaders, and the public.
- Engagement of Pacific Islanders in all three working groups of the IPCC AR 7 through: write-shops, mentorships and communities of practice; support for new and potential IPCC authors to build their publication portfolio; and facilitation for Pacific Islanders' engagement as expert reviewers of the draft AR 7.

A logical framework, Implementation Plan and Monitoring and Evaluation Template for the Research Roadmap 2025 are included in this document.

The Research Roadmap 2025 in its draft form was presented to participants at the Pacific Regional Dialogue on the Intergovernmental Panel on Climate Change (IPCC) and PCCC Legacy Initiatives Project Development workshop in Fiji from 7 – 11 April 2025. Participants included representatives from the PICTs, CROP agencies, research institutions, universities and colleges and partners.

There was overall support for the Research Roadmap 2025 and its placement in a Pacific context. Participants noted that a strong coordination mechanism between the Research Roadmap 2025 and the Climate Services Roadmap 2024 is critical for the successful delivery of the Research Roadmap 2025.

Following this workshop, two further consultations were conducted in May 2025, one with partners and research institutions and a second with the SPREP Climate Science and Information Programme.

The overall intention is for the Research Roadmap 2025 to be used as a concise, living document, regularly reviewed and flexible to encompass new ideas and approaches.

INTRODUCTION

Full Name of Document	Shortened Name used in this Document	Brief Description
Pacific Climate Change Science and Services Research Roadmap 2018	Research Roadmap 2018	This Roadmap focuses on climate change projections and includes aspects of climate services.
Pacific Climate Change Research Roadmap 2025 – 2030	Research Roadmap 2025	To enable multi-disciplinary research to connect the communities responsible for delivering climate change research and for addressing climate change impacts to contribute to the improved safety, security and prosperity of the Pacific Islands Countries and Territories (PICTs) within the 2050 Strategy for the Blue Pacific Continent
Pacific Roadmap for Strengthened Climate Services 2017-2026, and subsequently revised 2024-2033	Climate Services Roadmap 2024	This Roadmap focuses on the collection, analysis and projection of weather and climate variability data.

2.1 ABOUT THE RESEARCH ROADMAP 2018

The Research Roadmap 2018 had six Pillars: climate change science; traditional knowledge; capacity development; climate change services; data and information management; and governance: oversight and administration.

The Research Roadmap 2018 did not specify immediate priorities for climate change science and services research, but rather broadly defined the boundaries and provided an indicative scope of gaps and needs. The Research Roadmap 2018 provided a short introductory paragraph for each Pillar and listed the gaps and needs for each Pillar. It was intended that an action plan would be developed by relevant stakeholders on a consultative basis. However, due to COVID-19 and other factors no action plan was developed. However, two initial priorities were proposed: firstly, to enhance Pacific engagement in the preparation of the IPCC Assessment Report, and secondly to develop a next generation of the Coupled Model Intercomparison Project 6 (CMIP) projections for the Pacific and provide Pacific Island Countries and Territories (PICTs) with the best available, internationally bench-marked scientific data and information.

Key achievements of the Research Roadmap 2018 included:

- Nextgen climate change projections for each of the 14 PICTs including technical reports and user-friendly digital cards.
- Technical report on cyclones and climate change projections.
- Guide on climate change impact case studies for cocoa, coffee, root crops and black pearls.
- The VAN KIRAP portal which provides tools and resources to help users plan their climate change adaptation activities.
- IPCC writeshops to train Pacific Islanders and involve them in the IPCC process through contributions to the published literature, authorship of IPCC chapters and involvement in the review of draft IPCC assessment reports.
- Mentoring projects and establishing communities of practice.
- Developing partnerships with research institutions and universities and supporting conferences and workshops to share the research information.

3.2 STRUCTURE OF THE RESEARCH ROADMAP 2025

Figure 2 shows the overall log-frame structure of the Research Roadmap 2025. The full logical framework is presented in *Section 5.1*. *Figure 3* shows a schematic version of the log-frame.

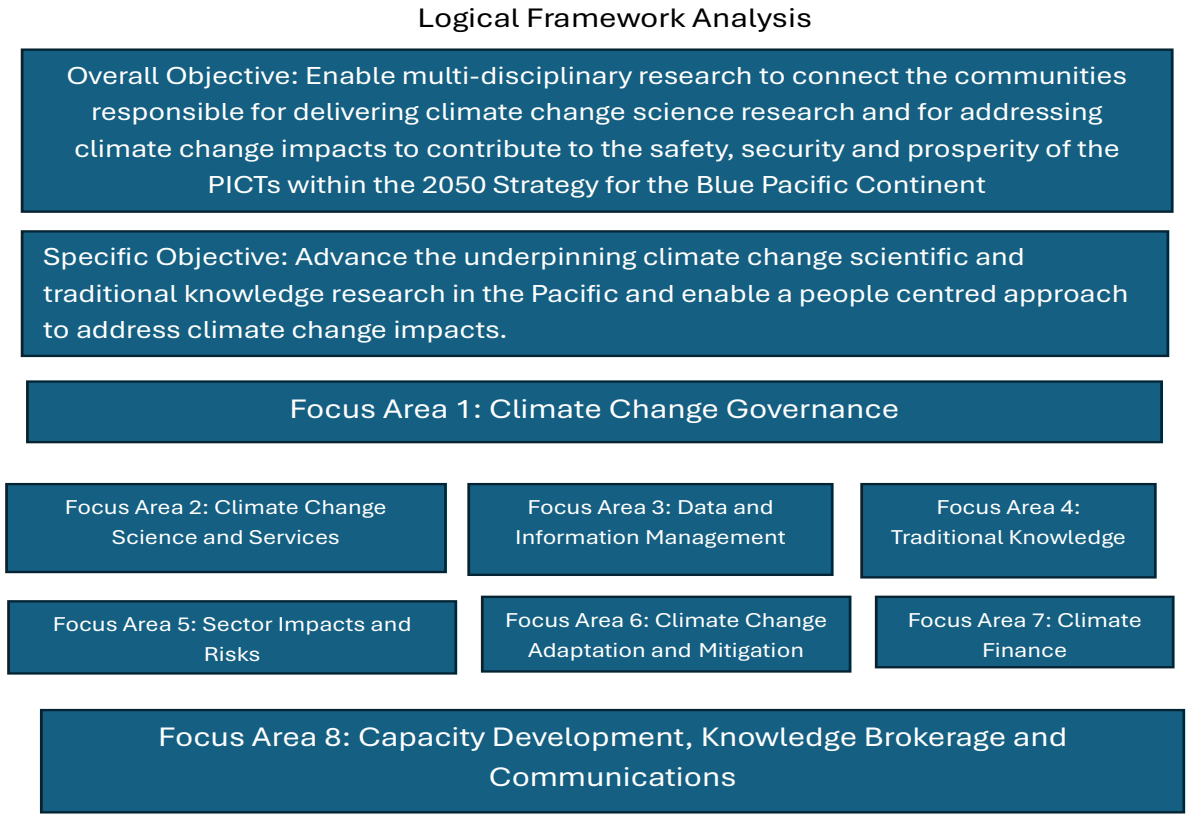

FIGURE 1: OVERALL LOG-FRAME OF THE RESEARCH ROADMAP 2025

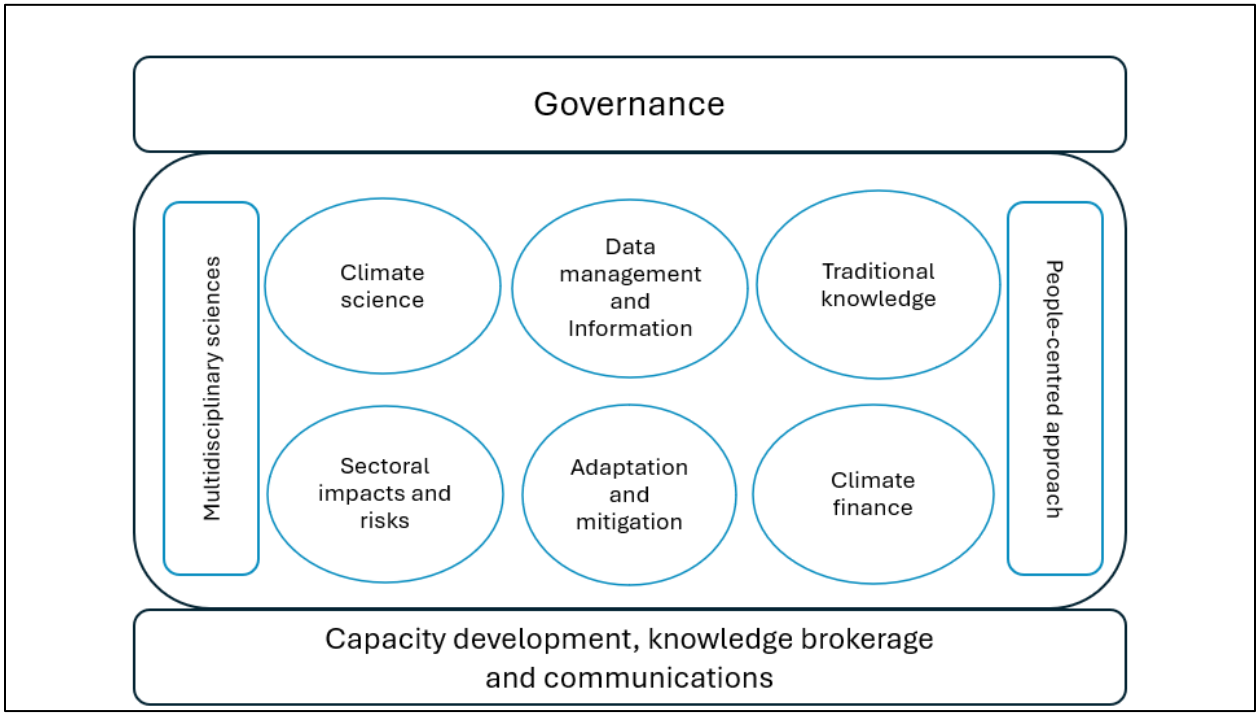

FIGURE 2: SCHEMATIC VERSION OF THE LOG-FRAME

The **Overall Objective** is to: Enable multi-disciplinary research to connect the communities responsible for delivering climate change science research and for addressing climate change impacts to contribute to the improved safety, security and prosperity of Pacific Islands within the 2050 Strategy for the Blue Pacific Continent.

The 2050 Strategy for the Blue Pacific Continent is the cornerstone blueprint for the Pacific region, that sets out a long-term approach towards a resilient Pacific of peace, harmony, security, social inclusion and prosperity. It includes seven thematic areas:

- Political leadership and regionalism
- People centred development.
- Peace and security.
- Resource and economic development
- Climate change and disasters
- Ocean and natural environment
- Technology and connectivity

Other key regional agreements include the Framework for Resilient Development in the Pacific (FRDP) which provides high level strategic guidance to different stakeholder groups on how to enhance resilience to climate change and disasters in ways that contribute to and are embedded in sustainable development.

To contribute effectively to the 2050 Strategy for the Blue Pacific Continent, the Research Roadmap 2025 emphasises a multi-disciplinary approach throughout its implementation. This structure is essential to fully address climate change impacts. This approach is in line with the preparation of IPCC-AR 7 in which a multi-disciplinary approach is being encouraged.

The **Specific Objective** is to**:** Advance the underpinning climate change scientific and traditional knowledge research in the Pacific and enable a people centred approach for PICTs to address climate change impacts.

Another key finding from the Review and Analysis report on the Research Roadmap 2018 was that there was very limited uptake of the new, underpinning, climate research information by potential users e.g., policy makers, sector leads, climate change focal points and community leaders, among others. This gap is addressed under several of the Focus Areas in the Research Roadmap 2025.

The Research Roadmap 2025 has been designed to build on the strategic approach described in the previous Research Roadmap 2018 by identifying specific research areas to guide the implementation over the twelve-year period 2025 – 2030.

Specific research areas listed under each focus area have not been prioritised as this will depend on funding support and areas of interest specific to researchers and partners. However, the implementation plan (section 5.2) shows that some research areas must be completed first before others can commence.

The Focus Areas link together and some of the proposed research areas and actions can be placed under more than one Focus Areas. To avoid duplication in this Research Roadmap 2025, research areas or actions are placed only under the most relevant Focus Area.

3.2.1 FOCUS AREA 1: CLIMATE CHANGE GOVERNANCE

Coordination between the Research Roadmap 2025 and the Climate Services Roadmap 2024

- **About coordination mechanisms**: There was no formal or informal coordination between the Research Roadmap 2018 and the Climate Services Roadmap 2024. Efficient implementation of the two Roadmaps requires a clear interaction mechanism to maximise outputs and avoid duplication.
- **Proposed action**:
    - Establish and maintain a half-yearly coordination and review mechanism, the details of which will be determined by SPREP. (An evaluation template is included in section 5.3). The mechanism should involve the PCCC as the coordinator of the Research Roadmap 2025 and the Climate Science and Information Programme (CSI) as the coordinator of the Climate Services Roadmap 2024. (CSI was known as the Pacific Meteorological Desk Partnership up until the end of 2024). After sharing their plans, the directors of the two roadmaps submit their annual reviews to the Pacific Meteorological Council. This coordination mechanism is extremely important for the effective delivery of the Research Roadmap 2025 and the Climate Services Roadmap 2024.

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Annual reporting, monitoring and reviews

- **About reporting and monitoring & evaluation (M&E):** There was no formal reporting on the delivery of the Research Roadmap 2018, although updates and presentations were delivered at regional meetings and conferences.
- **Proposed action:**
  - Coordinate and prepare concise annual progress reports. Regularly update the evaluation template in the implementation plan. These documents will inform donors and other partners about progress.

Mid-term external review

- **About reviews of the Research Roadmap 2018**: No formal or informal review of the delivery of the Research Roadmap 2018 was conducted before 2025.
- **Proposed action**:
  - Schedule a midterm (2029) external review of progress and delivery of the Research Roadmap 2025. Following this review the roadmap may need revision. The midterm review is scheduled to fit within the IPCC cycle for the preparation of AR 7 concluding in 2029, and the new cycle for AR 8 beginning thereafter.

Capacity of the PCCC

- **About the present capacity of the PCCC:** The PCCC currently has four positions: manager, two technical advisers, and one finance and administration officer. There are also three project staff, two of whom are engaged on an Innovative Solutions for Climate Resilience Project.
- **Proposed action:**
  - Expand the PCCC core staff to include expertise in communications and outreach, training and capacity building including the use of a people centred approach, and monitoring and evaluation.

3.2.2 FOCUS AREA 2 CLIMATE CHANGE SCIENCE AND SERVICES

This focuses on advancing the underpinning scientific research into the future climate of the Pacific region and the individual PICTs. This new information can then be incorporated into the preparation of the IPCC assessment reports and ensure that PICTs have the most up-to-date scientific information with which to address climate change impacts. This focus area will be coordinated by the PCCC in close collaboration with CSI and the Climate Services Roadmap 2024.

National projections

- **About national projections in the PICTs:** The first set of national climate change projections for the PICTs were published in 2012 as part of the Pacific Climate Change Science Program. The projections were based on simulations from up to 18 global climate models (GCMs) for three emission scenarios. The projections were revised in 2022 as part of the NextGen Projections for the Western Tropical Pacific project and were based on up to 26 GCMs from the Coupled Model Intercomparison Project (CMIP) 5. The IPCC Sixth Assessment WG1 Report (2021) has now released the latest CMIP 6 global climate model simulations, which will become the new standard for the western Pacific and are currently being integrated into projections at the regional to sub-regional/national scale.

- **Proposed research areas**:
  - Preparation of national projections of the means and extremes for future climates in the PICTs, based on the CMIP 6 models. Develop tools and provide training to users of the projection information.
  - Extreme events result in the most serious impacts in the PICTs, and further research is required to address the uncertainty in the projections for these events and changes. This requires leveraging the best available international climate research and undertaking fine-resolution downscaling of CMIP 6 climate models over the western tropical Pacific, ideally through the Coordinated Regional Downscaling Experiment (CORDEX).
  - Sea level rise projections, incorporating any vertical land movement, are very important to understand, particularly in low lying atoll countries. Coastal inundation is influenced by tides, waves, bathymetry and extreme events, and exacerbated by sea level rise.
  - The actual timing of tipping points caused by ice sheet collapse has low confidence. However, the impacts from such events are extremely significant and attention to updates is important.

Downscaling

- **About downscaling**: A GCM can provide plausible projection information on a scale of around 150-200 km^2. However, the resolution of many GCMs is too coarse to resolve many Pacific Islands and therefore the effect of the land on the climate. Regional Climate Models (RCM) and Empirical Statistical Downscaling (ESD), applied over a limited area and driven by GCMs can provide projection information at much higher resolution, supporting more detailed impact and adaptation assessments and planning. A new CORDEX Flagship study - Island Climate – Pacific (IC-PAC), approved in 2025, aims to supply useful climate projections for the Pacific Island region at high resolution (e.g., 20 km broadly, 1 km over selected areas). This modelling will be based on multi-model ensembles.
- **Proposed research areas:**
  - Support Pacific networking as part of CORDEX, a global monitoring community, with a focus on improved understanding of existing model applications and outputs.
  - Apply high resolution downscaled models, using the new information from the IC-PAC project, targeted towards sector specific climate change impacts.

Climate drivers

- **About climate drivers**: The Intertropical Convergence Zone (ITCZ), South Pacific Convergence Zone (SPCZ) and West Pacific Monsoon are characteristic features where convective activities such as tropical cyclones, thunderstorms and associated rainfall are frequently spawned. The Madden–Julian Oscillation (MJO), El Niño-Southern Oscillation (ENSO) and Interdecadal Pacific Oscillation (IPO) are the three main modes of climate variability that operate across the Pacific at intraseasonal, interannual and interdecadal timescales, respectively.
- **Proposed research areas:**
  - Further research into large-scale climate processes: ENSO, SPCZ, MJO, and IPO.
  - The SPCZ requires special attention as current models differ in the way rainfall may change in the future. Rainfall is a particularly important variable when determining sector related impacts in the Pacific region.

Climate change attribution science

- **About climate change attribution**: Climate change attribution is the science that links global climate change to specific extreme weather events e.g., tropical cyclones and marine heatwaves. This is achieved by combining information from climate models with long term historical weather data. Attribution information is usually expressed in terms of probability.
- **Proposed research area:**
    - Expand attribution research on the impacts of climate change on coastal, marine and terrestrial ecosystems and especially focus on livelihoods, economics and health, where there is less attribution information.

Ocean projections including ocean acidification.

- **About ocean projections and ocean acidification**: Large-scale oceanic changes and especially ocean acidification are major concerns for the PICTs, given their dependence on the Pacific Ocean for livelihoods, transportation and industry. Carbon dioxide from the atmosphere dissolves into the ocean, forming carbonic acid, which lowers the pH and reduces the availability of carbonate ions, essential for building shells and skeletons. The Pacific region, with its extensive coral reefs and reliance on marine resources, is particularly vulnerable to the impacts of ocean acidification. The Pacific Islands Ocean Acidification Centre (PIOAC), a partnership between the Pacific Community (SPC), the University of the South Pacific (USP), the National Institute of Water and Atmospheric Research (NIWA) and the University of Otago, functions as a hub for Pacific partners to study and monitor local ocean acidification conditions, identify effective and sustainable adaptation and mitigation approaches, and develop strategies to address changes to ecosystems, communities and economies.
- **Proposed research areas**:
    - Expansion of long-term monitoring and development of advanced monitoring technologies for ocean acidification.
    - Further research is needed into biological sensitivity and ecosystem response of ocean acidification. This will cover the impacts and adaptive capacity of specific species including economically important ones, ecosystem modelling, and the impact of combined stressors such as ocean acidification, global warming and pollution.

3.2.3 FOCUS AREA 3 DATA AND INFORMATION MANAGEMENT

Pacific climate change research is undertaken to advance the understanding of the various facets of future changes in the climate; to inform national and regional strategic planning, as well as planning at a local level; and to raise awareness of Pacific Islanders so they can prepare for the changes to come. This requires not only a multi-disciplinary approach but also an effective and efficient way to share information. Activities covered by this focus area seek to link the outputs of the other focus areas.

Audit of existing information sources

- **About an information audit**: There are several national and regional portals, hubs and websites, as well as agreements and memoranda of understanding in place where Pacific climate change information can be shared and accessed. Some of these sources were accessed to prepare the review and analysis of the delivery of the Research Roadmap 2018. However, none of these can be considered comprehensive and for the most part only cover one of the focus areas listed in this Roadmap.
- **Proposed action:**
    - Prepare an audit of the relevant regional and national portals, hubs, websites, agreements and memoranda of understanding relating to climate change research in the Pacific and including the areas described in the other focus areas. The audit should be updated annually and accompany the annual progress report and review of the Research Roadmap 2025. The PCCC is the best placed entity to implement this action.

Strengthen the PCCC Climate Change Portal

- **About the PCCC Climate Change Portal**: The Climate Change Portal was established in 2012 and updated in 2016 and its main menu covers country profiles, news, events, projects, resources and organizations. There is a search facility under each tab. It is a comprehensive portal but as it presently exists it does not provide a readily accessible source of climate change research information in the Pacific.
- **Proposed action**:
    - Review the PCCC Climate Change Portal, in the context of other regional platforms, and strengthen the Portal with a view to its enhancement and position as the central hub for climate change research information in the Pacific. Creating a more user-friendly interface for non-technical users could help them navigate and find information. The PCCC is the best placed entity to implement this action as it is responsible for the management of the portal.

Expand and strengthen collaborative research.

- **About collaborative research**: Some of the climate change science research conducted between 2018 and 2024 was led by a single, research-based institution or university, collaborating with a regional organization, e.g., SPREP, and the relevant countries. Opportunities exist to widen this scope by having several research institutions collaborate with SPREP and/or other CROP organizations and the relevant PICTs. Such an approach could lead to enhanced research. A mechanism already exists for such an approach, the Partnership Framework for Climate Change Research.
- **Proposed actions**:
    - Facilitate collaborative research among research institutions, universities and colleges, CROP organizations, and other partners under the Partnership Framework for Climate Change Research in the Pacific.
    - Data sharing can be a very sensitive issue for the PICTs and the region in general. However, to enable collaborative research, data sharing is essential. Among the different data hubs two important ones are:
        - The Climate Services Information System under the Climate Services Roadmap is the main mechanism through which information about climate (past, present and future) is routinely collected, stored and processed.
        - The SPC Pacific Data Hub was created in 2018 with the aim of establishing a sustainable data infrastructure to catalogue Pacific datasets, improve

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data management and policy, and encourage informed decision making. Already the Hub contains many data sets including climate change, disasters, fisheries, food and oceans. Expansion of this data hub will facilitate collaborative research.

- In some cases, specific collaborative efforts will require the establishment of data sharing protocols.
- Foster collaboration, knowledge exchange, and concrete actions to address climate change impacts in the Pacific, through events such as the Pacific Ocean: Pacific Climate Change Conference (held every two years) and the Pacific Climate Change Roundtable (which was reconvened in 2024 after a seven-year gap).

3.2.4 FOCUS AREA 4 TRADITIONAL KNOWLEDGE

Traditional knowledge is based on repeated observations, know how, skills and practices that are developed, sustained and passed between generations within a community. In many Pacific communities, people do not heed meteorological forecasts except in the cyclone season, rather they rely on traditional knowledge. Significant work has been done on the compilation and storage of traditional knowledge and its links to weather forecasting in the PICTs under the SPREP CSI programme and especially through the Climate, Oceans Support Programme for the Pacific (COSPPac) project. This focus area addresses the merging of contemporary science and traditional knowledge as it relates to climate change over longer timeframes - decadal and multidecadal.

Collection of case studies relating to decadal and multidecadal traditional knowledge

- **About the collection of case studies**: Significant work has already been done in some PICTs relating to the collection of traditional knowledge over monthly and annual time scales, and there is a need to expand this work to decadal and multidecadal timescales.
- **Proposed research area:**
  - Conduct case studies relating to traditional and historical knowledge as it relates to climate variability and climate change over decadal and multidecadal timescales.

Storage and publication of new longer term traditional knowledge

- **About the storage of traditional knowledge**: Much of the Pacific traditional knowledge is place-based and communities in the PICTs have serious concerns about the sensitivity and storage of this information. SPREP maintains a traditional knowledge database for five countries that is shared only with the relevant NMHS where it is used to assist weather forecasting.
- **Proposed research areas**:
  - Build on and expand the existing databases and applications to store the longer-term traditional knowledge or create new databases. Investigate protocols for sharing these databases with researchers.
  - Support the publication of the longer-term case studies of climate related traditional knowledge over multidecadal timeframes.
  - Prepare guidance and demonstration materials, including case studies, to show past adaptation measures and how these can be applied to future adaptation pathways.

Merge the longer-term traditional knowledge and contemporary science.

- **About merging traditional knowledge and scientific projections**: Historically, Pacific communities have adapted their livelihoods to changes in the climate that have a longer timespan than meteorological forecasting. Such practices included positioning buildings and communities inland from the coast and house construction to withstand strong winds and cyclones. Other livelihood practices include food and water security and traditional ecological practices.
- **Proposed research area:**
    - Investigate the livelihood pathways used traditionally by Pacific communities and combine these findings with contemporary climate change projections to analyse long term adaptation options. Such an approach may identify future options that are more acceptable to Pacific communities than those that are based on contemporary science alone.

Link long-term traditional knowledge and attribution science

- **About attribution science and long-term traditional knowledge:** Attribution science has previously been described in *Section 3.2.2* and may be supported by long term traditional knowledge.
- **Proposed research areas:**
    - Link long term traditional knowledge and attribution science to help ascertain the likelihood that human influence has changed the frequency and/or severity of extreme events in the Pacific region.
    - The preparation and publication of case studies to support this linkage will provide additional information for national applications to the Fund for Responding to Loss and Damage Fund, see *Section 3.2.6*.

3.2.5 FOCUS AREA: SECTOR IMPACTS AND RISK

To link the underpinning climate change research information (focus area 2 in section 3.2.2) with the needs of the adaptation and mitigation community (focus area 6 in section 3.2.6), it is necessary to understand and conduct research into the concept of risk. The core definition of risk is the potential for adverse consequences in human and ecological systems and the uncertainty relating to those consequences. For example, the risk from flooding to human and ecological systems is caused by the flood hazard (the frequency and/or magnitude of flood events), the exposure of the affected system (e.g., topography) and the vulnerability of the system (e.g., design and maintenance of any infrastructure in the system).

Across the PICTs, major sectors potentially exposed to climate hazards include water resources; health and wellbeing; agriculture, fisheries and marine resources; disaster management and emergency response; infrastructure and coastal protection; energy, telecommunications, transport and supply chains; waste management; biodiversity and environment; community and culture. It is important to note these sectors are interconnected, so in practice there can be cascading and compounding impacts across multiple sectors.

This focus area builds a bridge between the underpinning science and the selection and implementation of adaptation and mitigation measures.

Training in risk assessment

- **About risk assessment**: Risk is the combination of hazard, exposure and vulnerability. Multi-disciplinary climate change research requires climate information (hazards), as well as exposure and vulnerability information to prepare risk assessments. Managing exposure and vulnerability is key to adaptation.
    - **Proposed research area**:

Develop user friendly tools for risk assessment and provide training in the application of these tools to the prioritisation of national projects and adaptation activities identified in National Adaptation Plans (NAPs) and Nationally Determined Contributions (NDCs).

Compilation of robust sector data sets

- **About sector data sets**: The application of high-level downscaling climate projections to specific sectors requires robust sector data sets to understand how the climate changes will affect the sector (e.g., agriculture) and its users (e.g., farmers). In many islands such information may be incomplete and sometimes inaccessible.
    - **Proposed research area**:

Advance research into the compilation of robust sector data sets to fully understand the impacts of the downscaled models.

3.2.6 FOCUS AREA 6 CLIMATE CHANGE ADAPTATION AND MITIGATION

Climate change adaptation in the Pacific Islands involves adjusting to the impacts of climate change, such as rising sea levels and changing weather patterns, by implementing strategies to build resilience and reduce vulnerability. Significant work has been undertaken on building resilience and adapting to climate change in the PICTs in the past two decades. However, as was noted in *Section 3.2* there has been very limited uptake of the new climate change science information by the adaptation community.

Given the extreme vulnerability of the PICTs to climate change, and that their combined carbon emissions are less than 1% of the world's total carbon emissions, it is understandable that less attention has been given to climate change mitigation as compared to adaptation. Nevertheless, important research work in the field of mitigation is being done, e.g., through the NDC Hub. NDCs are essentially each country's self-defined commitments to reduce greenhouse gas emissions and adapt to the impacts of climate change, as outlined in the Paris Agreement.

This focus area relates to the application of the underpinning climate change science research to climate change impacts, adaptation and mitigation.

Continual consultation between research providers and research users

- **About consultation**: As already identified, a space needs to be created between research providers and research users to promote understanding of the needs, constraints and future plans of the two groups.
- **Proposed research areas**:
    - Provide a space whereby the providers and users of research information can meet on a regular basis. One such space could be the coordination and review mechanism, see *Section 3.2.1*. Other opportunities such as conferences, meetings and workshops should also be maximised so there is continual interaction.
    - Together with the Climate Services Roadmap 2024 test a co-production approach, such as the one successfully used in Africa, that is tailored to a specific context and

brings together the producers of weather and climate information with those who use the information. Such an approach has positive benefits; however, it is resource and time intensive.

Linking the high-resolution downscaling research to national projects and plans

- **About linking downscaling research to national projects and plans**: As part of their NDCs, countries are required to submit to the United Nations Framework Convention on Climate Change (UNFCCC) their self-defined commitments to reduce greenhouse gas emissions and adapt to the impacts of climate change. NAPs take the planning process one step further by transforming the NDC adaptation goals into prioritised actions which are listed with specific timeframes and costs. To date only six PICTs have NAPs however, other countries are progressing their NAPs.
- **Proposed research area**:
    - Link the high-resolution downscaled research, described in *Section 3.2.2*, to specific sectors and adaptation activities and projects prioritised by the countries in their NAPs. This will strengthen ongoing and planned adaptation work. Whilst generic guidelines are useful, this targeted approach will help direct the research to actual on-the-ground case studies where adaptation activities are implemented and can then be evaluated over a period of years. It should be noted that the Climate Services Roadmap 2024 also includes services for different sectors, and this is an area where the two roadmaps need to collaborate closely.

Advancing research to support national applications to the Fund for Responding to Loss and Damage

- **About the Fund for Responding to Loss and Damage**: Loss and damage in the Pacific Island region refers to the irreversible and often unmitigated negative impacts of climate change bought on by rapid, extreme and slow onset events. These impacts relate to rising sea levels, extreme weather events, and ocean acidification. Economic losses cover damaged infrastructure, disruption to business and income reduction among others; while non-economic losses include loss of culture and biodiversity, and physical and psychological impacts such as trauma. These losses and damages cannot be fully compensated for by adaptation measures alone.

The Fund for Responding to Loss and Damage was established at the UNFCCC Conference of Parties (COP) 27 in 2022 and operationalized the following year. The Fund works together with the Santiago Network for Loss and Damage which connects vulnerable developing countries with providers of technical assistance, including entities from civil society, non-governmental organizations, and the private sector.

- **Proposed research areas:**
    - Advancement of multi-disciplinary research to assist PICTs in their preparation of applications to the Fund for Responding to Loss and Damage through the Santiago Network.
    - Encourage and help facilitate regional organizations to become accredited as organizations, bodies, networks and experts (OBNE) to the Santiago Network.
    - Advance research into the science and impacts of rising sea levels, extreme events and ocean acidification including through attribution science, see *Section 3.2.2*, and historical and satellite geographical modelling.

Advance research into long term climate security

- **About climate security in the PICTs**: Climate security in the Pacific Islands region is a critical issue, as these low-lying nations face existential threats from sea level rise, extreme weather events, and the impacts of climate change on their ecosystems, livelihoods, and cultures. Climate change, particularly sea level rise, poses a significant threat to maritime boundaries and the security of Pacific Island nations, necessitating proactive measures to secure their maritime zones and address the impacts on their livelihoods and sovereignty.
- **Proposed research areas**:
    - Undertake multi-disciplinary research, especially into sea level rise and extreme events to understand and address the impact that climate change will have on the regional security landscape through its interaction with human security and conflict.
    - Undertake research into the impacts of climate change on maritime boundary agreements and the security of the PICTs and their Exclusive Economic Zones. This will require analysis of the vulnerability of coastal features, which serve as the basis of maritime boundaries, and the disappearance of boundary basepoints.

Advance research into climate change mitigation

- **About climate change mitigation:** Climate change mitigation refers to actions taken to reduce or prevent greenhouse gas emissions from human activities, aiming to lessen the severity of climate change impacts**.** In the Pacific region, the NDC Hub supports PICTs in reviewing, enhancing and implementing their climate commitments and promoting a transition to a low-carbon development pathway through solar, wind and geothermal power.
- **Proposed research areas**:
    - Enhance the data sets required for NDC measurement, reporting and verification of climate action, especially mitigation actions.
    - Oceanic carbon sequestration is the process of compressing and liquefying carbon dioxide obtained from concentrated emission sources, e.g., fossil fuel power plants and cement plants, and then transporting and injecting it into the deep ocean. While still a newly emerging mitigation option, if implemented it could have significant negative impacts for the Pacific Ocean and the PICTs and requires feasibility studies.

3.2.7 CLIMATE FINANCE

Climate finance is critical for the PICTs to be able to address climate change. Effective adaptation and climate-resilient development is predicated on proper access to financial, technological, and human resources. However, the global climate finance landscape is complex, including many funds, each with different objectives and requirements to access financing and including the Green Climate Fund (GCF), Adaptation Fund (AF), the Global Environment Facility (GEF) and the Climate Investment Funds (CIF), in addition to bilateral sources. Capacity building in robust public financial management (PFM) systems is ongoing and is key to accessing these funds.

Climate finance is one of the PCCC's four themes and a Project for Innovative Solutions for Pacific Climate Change Resilience 2023-2026 is underway to build capacity to support both public and private sector initiatives to facilitate and institutionalize innovative solutions.

This focus area outlines some of the smaller scale climate finance options being adopted by PICTs to promote and deliver climate resilience and where further expansion and research is proposed.

Research on Innovative Climate Finance Options being tested in PICTs.

- **Insurance initiatives:** Parametric insurance is a type of insurance where payouts are triggered by the occurrence of a specific event, measured by a pre-defined parameter, rather than by the actual damage sustained. Fiji has trialed a parametric micro-insurance product for individuals for extreme weather events.
- **Proposed research areas:**
    - Similar parametric schemes are being trialed in Tonga and Vanuatu and the innovation has potential for expansion throughout the PICTs. Preparation and publication of a review would provide a solid basis for expansion.
    - Investigate the potential for expanding existing climate proofing initiatives for homes and businesses and link this to other insurance incentives on a regional basis.
- **National Climate Trust Funds:** These promote more flexibility for governments to support adaptation, mitigation, or relocation interventions in a timely manner. Trust funds have been established in Fiji, Palau, Tonga, Tuvalu and Vanuatu; however, it has been challenging for the countries to attract scalable donor contributions to these national climate funds.
- **Proposed Research areas:**
    - Investigate ways and requirements such that these national trust funds can attract scalable donor contributions, besides the already tested national levies such as plastic bag and visitor levies.
    - Review the Niue Ocean Wide public-private partnership, a trust fund supported with Ocean Conservation Credits through a public-private partnership.

3.2.8 FOCUS AREA 8 CAPACITY DEVELOPMENT, KNOWLEDGE BROKERAGE AND COMMUNICATIONS

This focuses on the development and retention of capacity in the Pacific Islands noting that all the focus areas in this roadmap also contain elements of capacity development. A people centred approach, (further described in Section 3.2) which places people and their environment at the centre of all research and development and incorporates the principles of GEDSI is incorporated throughout the roadmap. It should be noted that a people centred approach, like the co-production approach, described is section 3.2.6, is resource and time intensive.

Provide training in the incorporation of a people centred approach to implementing partners.

- **About a people centred approach**: This approach includes addressing human rights, gender and social inclusion, Pacific culture, and environmental sustainability. The unique social and cultural fabric of each Pacific Island country and territory affects how these components are interpreted for local application.
- **Proposed actions:**
    - Together with experts from Pacific-based social science disciplines, develop a guidance template to direct researchers on the use of a people centred approach. Such a guidance template would include the following elements: participation, link to human rights, accountability, non-discrimination, gender equity, empowerment, and transforming social norms.

- Provide training in the application of the guidance template, where appropriate, to climate change research activities.

Focused capacity development

- **About focused capacity development:** Capacity development is a continuing need in the PICTs now and into the future. Retention of capacity is also a key concern. For the purposes of this Roadmap, it is necessary to focus on capacity development for specific users as there is no "one size fits all".
- **Proposed actions:**
  - Continued training and involvement of the NMHS in the new climate change research is critical, especially in view of the important role played by NMHS as the interface between the research community and policy makers, government and non-governmental organizations, adaptation practitioners, communities and the public in PICTs.
  - Training and capacity development for the adaptation and mitigation communities and involvement in the applied research is also important, especially national climate change focal points, sector leads, and the private sector. Assist these information users to understand and apply the scientific research. They can then relay the relevant information in local languages to traditional and community leaders and the public.
  - Engage directly with Pacific tertiary institutions (universities and colleges) to provide internships and fellowships and to encourage postgraduate students to undertake research relevant to all the eight focus areas of the Research Roadmap 2025. Universities and colleges already provide capacity building through academic courses and curricula.
  - Through the specific activities listed in Focus Area 2 – 7 engage Pacific youth and young professionals in the research activities.

Focused information sharing

- **About focused information sharing:** It is important to share the research information with different stakeholders in a manner that is relevant to the user's needs and understandable by the user group.
- **Proposed actions**:
  - Sharing of relevant climate change research information with policy makers is important as they control national budgets and strategic plans. They also play a key role in discussions with development partners and donors. This requires understanding the national decision-making process and developing relationships.
  - Maximise opportunities to engage with development partners and donors, given that their support is essential for the advancement of the Research Roadmap.
  - Sharing the climate change research information with community and traditional leaders and the public is, for the most part, best done through national partners, given their local language skills and understanding of the local context.

Engagement of Pacific Islanders in all three working groups of the IPCC process for the preparation of Assessment Reports

- **About the IPCC Assessment Report process**: Three working groups (WG) prepare the IPCC assessment reports: WG I - physical science basis of climate change, WG II - impacts, adaptation, and vulnerability of climate change, and WG III - options for mitigating climate change. The assessment reports are prepared every seven to eight years. Involvement of Pacific Islanders in the preparation of the assessment reports builds individual professional capacity and increases the quantity and visibility of Pacific-based research papers thereby enhancing the scope and quality of the assessment reports.

- **Proposed actions:**
  - Maintain and expand training to qualified Pacific Islanders to prepare climate change research papers suitable for peer reviewed journals and other publications via write-shops, mentorship programmes and communities of practice. Such programmes also build long term relationships for future research.
  - Assist qualified and interested Pacific Islanders to build their publication portfolio, so they can be considered as authors for the IPCC AR 8 process beginning in 2029/2030.
  - Assist qualified and interested Pacific Islanders to register in 2026 and 2027 as expert reviewers of the first and second order drafts of the IPCC AR 7. This will ensure more Pacific input to AR 7 and help Pacific Islanders gain experience in the IPCC AR preparation process. (All expert reviewers are acknowledged in the final AR report).

3.2.9 PRESENTATION OF THE PACIFIC RESEARCH ROADMAP 2025 TO PICTS

The Research Roadmap 2025 in its draft form was presented to participants at the Pacific Regional Dialogue on the IPCC and PCCC Legacy Initiatives Project Development workshop in Fiji from 7 – 11 April 2025. Participants included representatives from the PICTs, CROP agencies, research institutions, universities and colleges, and partners.

There was overall support for the Research Roadmap 2025 and its placement in a Pacific context. Participants noted that a strong coordination mechanism between the Research Roadmap 2025 and the Climate Services Roadmap 2024 is critical for the successful delivery of both Roadmaps.

After the presentation and discussion, representatives of the PICTs divided into country groups, and assisted by other participants, discussed the proposed research areas that were most relevant to their national context.

Research areas most often highlighted in importance by the countries were as follows:

- Preparation of high-resolution downscaled models and their application to climate change impacts in specific sectors and adaptation projects identified by countries in their NAPs.
  - This requires linking research activities in Focus Area 2 (climate change science) and 6 (adaptation and mitigation).

- Advancement of multi-disciplinary research to assist PICTs in their applications to the Fund for Responding to Loss and Damage.
    - This links Focus area 2 (climate change science and services), 4 (traditional knowledge), and 6 (adaptation and mitigation).
- Advancement of research into long term climate security including the impact of climate change on maritime boundaries and exclusive economic zones.
    - This links Focus Area 2 (climate change science) and 6 (adaptation and mitigation).
- Expand attribution research on the impacts of climate change on coastal, marine and terrestrial ecosystems and especially focus on livelihoods, economics and health.
    - This links Focus Area 2 (climate change science), Focus Area 4 (traditional knowledge) and 6 (adaptation and mitigation).
- Investigate the livelihood pathways used traditionally by Pacific communities and merge these findings with contemporary climate change projections to analyse long term adaptation options.
    - This links focus area 2 (climate change science and services) and 4 (traditional knowledge).
- Focus capacity development for specific users, e.g., NMHS, adaptation and mitigation communities, Pacific youth and young professionals.
    - This links Focus Area 8 (capacity development, knowledge brokerage and communications) with all the other focus areas.
- Facilitate collaborative research among research institutions, universities and partners through the Partnership Framework for Climate Change Research in the Pacific; and conduct an audit of existing communication sources.
    - This links Focus Area 3 (data and information management) with all the other focus areas.

(It should be noted that the focus areas for sector impact and risk (5) and climate finance (focus area 7) had not been defined in the draft Roadmap that was presented to participants).

New proposals identified by the PICTs included a suggestion for a sub-regional approach for specific research to be focused on the atoll only countries. In addition, a need was noted for outside researchers to ensure national protocols for research are followed.

The feedback from the PICTs clearly endorsed the Research Roadmap's focus on multi-disciplinary research and that the Research Roadmap 2025 should be viewed as one integrated and living document.

OUTCOMES AND CONCLUSION

The main outcomes of the Research Roadmap are shown in the log frame (see section 5.1) and summarised below:

- Outcome 1 (Key Result Area 1): Research Roadmap effectively governed (focus area 1).

- Outcome 2 (Key Result Area 2): Climate change science advanced (focus area 2).

- Outcome 3 (Key Result Area 3): Data and information effectively managed to support ongoing research (3).
- Outcome 4 (Key Result Area 4): Information on long term traditional knowledge compiled, analysed and incorporated into adaptation options (4).
- Outcome 5 (Key Result Area 5): Understanding of risk assessment strengthened and more robust sector data sets assembled (5).
- Outcome 6 (Key Result Area 6): New climate change science and traditional knowledge research informs adaptation and mitigation actions (6).
- Outcome 7 (Key Result Area 7): Innovative climate finance options expanded and shared (7).
- Outcome 8 (Key Result Area 8): Capacity within the PICTs is expanded to advance, share and apply the new research information (8).

The Pacific Climate Change Research Roadmap 2025 – 2030 is presented as a concise, integrated, living document, regularly reviewed and flexible to encompass new ideas and approaches.

LOGICAL FRAMEWORK, IMPLEMENTATION PLAN AND MONITORING TEMPLATE

SPREP's Strategic Plan 2017-2026 prioritises four regional goals and the first goal, climate resilience is the organization's principal concern. Implementation of the SPREP Strategic Plan is guided by a two-year Performance Implementation Plan.

The Biennial Work Programme and Budget for 2024 – 2025 has as its first regional goal: Pacific people benefit from strengthened resilience to climate change. The eight focus areas in the Research Roadmap 2025 relate, to some extent, to

- Regional Goal 1.1 Strengthen the capacity of Pacific Island members to lead, prioritise and manage national climate change adaptation, mitigation and disaster risk reduction in fulfilment of their national environment and development goals and their voluntary and legal obligations under regional and international agreements; and
- Regional Goal 1.3 Enhance National Meteorological and Hydrological Services (NMHS) capacity in weather forecasting, early warning systems, long term projections, and improved climate services to support members' decision-making and coordination through the Pacific Meteorological Council.

As SPREP develops its new Strategic Plan it is anticipated that the actions listed under the Focus Areas in the Research Roadmap 2025 will be incorporated more specifically into the future biennial work programmes and budgets.

The Logical Framework, Implementation Plan and Monitoring and Evaluation Template for the Research Roadmap cover the period 2025 – December 2029. The midterm external review is planned for 2029 after which it is anticipated that the Research Roadmap will be revised thereby requiring revised planning documents.

5.1 LOGICAL FRAMEWORK

The Phase 1 logical framework for 2025 – 2029 is shown below.

PACIFIC CLIMATE CHANGE RESEARCH ROADMAP 2025 - 2030		
Phase 1 Logical Framework 2025 - 2029		
Overall Objective: Enable multi-disciplinary research to connect the communities responsible for delivering climate change science research and for addressing climate change impacts to contribute to the improved safety, security and prosperity of the Pacific Island Countries and Territories ICTs within the 2050 Strategy for the Blue Pacific Continent.		
Indicator	**Target Dec. 2029**	**Assumptions**
Number of new multi-disciplinary research activities started	10	Funding availability and researchers willing to adopt a multi-disciplinary approach.
Number of multi-disciplinary research activities completed.	7	
Specific Objective: Advance the underpinning climate change scientific and traditional knowledge research in the Pacific and enable a people centred approach to address climate change impacts.		
Indicator	**Target Dec. 2029**	**Assumptions**
Number of new research activities showing specific evidence of the use of a people centred approach.	11	Funding availability and researchers willing to adopt a people centred approach and integrate GEDSI principles. Success is also dependent on the delivery of the training in a people centred approach - see Focus Area 8.

Key Result Area 1: Research Roadmap effectively governed (Focus Area1)		
Indicator	**arget Dec. 2029**	**Assumptions**
1.1 Coordination mechanism between Research Roadmap and Climate Services Roadmap established and annual coordination meetings held	1 mechanism , 5 annual meetings	Successful governance is critical for the delivery of the entire Research Roadmap. Additional funding, particularly for additional core staff, is required to meet these targets.
1.2 Annual reports and monitoring & evaluation conducted.	5 reports & evaluations	
1.3 External midterm review completed	1 external review	
1.4 PCCC core staff expanded	3 new staff	
Key Result Area 2: Climate change science advanced (Focus Area 2)		
Indicator	**arget Dec. 2029**	**Assumptions**
2.1 Revise national projections of the means and extremes for future climates and sea level based on CMIP 6 models	1 set of national projections (14 PICTs)	Progress on all activities is dependent on accessing funding. The revised national projections and the high-resolution downscaling are fundamental to progressing many of the other research activities.
2.2 Support Pacific networking as part of CORDEX and apply high resolution downscaled models to sector specific impacts		
2.3 Advance research into large-scale climate processes especially SPCZ		
2.4 Expand attribution science relating to extreme weather events and especially focus on the impacts on livelihoods, economics and health		
2.5 Expand long term monitoring and research into ecosystem response to ocean acidification		

Key Result Area 3: Data and information effectively managed to support ongoing research (Focus Area 3)		
Indicators	**Target Dec. 2029**	**Assumptions**
3.1 Audit of existing information services	1 audit, updated annually	Progress on all activities is dependent on accessing funding. Willingness of research organizations to collaborate.
3.2 Review and expand the Climate Change Portal to become a central hub for climate change research information		
3.3 Expand collaborative research among research organizations and promote data sharing with existing hubs and partners		

Key Result Area 4: Information on long term traditional knowledge compiled, analysed and incorporated into adaptation options (Focus Area 4)		
Indicators	**Target Dec. 2029**	**Assumptions**
4.1 Case studies on longer term traditional knowledge collected, documented and published		Progress on all activities is dependent on accessing funding. In the case of traditional knowledge, it is necessary first to research, analyse and publish the longer-term traditional knowledge case studies before the application research can proceed.
4.2 Databases and applications expanded to store longer term traditional knowledge		
4.3 Longer term traditional knowledge and contemporary science merged to inform longer term adaptation options		
4.4 Inclusion of long erm traditional knowledge into attribution science		
Key Result Area 5: Understanding of risk assessment strengthened and more robust sector data sets assembled (Focus Area 5)		
Indicators	**Target Dec. 2029**	**Assumptions**

5.1 User friendly tools developed for risk assessment and training provided to PICTs in their use		Progress on all activities is dependent on accessing funding.
5.2 Robust sector data sets compiled		

Key Result Area 6: New climate change science and traditional knowledge research informs adaptation and mitigation actions (Focus Area 6)		
Indicators	**Target Dec. 2029**	**Assumptions**
6.1 Number of consultations between research providers and research users	10	Progress on all activities is dependent on accessing funding. PICTs are willing to incorporate the new research into NAPs and NDCs.
6.2 Link high resolution downscaling research to prioritised projects and plans in the NAPs		
6.3 Advance research to support national applications to the Fund for Responding to Loss and Damage		
6.4. Advance research into long term climate security including changes in maritime boundaries		
6.5 Enhance climate change mitigation monitoring and investigate the potential impact of oceanic carbon sequestration in the Pacific Ocean		

Key Result Area 7: Innovative climate finance options expanded and shared (Focus Area 7)		
Key Indicators	**Target Dec. 2029**	**Assumptions**
7.1 Use of innovative insurance products for climate resilience (including parametric and micro insurance) reviewed, shared and published		Progress on all activities is dependent on accessing funding.
7.2 Research conducted into ways in which national trust funds for climate resilience can attract scalable donor contributions		
Key Result Area 8: Capacity within the PICTs is expanded to advance, share and apply the new research information (Focus Area 8)		
Indicators	**Target Dec. 2029**	**Assumptions**
8.1 Training in the incorporation of a people centred approach into research activities	4 trainings	Progress on all activities is dependent on accessing funding. Retention of trained Pacific Islanders is critical.
8.2 Focused capacity development for: NMHS, adaptation and mitigation communities, Pacific youth and young professionals		
8.3 Focused information sharing with: policy makers, development partners and donors, community and development leaders, and the public		
8.4 Engagement of Pacific Islanders in all three working groups of the IPCC AR 7 through: write-shops, mentorships and communities of practice; support for new and potential IPCC authors to build their publication portfolio; and facilitation for Pacific Islanders' engagement as expert reviewers of the draft AR 7		

5.2 IMPLEMENTATION PLAN

The Phase 1 Implementation Plan for 2025 – 2029 is shown below.

PACIFIC CLIMATE CHANGE RESEARCH ROADMAP 2025 - 2030							
Phase 1 Implementation Plan 2025 - 2029							
Overall Objective: Enable multi-disciplinary research to connect the communities responsible for delivering climate change science research and for addressing climate change impacts to contribute to the safety, security and prosperity of the Pacific Island Countries and Territories within the 2050 Strategy for the Blue Pacific Continent.							
Activity	**'25**	**'26**	**'27**	**'28**	**'29**	**Target Dec. 2029**	**Notes**
Number of new multi-disciplinary research activities started		2	4	4	4	10	Itemise the activities.
Number of new multi-disciplinary research activities completed		1	2	2	2	7	Itemise the activities.
Specific Objective: Advance the underpinning climate change scientific and traditional knowledge research in the Pacific and enable a people centred approach to address climate change impacts.							
Activity	**'25**	**'26**	**'27**	**'28**	**'29**	**Target Dec. 2029**	**Notes**
Number of new research activities showing specific evidence of the use of a people centred approach started		1	2	3	3	11	Itemise the activities.
Focus area 1 Climate Change Governance							
Activity	**'25**	**'26**	**'27**	**'28**	**'29**	**Target Dec. 2029**	**Notes**

1 Coordination mechanism established, and annual coordination meetings held	1	1	1	1	1	1 mechanism, 5 meetings	
1.2 Annual reports and monitoring and evaluation conducted	1	1	1	1	1	5 reports and M&E reviews	
1.3 External midterm review completed					1	1 external midterm review	
1.4 PCCC core staff expanded		1		1	1	3 staff	
Focus Area 2 Climate Change Science to Services							
Activity	**'25**	**'26**	**'27**	**'28**	**'29**	**Target Dec. 2029**	**Notes**
2.1 Revise national projections of the means and extremes for future climates based on CMIP 6 models							Progress on all activities is dependent on accessing funding. The revised national projections are fundamental to progressing many of the other research activities.
2.2 Support Pacific networking as part of CORDEX and apply high resolution downscaled models to sector specific impacts							
2.3 Advance research into large-scale climate processes especially SPCZ							
2.4 Expand attribution science relating to extreme weather events and especially focus on the impacts on livelihoods, economics and health							

2.5 Expand long term monitoring and research into ecosystem response to ocean acidification							

Focus Area 3 Data and Information Management							
Activity	**'25**	**'26**	**'27**	**'28**	**'29**	**Target Dec. 2029**	**Notes**
3.1 Audit of existing information services						1 audit	Progress on all activities is dependent on accessing funding.
3.2 Review and expand the Climate Change Portal to become a central hub for climate change research information							
3.3 Expand collaborative research among research organizations and promote data sharing with existing hubs and partners							

Focus Area 4 Traditional Knowledge							
Activity	**'25**	**'26**	**'27**	**'28**	**'29**	**Target Dec. 2029**	**Notes**
4.1 Case studies on longer term traditional knowledge collected and published.	1	1	1	1	1	5	Progress on all activities is dependent on accessing funding. In the case of traditional knowledge, it is necessary

4.2 Databases and applications expanded to store longer term traditional knowledge.							first to research, analyse and publish the longer-term traditional knowledge case studies before the application research can proceed.
4.3 Longer term traditional knowledge and contemporary science merged to inform adaptation options.							
4.4 Inclusion of longer- term traditional knowledge into attribution science.							

Focus Area 5 Sector Impacts and Risk							
Activity	**'25**	**'26**	**'27**	**'28**	**'29**	**Target Dec. 2029**	**Notes**
5.1 User friendly tools developed for risk assessment and training provided to PICTs in their use							Progress on all activities is dependent on accessing funding.
5.2 Robust sector data sets compiled							

Focus Area 6 Climate Change Adaptation and Mitigation							
Activity	**'25**	**'26**	**'27**	**'28**	**'29**	**Target Dec. 2029**	**Notes**
6.1 Number of consultations between research providers and research users	1	2	2	2	2	9	Progress on all activities is dependent on accessing funding

6.2 Link high resolution downscaling research to prioritised projects and plans in the NAPs							
6.3 Advance research to support national applications to the Fund for Responding to Loss and Damage							
6.4 Advance research into long term climate security including changes in maritime boundaries							
6.5 Enhance climate change mitigation monitoring and investigate the potential impact of oceanic carbon sequestration in the Pacific Ocean							

Focus Area 7 Climate Finance							
Activity	**'25**	**'26**	**'27**	**'28**	**'29**	**Target Dec. 2029**	**Notes**
7.1 Use of innovative insurance products for climate resilience (including parametric and micro insurance) reviewed, shared and published							Progress on all activities is dependent on accessing funding
7.2 Research conducted into ways in which national trust funds for climate resilience can attract scalable donor contributions							

Focus Area 8 Capacity Development, Knowledge Brokerage and Communications							
Activity	**'25**	**'26**	**'27**	**'28**	**'29**	**Target Dec. 2029**	**Notes**
8.1 Training in the incorporation of a people centred approach into research activities		1	1	1	1	4 trainings	Progress on all activities is dependent on accessing funding. Retention of trained Pacific Islanders is critical.
8.2 Focused capacity development for: NMHS, adaptation and mitigation communities, Pacific youth and young professionals							
8.3 Focused information sharing with policy makers, development partners and donors, community and development leaders, and the public							
8.4 Engagement of Pacific Islanders in all three working groups of the IPCC AR 7 through: writeshops, mentorships and communities of practice; support new and potential IPCC authors to build their publication portfolio; and facilitation for Pacific Islanders' engagement as expert reviewers of the draft AR 7							

5.3 TEMPLATE FOR MONITORING AND EVALUATION

The Phase 1 Monitoring and Evaluation Template for 2025 -2029 is shown below.

PACIFIC CLIMATE CHANGE RESEARCH ROADMAP 2025 - 2030		
Phase 1 Monitoring and Evaluation Template 2025 - 2029		
Year to which this evaluation form refers:		
Overall Objective: Enable multi-disciplinary research to connect the communities responsible for delivering climate change science research and for addressing climate change impacts to contribute to the safety, security and prosperity of the Pacific Island Countries and Territories within the 2050 Strategy for the Blue Pacific Continent.		
Results notation: N = Not started, P = Planning stage, I = In progress, C = Completed		
Activity	**Result**	**Itemization and Notes**
Number of transdisciplinary research activities completed or in progress.		
Specific Objective: Advance the underpinning climate change scientific and traditional knowledge research in the Pacific and enable a people centred approach to address climate change impacts.		
Results notation: N = Not started, P = Planning stage, I = In progress, C = Completed		
Activity	**Result**	**Itemization and Notes**
Number of research activities showing specific evidence of the use of a people centred approach.		

Focus Area 1 Climate Change Governance		
Activity	**Result**	**Notes**
Results notation: N = Not started, P = Planning stage, I = In progress, C = Completed		

1.1 Coordination mechanism established, and annual coordination meetings held	Y/N	
1.2 Annual reports and annual monitoring and coordination conducted	Y/N	
1.3 External midterm review completed	Y/N	
1.4 PCCC core staff expanded	Y/N/Nos	

Focus Area 2 Climate Change Science		
Activity	**Result**	**Notes**
Results notation: N = Not started, P = Planning stage, I = In progress, C = Completed		
2.1 Revise national projections of the means and extremes for future climates based on CMIP 6 models		
2.2 Support Pacific networking as part of CORDEX and apply high resolution downscaled models to sector specific impacts		
2.3 Advance research into large-scale climate processes especially SPCZ		
2.4 Expand attribution science relating to extreme weather events and especially focus on the impacts on livelihoods, economics and health		
2.5 Expand long term monitoring and research into ecosystem response to ocean acidification		

Focus Area 3 Data and Information Management		
Activity	**Result**	**Notes**
Results notation: N = Not started, P = Planning stage, I = In progress, C = Completed		
3.1 Audit of existing information services		
3.2 Review and expand the Climate Change Portal to become a central hub for climate change research information		
3.3 Expand collaborative research among research organizations and promote data sharing with existing hubs and partners		

Focus Area 4 Traditional Knowledge		
Activity	**Result**	**Notes**
Results notation: N = Not started, P = Planning stage, I = In progress, C = Completed		
4.1 Case studies on longer term traditional knowledge collected and published		
4.2 Databases and applications expanded to store longer term traditional knowledge		

4.3 Longer term traditional knowledge and contemporary science merged to inform adaptation options		
4.4 Inclusion of longer-term traditional knowledge into attribution science		

Focus Area 5 Sector Impacts and Risk		
Activity	**Result**	**Notes**
Results notation: N = Not started, P = Planning stage, I = In progress, C = Completed		
5.1 User friendly tools developed for risk assessment and training provided to PICTs in their use		
5.2 Robust sector data sets compiled		

Focus Area 6 Climate Change Adaptation and Mitigation		
Activity	**Result**	**Notes**
Results notation: N = Not started, P = Planning stage, I = In progress, C = Completed		
6.1 Number of consultations between research providers and research users.		
6.2 Link high resolution downscaling research to prioritised projects and plans in the NAPs.		
6.3 Advance research to support national applications to the Fund for Responding to Loss and Damage.		

6.4. Advance research into long term climate security including changes in maritime boundaries.		
6.5 Enhance climate change mitigation monitoring and investigate the potential impact of oceanic carbon sequestration in the Pacific Ocean		

Focus Area 7 Climate Finance		
Activity	**Result**	**Notes**
Results notation: N = Not started, P = Planning stage, I = In progress, C = Completed		
7.1 Use of innovative insurance products for climate resilience (including parametric and micro insurance) reviewed, shared and published		
7.2 Research conducted into ways in which national trust funds for climate resilience can attract scalable donor contributions		

Focus Area 8 Capacity Development, Knowledge Brokerage and Communications		
Activity	**Result**	**Notes**
Results notation: N = Not started, P = Planning stage, I = In progress, C = Completed		
8.1 Training in the incorporation of a people centred approach into research activities		
8.2 Focused capacity development for: NMHS, adaptation and mitigation communities, Pacific youth and young professionals		

8.3 Focused information sharing with policy makers, development partners and donors, community and development leaders, and the public		
8.4 Engagement of Pacific Islanders in all three working groups of the IPCC AR 7 through: writeshops, mentorships and communities of practice; support new and potential IPCC authors to build their publication portfolio; and facilitation for Pacific Islanders' engagement as expert reviewers of the draft AR 7		

ANNEX1: KEY FINDINGS FROM THE REVIEW AND ANALYSIS OF THE RESEARCH ROADMAP 2018

(i) Significant work had been done under climate change science (Pillar 1) including revised national projections for 14 PICTs, sector-specific case studies in four countries and the development of a Climate Futures Portal in one country, Vanuatu. However, there was minimal evidence of these outputs being used by policy makers, climate change focal points, sector leaders, the private sector, or community leaders.

(ii) One of the overarching results of the review was that there is a significant overlap between the Research Roadmap 2018 and the Climate Services Roadmap 2024. Recognizing that there is so much work to be done in both domains, it was recommended that the new Research Roadmap 2025 focus on the decadal and multidecadal (next ten years to the end of this century) aspects of climate change research and its uptake by the adaptation and mitigation communities. While the Climate Services Roadmap 2024 retains its focus on weather and climate variability timescales (weather, seasonal and

annual changes). However, it is recognised that weather, climate variability and climate change are essentially part of a time continuum, and it is not always clear where one starts and the other begins.

(iii) Considerable progress had been made on merging traditional knowledge (Pillar 2) with meteorological forecasting and climate variability, mainly through the Climate Services 2017 Roadmap. This included the production of research publications, the establishment of a traditional knowledge database and university partnerships. However, there has been little research done into traditional knowledge and climate change coping mechanisms on decadal and multidecadal time scales.

(iv) The review showed capacity development (Pillar 3) had largely focused on the National Meteorological and Hydrological Services (NMHS), who play an important role in the climate change research arena. It was recommended that building the capacity of adaptation and mitigation practitioners, as well as other stakeholders, in the uptake of climate change research should also be included that in the new Research Roadmap 2025.

(v) Regarding climate change services (Pillar 4**)**, significant work has been done under the Climate Services Roadmap 2017. It was proposed that the new Research Roadmap 2025 would not include a separate climate services Pillar, although reference to climate change services research would be included in other Pillars. It was recommended that a strong mechanism be established to coordinate the Research Roadmap 2025 and the Climate Services Roadmap 2024.

(vi) Data and information management (Pillar 5) is an important area and progress had been made with the Climate Change Portal, and in sharing the new climate change research information with the NMHS, although less so with other users. The sharing of data is a separate issue, given the specific protocols that must be put in place for individual joint research efforts.

(vii) Governance: oversight and administration (Pillar 6), is an extremely important underpinning Pillar and will be listed first in the new Research Roadmap 2025. Key concerns from the review are the very small core staff of the PCCC, the absence of any monitoring and evaluation of the roadmap, and the limited uptake of the Research Roadmap 2018.