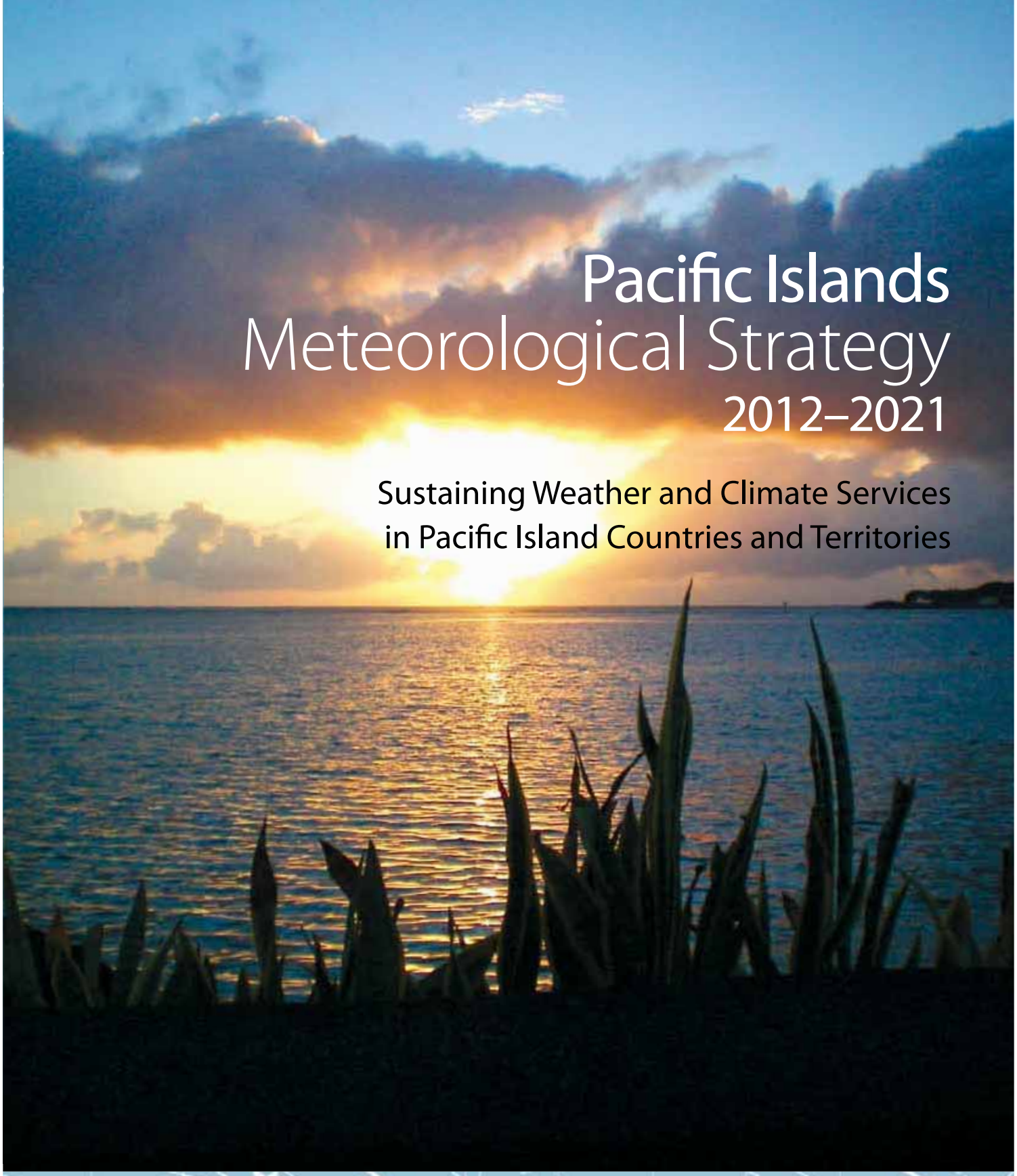

Pacific Islands Meteorological Strategy 2012–2021

Sustaining Weather and Climate Services in Pacific Island Countries and Territories

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Contents


160E
165E
170E
175E
180E
175W
170W
165W
160W
1010
1012
1014
1016
1018
1020
1022

Statement from the Inaugural Chairman

The Pacific Islands Meteorological Strategy 2012–2021 represents a continued strategic effort on the part of the Directors of National Meteorological Services (NMSs) of all Pacific Island Countries and Territories (PICTs), to ensure that the services that we provide are sustained and ensured of the best quality possible.

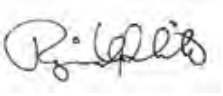
Tropical cyclones and typhoons, drought and flash floods, storm surges, earthquakes and tsunami, are but some of these extreme events that concern our services. The past decade has seen some unprecedented disasters in the wake of these in the loss of life and livelihoods of Pacific people. As a Chair from an atoll country, the severe impacts of these and climate change provide more than enough motivation to ensure that our NMSs continue to grow in providing time critical and relevant data and information services to the public.

The growth and sustenance of NMSs must be a priority for our respective governments in the Pacific. We have made large steps in the achievements of where our services are today, thanks in a large part to the assistance and support from our counterpart agencies in Australia, Finland, Japan, New Zealand, the United States of America and the World Meteorological Organization. The time is now to forge a renewed strategic partnership with the many supporters we are fortunate to have, and with our respective governments to ensure that a logical approach to strengthening our many diverse areas of need is in place.

As the first Chair of the Pacific Meteorological Council (PMC), I am proud to take this opportunity to provide leadership in the first couple of years of this strategy, and to ensure that we make strides in achieving the goals we have set for ourselves as the PMC. This strategy reflects not only the best way forward but highlights the key areas of focus for development and support and we welcome as many partners at the national and regional level to work together on these. I am confident that this Strategy and the commitment of support from the SPREP Secretariat and the Pacific Meteorological Desk Partnership will provide us with a sound roadmap for the next ten years at the end of which I am sure we will arrive at a result of a well-functioning professional NMS able to provide the best service to its country and people. I am sure that my fellow Directors who will follow in turn as Chairs will be as committed as I am to the vision and objectives of this Strategy.

Our continued thanks go to our partners who have aided our development over the past few decades and who continue to provide enthusiastic support to the region. Our thanks to SPREP and WMO also for the continued secretariat services to the region and without whom this strategy would not be possible. To my fellow Council members, here lies our pathway and challenge for the next decade, together as partners we can achieve these and more!

Komol tata,



Reginald White

DIRECTOR

REPUBLIC OF MARSHALL ISLANDS NATIONAL WEATHER SERVICE

Foreword

The Pacific Islands Meteorological Strategy (PIMS) presents the priorities for action and where Pacific Island Countries and Territories National Meteorological Services (NMSs) would like to be in the next three years if their capacity are strengthened.

The continued support of the development partners of the Pacific Meteorological Council (PMC) such as World Meteorological Organisation (WMO), National Oceanic and Atmospheric Administration (NOAA) of the USA, Meteorological Service of New Zealand Ltd (MetService), National Institute of Water and Atmospheric Research (NIWA) of New Zealand, Bureau of Meteorology (BOM) of Australia, Meteo France, Japanese International Cooperation Agency (JICA), Finland Ministry of Foreign Affairs and the Finnish Meteorological Institute, and bilateral and multilateral partners such as Australia, New Zealand, USA and the World Bank are crucial for the timely and successful implementation of this PIMS. Other developed countries and their meteorological services are invited to join the PMC and the Secretariat of the Pacific Regional Environment Programme (SPREP) to provide support for National Meteorological Services (NMSs) as mapped out in this strategy..

This strategy is for Pacific Island Countries and Territories' NMSs, donors and partners to strengthen weather and climate services for all stakeholders through timely provisions of early warnings, information on weather and climate, especially climate change.

The biannual meeting of the Regional Meteorological Service Directors' (RMSD) meeting was replaced by the Pacific Meteorological Council's first meeting in Majuro, Republic of the Marshall Islands (RMI) in 2011. The PMC is a specialized subsidiary body of the SPREP Meeting. It was established at the 14th RMSD meeting in RMI, to facilitate and coordinate the scientific and technical programme and activities of the National Meteorological Services (NMSs). The PMC replaces the RMSD and provides relevant policy advice to the SPREP Meeting on the needs and priorities of SPREP member countries and territories in relation to meteorology (weather and climate) and related fields. I would like to acknowledge the fine leadership of the first PMC chair from the Republic of Marshall Islands, Mr Reginald White.

We call on NMSs and PMC partners in addition to members of the Council of Regional Organisation Programmes (CROPs) to support the implementation of this PIMS not only to strengthen NMSs capacity but to ensure that weather; climate variability and climate change information reach the 'last person' in urban and rural areas and in remote outer islands in a timely and effective manner.

David Sheppard

DIRECTOR GENERAL
SPREP

Executive Summary

National Meteorological Services (NMSs) underpin economic growth and sustainable development in the Pacific Islands region. The weather and climate services provided by NMSs significantly contribute to the safety and well-being of Pacific people and communities and support key economic areas including agriculture, aviation, forestry, fishing, water resources, energy industries, transportation and tourism.

In addition, these services are crucial to enhancing resilience to and reducing vulnerability from natural hazards and the effects of climate variability and climate change.

The Pacific Meteorological Council (PMC) has adopted the Pacific Islands Meteorological Strategy to ensure that NMSs have the capacity to fulfill their responsibilities over the next decade. Its Vision is:

National Meteorological Services of the Pacific Island Countries and Territories (PICTs) are able to provide relevant weather and climate services to their people to make informed decisions for their safety, socio-economic well-being and prosperity and sustainable livelihoods.

The Strategy identifies four priority areas for action:

- Improved weather services, in particular aviation, marine and public weather services.
- Improved end-to-end Multi-Hazard Early Warning Systems (MHEWS).
- Enhanced infrastructure (data and information services) for weather, climate and water.
- Improved climate services.

The Strategy sets out priority areas in a Matrix of Pacific Outcomes and Activities that can be undertaken at national, regional and international levels.

The priorities and actions are supported by a set of institutional partnerships that bring together PICTs and development partners to support meteorological (weather and climate) services in the Pacific Islands region.


1008
1010
1012
1012
1014
1016
1012
1014
1014
1012
1016
1018
1020
1012
1010
1026
1022
1024
1010

THE PACIFIC ISLANDS METEOROLOGICAL STRATEGY

2012–2021

PART 1

Strategic Context and Direction

1 Purpose

The purpose of this Pacific Islands Meteorological Strategy 2012–2021 (PIMS) is to set out the strategic context and direction for strengthening National Meteorological Services (NMSs[1]) in the Pacific Islands region.

The PIMS provides a guiding framework for the development and support of national and regional meteorological (weather and climate) services. It seeks to promote development through building capacity within NMSs, and ensuring support is coordinated and delivered effectively in partnership with international agencies, regional agencies, donors and technical partners.

The PIMS builds upon the *Strategic Action Plan for the Development of Meteorology in the Pacific Region 2000–2009*.

The PIMS is arranged in two parts:

PART 1 sets out the overall strategic direction and global and regional context. It describes relevant institutional and governance arrangements, including the roles of the PMC and the Pacific Meteorological Desk Partnership.

PART 2 sets out Pacific Key Outcomes adopted by the PMC[2], each implemented through a Matrix of Pacific Outcomes and Activities at national and Pacific regional level.

1 National Meteorological Services (NMSs) throughout this document refers to the Pacific Island Countries and Territories NMSs.

2 Pacific Meteorological Council (PMC) memberships are Directors/Heads of NMSs of SPREP Members and Partners as approved by the SPREP and PMC meetings.

2 Background

2.1 Status of National Meteorological Services

All Pacific Island Countries and Territories (PICTs) have Meteorological Services. During the past decade there has been significant development and general improvement in their capacity and capabilities. PICTs, working closely together with developed Members of SPREP (Australia, France, New Zealand and USA), other countries (including China, Italy, Denmark, Finland, Japan and the UK) and the global network of meteorological infrastructure and services provided through WMO and others, much capacity development and training has been undertaken to improve technical skills needed to deliver weather and climate services in the PICTs.

Technical skills for weather services include surveillance, forecasting and warning, supply and maintenance of equipment and data collection and management (including processing, storage, access and exchange of near real-time weather data).

Technical skills for climate services include collection of, archiving, quality control and management of historical climate data, supply and maintenance of equipment, analyses of climate data, and capability for seasonal and interannual predictions and climate change projections (scenarios).

Despite the progress made, much remains to be done to bring many NMSs up to the level that will ensure they can meet their mandates and serve their nations effectively. The current capacity at the national level varies greatly between NMSs. Most NMSs in the region operate with poor infrastructure and limited capability. Their climatological services are generally poorly developed or non-existent. In a number of instances, PICTs rely mainly on external support to provide basic climatological services.

2.2 Value of National Meteorological Services

The weather and climate services provided through NMSs are of tremendous value to people and communities, and the economies of PICTs.

VULNERABILITY AND RESILIENCE: The Pacific is one of the most environmentally fragile regions on the planet, being prone to natural disasters and the effects of climate change. There is an intrinsic relationship between poverty and the vulnerability of communities to natural disasters and climate variability. Timely information on extreme weather events (through early warning systems and climate outlooks) can support resilience through reducing loss of life and property.

CLIMATE CHANGE: Climate variability, climate change and future sea level rise can have significant impacts in terms of food and fresh water security, human health and investment in infrastructure. Being located in a region most affected by these events, PICTS have a strong incentive to contribute climate data/information and raised the expectation of NMSs to provide climate services to respond to the impacts of climate change.

FOOD SECURITY: Many PICTs rely on subsistence agriculture and fishing as a means of livelihood. Subsistence farmers and fishers are very vulnerable to external shocks, including natural hazards such as severe weather events and the impacts of climate change. Their thin margin for error can

mean one event plunges them into catastrophic losses. People living at a subsistence level are easily trapped in poverty because they cannot recover from such shocks as readily as those with greater economic resources. Sound information on storms, extreme rainfall, floods and drought events can help reduce these impacts.

COMMUNITIES AND CIVIL SOCIETY: Many people in the Pacific Islands region depend on land for their livelihood – for food production, employment, social status and power. Studies have shown that those with least resources are generally hardest hit by droughts, floods, landslides and other natural hazards. These events can severely disrupt communities and civil society generally.

Mitigating the risk associated with natural disasters and adaptation to climate change requires people to be aware of potential risks and changes in the climate and to understand the implications for their lives.

ECONOMIC DEVELOPMENT AND TRADE: Key economic sectors such as agriculture, forestry, fishing, water resources, energy, transportation and tourism depend on reliable weather forecasts and climate services to manage their activities effectively. They are also highly vulnerable to natural hazards and the impacts of climate change. High quality and reliable weather information and forecasts, and seasonal to annual climate prediction are crucial for these sectors. In particular, high quality weather information and forecasts are crucial for aviation services.

2.3 Future Focus

A number of growing global issues point to increasing demands being made on NMSs over the next decade:

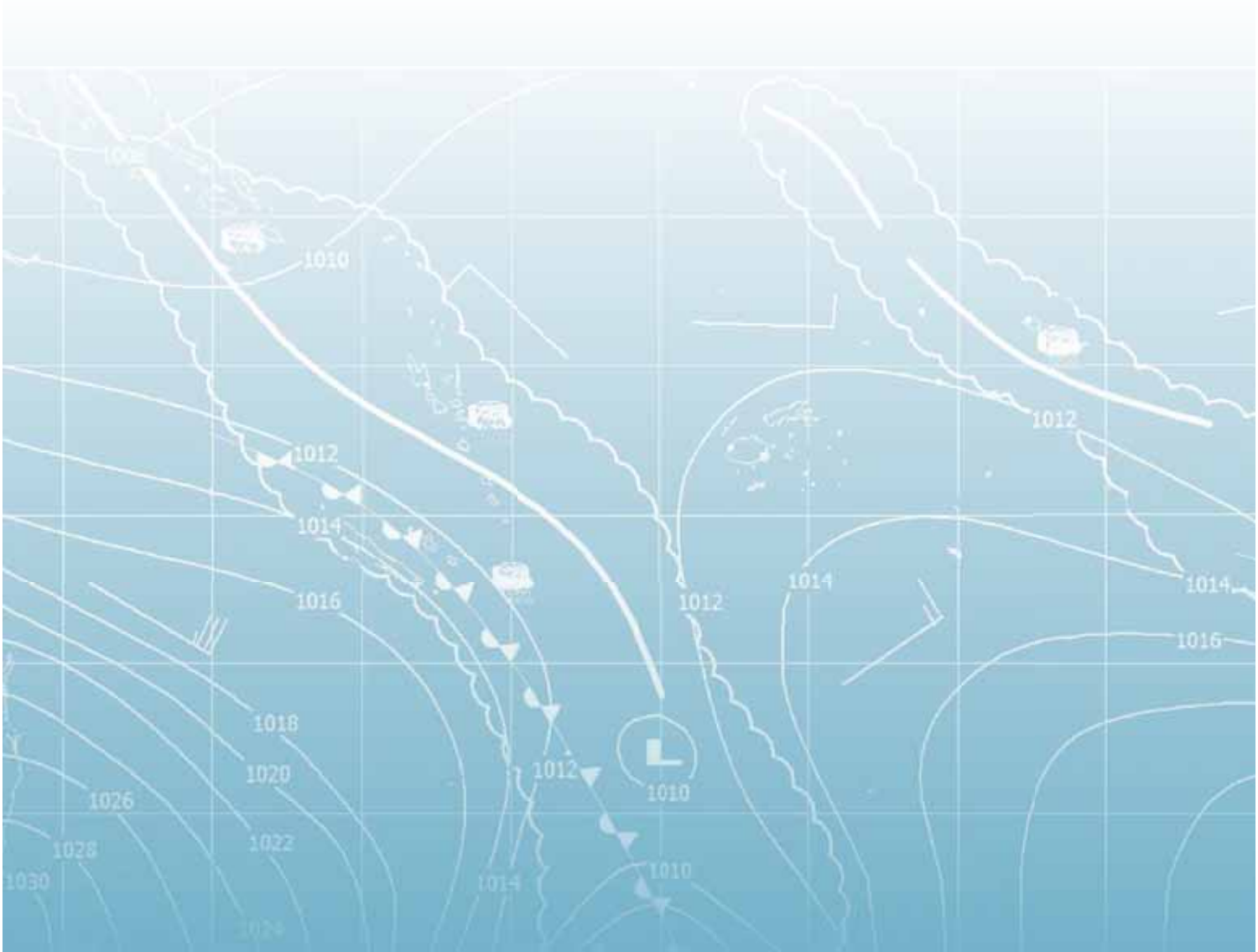
- Increasing population, changing expectations of communities and the push for economic development, free trade, sustainability and security will all place increasing demands on NMSs to provide effective weather and climate services.
- Increasing recognition of the need to integrate women, girls, children, youth, the poor and people living with disabilities, and their rights into the mainstream of the provision of weather and climate services – including warnings, climate services and climate change information.
- The global focus on climate change, and the particular vulnerability of PICTs, brings increased dependence on both sustaining long term climate observation and prediction of severe weather and climate events.
- Rapid changes in technology (e.g. new weather satellites) mean that continual investment is needed in installation and maintenance of infrastructure. Training is necessary for NMSs to deliver data and services to meet community needs and international obligations.
- Weather, climate and other natural hazards cross international boundaries. NMSs must comply with changing international obligations and standards to contribute to further enhancing global understanding of the earth's weather and climate systems.

This Strategy is designed to guide NMSs, the Pacific Meteorological Council (PMC), SPREP, other regional organisations and partners on the type of priority activities to be implemented to meet the challenges set out here, and make the best possible contribution to the well-being of PICTs' communities.

3 Vision

The Pacific Meteorological Council (PMC) has adopted the following Vision statement for this Strategy:

National Meteorological Services (NMSs) of the Pacific Island Countries and Territories (PICTs) are able to provide relevant weather and climate services to their people to make informed decisions for their safety, socio-economic wellbeing and prosperity, and sustainable livelihoods.



4 Principles

The Principles set out below apply to the implementation of this Strategy, including the delivery of National and Regional Priority Actions.

I **PACIFIC FOCUS:** The work of NMSs is primarily focused on effective delivery of meteorological (weather and climate) services for the benefit of Pacific peoples and communities.

II **GLOBAL CONTRIBUTION:** The PMC and NMSs recognise the global character of weather and climate, and the need for an international approach that is consistent with relevant guiding frameworks.

III **SUPPORTING GENDER EQUALITY AND THE MOST VULNERABLE IN SOCIETY:** NMSs accept the need to operate and deliver services in ways that address principles of gender equality and the needs of the most vulnerable in society.

IV **COST EFFECTIVENESS:** Services should be delivered in an efficient, cost-effective way. NMSs' ability to deliver the actions in this Strategy is critically dependant on the resources available to them. Where appropriate, services may be delivered by NMSs with greater resources in support of those with less. In some cases, depending on available resources, it may be more efficient to deliver certain services and support at a regional level, subject to bilateral and multilateral agreements.

V **SHARING INFORMATION:** NMSs are committed to sharing data in line with international obligations and national policies; in particular the WMO commitment to free and unrestricted exchange of meteorological and related data and products (WMO Resolutions 40 and 25).

VI **PARTNERSHIPS:** Partnerships with the WMO, regional inter-governmental agencies and organisations, and technical partners are critical to the success of this Strategy. A multilateral coordinated approach enhances effectiveness in increasing resources, targeting effort and managing potential overlap between agencies, organizations and development partners, especially where these are managed through bilateral arrangements. Partnerships between NMSs have an important role in ensuring cooperation and sharing of lessons-learned within the region.

5 Objectives and Priorities

5.1 Objectives

The overall objective of this Strategy is to provide a strategic framework for building and strengthening the capacity of National Meteorological Services (NMSs), either through direct national support or through coordinated, coherent, and sustained regional support.

With added resources and support these NMSs will be able to meet the growing demands from their governments and citizens for improved weather and climate services that:

- Ensure the safety, security and wellbeing of their people
- Contribute to achieving sustainable development
- Fulfill Pacific Meteorological Council (PMC) member countries' commitments and obligations under relevant regional and international agreements and conventions.

Within this overall context, the specific objectives of this Strategy are to:

- Provide the guiding framework for addressing NMSs' priorities through strengthened regional coordination;
- Guide donors and partners to focus on priority capacity building activities and transfer of technology identified by the NMSs that may be delivered either bilaterally or through regional approaches;
- Guide NMSs towards critical activities aimed at building or strengthening capacity and planning and implementing national projects;
- Guide the PMC and Pacific Meteorological Desk Partnership with respect to sustaining priority actions at the regional level.

5.2 Priorities

This Strategy focuses on the following priority areas for action:

- Improved weather services, in particular, aviation, marine and public weather services.
- Improved end-to-end Multi-Hazard Early Warning Systems (MHEWS).
- Enhanced infrastructure (data and information services) for weather, climate and water.
- Enhanced development of climate services.

The actions associated with these priorities are set out in Part 2 of this Strategy.

In line with the overall purpose and objective of this Strategy, the PMC has also assigned high priority to the cross-cutting theme of 'Capacity Building'. This is expressed in the *Matrix of Pacific Outcomes and Activities* (Part 2), where capacity development actions are embedded throughout the Pacific Key Outcomes.

6 Partnerships and Linkages

Partnerships are critical to the successful implementation of this Strategy. To be effective, the Strategy must be clearly linked with the work of other government departments and agencies, technical partners and the private sector, and work in concert with other global and regional frameworks.

The PMC acknowledges the particular importance of aligning actions under this Strategy with the Pacific Islands Framework for Action on Climate Change (PIFACC), the Pacific Disaster Risk Reduction (DRR) and Disaster Management Framework (DRM) for Action 2005, the Pacific Plan and other relevant regional and international initiatives. Figure 1 shows the linkages between key international and regional initiatives.

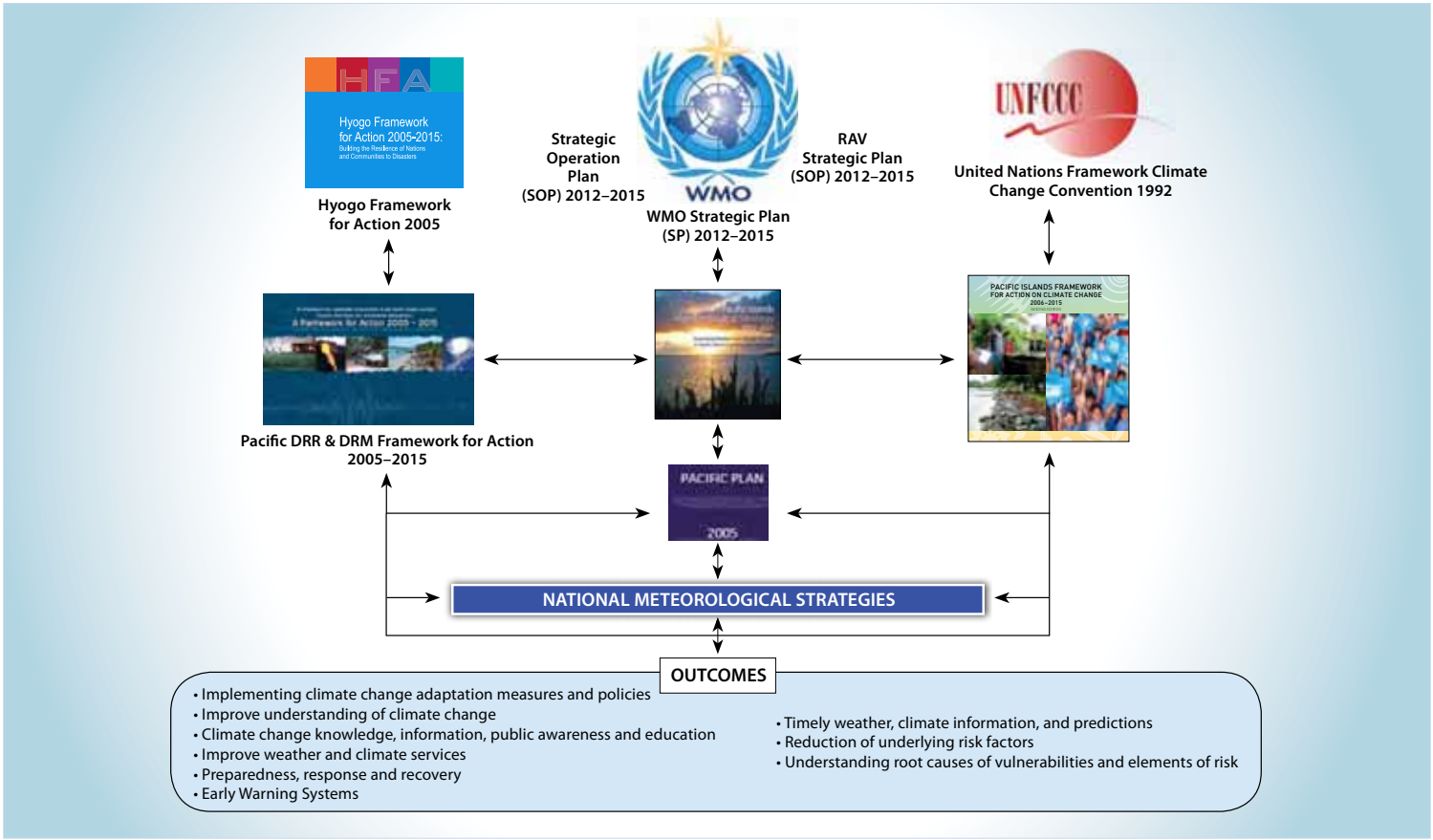


FIGURE 1: LINKAGES OF RELEVANT GLOBAL AND REGIONAL FRAMEWORKS WITH PIMS

Figure 1 shows that although each of the related regional policies and strategies originated from separate global institutions, there are clear linkages at the regional level where the regional frameworks contribute to similar outcomes. The Strategy will help to highlight the strong role NMSs must play in relation to all three regional frameworks. The principles incorporated in this Strategy will work to strengthen coordination among the key regional organisations that provide support to the NMSs and the PMC.

A regional framework for the sustainable management of water resources will be developed in due course which will also have linkages with this strategy through institutional arrangements, information sharing and application of information and data at national and community levels of development. To support PICTs in the implementation of the many inter-connected national, regional and global frameworks called for an integrated and collaborative approach from the regional and global organisations and partners.

The outcomes in Figure 1 are not exhaustive. They are examples of how the national responsibilities of NMSs correspond with larger regional and international initiatives important in the global arena of economic growth and sustainable development.

7 Institutional Arrangements

A series of related institutions and structures are already in place to support the implementation of this Strategy. Figure 2 shows the institutional arrangements.

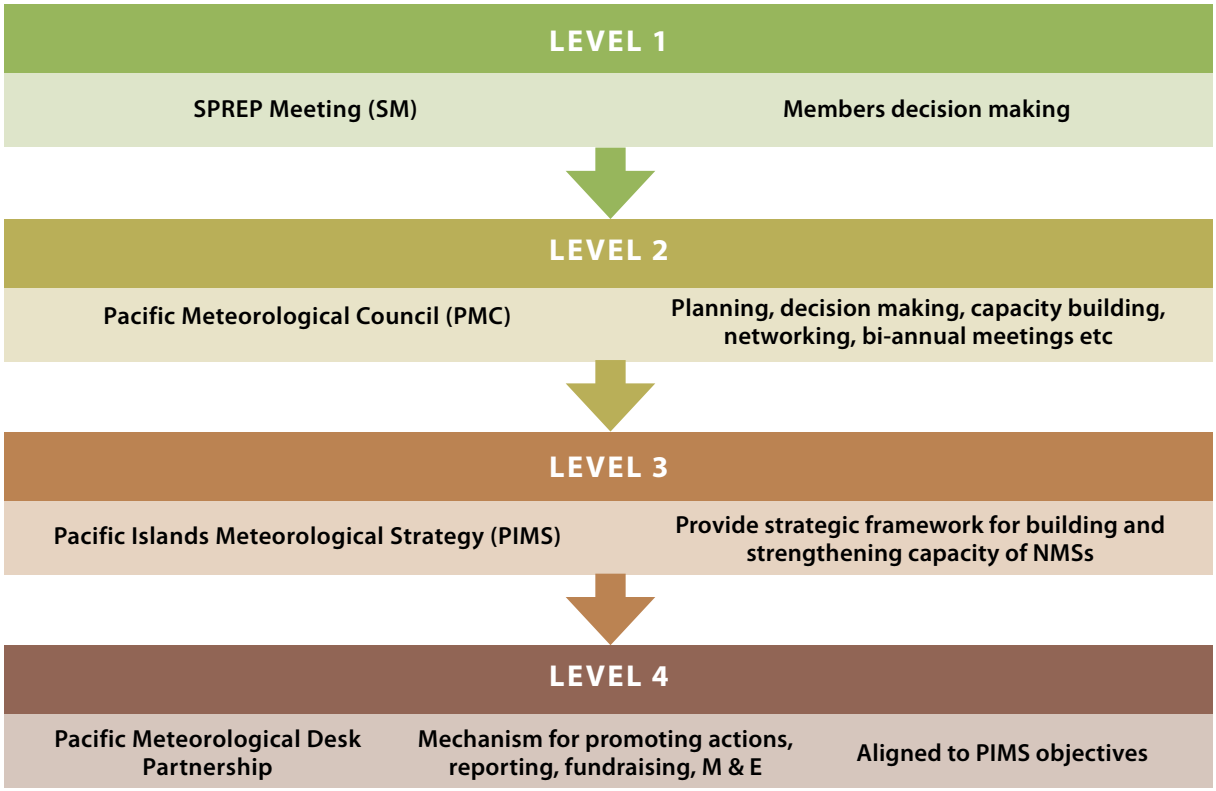


FIGURE 2: PIMS INSTITUTIONAL ARRANGEMENTS

The PMC is a specialised subsidiary body of the SPREP Meeting; the SPREP Secretariat acts as Secretariat and host organisation for the PMC. The SPREP Meeting is the governance mechanism with respect to the PMC mandate and Terms of Reference. Through the PMDP within the SPREP Secretariat, the SPREP Meeting will be kept informed of the operation of the PMC and progress in implementation of and meeting the PIMS's objectives.

The PMDP will assist the PMC and NMSs in securing resources to implement this Strategy, address gaps and challenges and will report to the PMC. The PMC takes on a key role through the adoption of this Strategy, which provides guidance on national and regional actions. The PMC will take responsibility for ensuring coordination at the regional level and for advocating and monitoring the Strategy. The PMC will oversee initiatives taken to implement the Strategy at a regional level. In particular, it will seek to ensure appropriate accountability in relation to funds, and promote activities that are aligned with the priorities and principles set out in this Strategy.

At the national level, NMSs will work to achieve their respective priorities and objectives in the context of National Meteorological Plans developed through their respective Ministries or Departments.

8 Monitoring and Evaluation

The PMC has primary responsibility for monitoring progress towards the outcomes set out in this Strategy. The PMC will be supported by the PMDP Secretariat at SPREP which will inform the PICTs and collaborating partners on the progress towards achieving the objectives of this Strategy. The PMDP Secretariat will also report on the activities of the PMDP.

To enable the PMC to carry out its monitoring role, the PMDP Secretariat will provide progress reports covering:

i A summary of the work and achievements of the PMDP during the previous six months. This report is to be circulated electronically to the PMC members.

ii An annual summary of progress in implementing the Regional Priority Actions and to be circulated electronically in the non-meeting year to the PMC members.

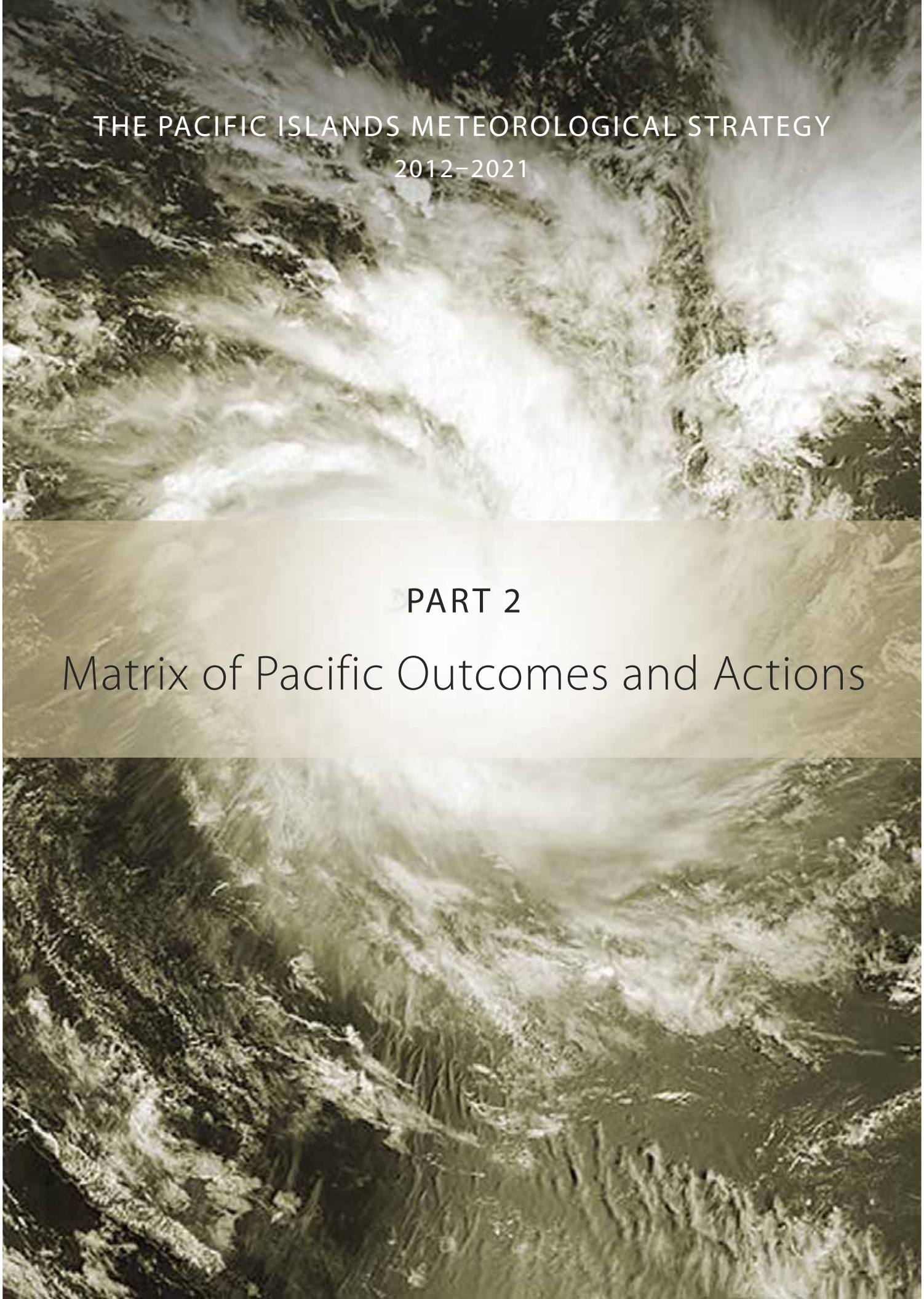
iii An annual assessment of progress towards achieving the Pacific Key Outcomes (PKO) and to be circulated electronically in non-meeting year to the PMC members.

On the basis of these reports and other information available to it, the PMC will provide feedback and guidance where necessary on implementation of the Strategy.

On behalf of PMC, the PMDP will provide a report of progress in its annual report to the SPREP Meeting to give SPREP Members an opportunity to provide feedback on progress towards implementing the outcomes and actions in this Strategy.

9 Mid-Term Review

The PMC will conduct a mid-term review of the implementation of this Strategy no later than 1 July 2017 to ensure that it remains current and focussed on the appropriate priority areas.



THE PACIFIC ISLANDS METEOROLOGICAL STRATEGY

2012–2021

PART 2

Matrix of Pacific Outcomes and Actions

This matrix sets out the Pacific Key Outcomes (PKO) to be pursued through this Strategy.

Each KPO is accompanied by a table of National and Regional Priority Actions:

- The National Priority Actions comprise a list of activities that may be delivered by NMSs, development/technical partners or others. The list is neither mandatory nor exhaustive; it is up to each NMS to determine its own activities according to national circumstances, priorities, plans and resources.
- The Regional Priority Actions provide guidance for the work of the agencies making up the PMC, PMDP and any other partners with an interest to invest in NMSs in the Pacific.

The matrix focuses on priorities for the Pacific Islands region. The Outcomes and Actions are designed to supplement the work currently being undertaken in the Pacific Islands region.

PACIFIC KEY OUTCOME (PKO) 1:

Aviation weather services in the Pacific Island Countries and Territories' (PICTs') region are improved.

PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
1. Develop and implement a quality management system (QMS) (procedures and standards for aviation weather services including TAF and verification schemes, METAR and SPECI). 2. Develop long-term agreements among NMSs and relevant national aviation authorities on implementation of QMS for aviation weather services including TAF and verifications, METAR and SPECI. 3. Put in place and use appropriate equipment and communication systems for aviation weather services including TAF, METAR and SPECI.	1. Coordinate the development and implementation of a regional plan to support Pacific Islands NMSs QMS for aviation weather services including TAF, METAR and SPECI. 2. Coordinate capacity development on aviation weather services including: • QMS development; • Auditing and establishment of a regional roving team to assist with QMS certification; • Preparation of TAF and verification schemes and preparation of METAR and SPECI.
4. Develop formal inter-agency agreements relating to provision of aviation weather services, including contingency measures in case of natural disasters and other disruptions to service (for example between some small island states' (SISs) NMSs and the Fiji Meteorological Service/RSMC Nadi).	3. Coordinate the development of inter-agency agreements relating to aviation weather services, including contingency measures in case of natural disasters and other disruptions (for example between some SISs' NMSs and Fiji Meteorological Service/RSMC Nadi).
5. Coordinate with relevant national aviation authorities to ensure that national legislation related to aviation weather services are harmonized and aligned with ICAO provisions. 6. Develop cost recovery policy at a national level for aviation weather services. 7. Cooperate with volcanic observatories and developed countries' NMSs to develop advisory messages and test these for operational use for issuing SIGMETs necessary for the aviation industry.	4. Promote among NMSs, Governments' obligations as signatories to the Convention for ICAO. 5. Coordinate support for improving awareness among NMSs about ICAO policies and provisions for cost recovery through the provision of aviation weather services. 6. Promote the accreditation of NMSs as the Meteorological Authority for aviation weather purposes.
8. Conduct studies to evaluate and demonstrate the socio-economic benefits of aviation weather services to the development of a national economy.	7. Coordinate safety oversight with ICAO, WMO, PASO and Pacific Islands' NMSs.

PACIFIC KEY OUTCOME (PKO) 2:

Marine weather services in the PICTs' region are improved.

PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
1. Strengthen relationships between NMSs and relevant marine agencies, for example through developing agreements with Port Authorities about the way that NMSs will provide weather services to support shipping and inter-islands boat operations. 2. Review all services and standard operating procedures that affect mariners. 3. Develop products and conduct public education programmes for inter-islands boat operators and users of small craft on the delivery and use/ interpretation of weather forecasts and warnings. 4. Provide relevant information for search-and-rescue operations.	1. Coordinate a regional marine weather services programme to support linking NMSs with partners and users of these services.
5.Take appropriate actions to improve coordination of marine meteorology and oceanography programmes.	2. Coordinate regional capacity development in the fields of marine meteorology and oceanography. 3.Collaborate with PI-GOOS to develop oceanography programme.
6. Put in place systems to improve delivery of marine weather services, including: • meteorological and oceanographic data and products • tools and techniques such as forecast of wave period and probable wave height for predicting storm surges and waves • guidelines for "good-practices-approach" on methodologies for hazard data, metadata and mapping tools for storm surges and other marine meteorological hazards. 7. Take appropriate actions as advised by WMO bodies such as JCOMM to improve marine weather services	4. Identify and develop ways to assist the delivery of marine weather services and make them available to NMSs, including: • meteorological and oceanographic data and products • tools and techniques such as forecast of wave period and probable wave height for predicting storm surges and waves • guidelines for "good-practices–approach" on methodologies for hazard data, metadata and mapping tools for storm surges and other marine meteorological hazards.
8. Develop NMSs QMS procedures for marine weather services.	5. Coordinate the development of NMSs QMS for marine weather services.

9. Improve marine observations, including observation and collection of marine-relevant data at small and major ports, from ships and other sources. Increase collection and dissemination of marine weather reports to and from small boats traversing between islands.	6. Assist with the development of inter-agency agreements relating to weather information for respective coastal areas, as well as contingency measures in case of natural disasters and other disruptions (for example between some SISs' NMSs and the Fiji Meteorological Service/RSMC Nadi).
	7. Coordinate the improvement of coverage and quality of marine observations, including marine weather observations at small and major ports, and the collection and dissemination of marine weather reports from small boats and commercial shippers traversing in between the islands.
10. Support studies on socio-economic benefits of marine weather services 11. Coordinate and support tsunami early warning system among national agencies and stakeholders, in cooperation with the IOC/ICG/ Pacific Tsunami Warning & Mitigation System (PTWS)	8. Ensure full cooperation between the WMO and UNESCO/IOC and IOC/ICG/PTWS and the PMC, so that requirements for regional tsunami early warning systems are fully coordinated and meet national and regional requirements, including support from regional institutions, such as the Pacific Tsunami Warning Center and the International Tsunami Information Center.

PACIFIC KEY OUTCOME (PKO) 3:

Public weather services in the PICTs' region are improved.

PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
1. Put in place ways to improve public weather services at national levels, including: • Making use of new tools and technologies • Providing institutional support for receiving technical assistance and capacity building	1. Coordinate assistance to improve public weather services for Pacific Islands NMSs, including: • Information on new tools and technologies • Technical assistance • Capacity building
2. Implement ways to improve the presentation and usefulness of public weather services, including: • Dialogue with the full range of users of public weather services (including women, children, and vulnerable communities) • Putting in place services tailored to user/ community needs • Developing infrastructure to better disseminate weather information. • More effective public weather presentations for radio, TV and other media. • Communications/media training • Public education and awareness programmes.	2. Identify and develop ways to improve the presentation and usefulness of public weather services, including: • Assessing current and future needs of users (including women, children, and vulnerable communities), and their implications for NMSs • Public education and awareness activities (including forecast confidence and uncertainty) • Communication skills. 3. Promote improved access to different ways to deliver weather services to users including: national TV channels, RANET, EMWIN, improved software, multi-media techniques and websites.
3. Contribute weather information for cities to WWIS website http://worldweather.wmo.int.	4. Promote the use of WWIS website http://worldweather.wmo.int.

PACIFIC KEY OUTCOME (PKO) 4:

Multi-Hazard Early Warning Systems (MHEWS) for tropical cyclones, storm surges, waves and tsunami in the PICTs' region are implemented and improved.

PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
1. Establish and/or strengthen MHEWS and ensure that they are integrated into government policies at national and community levels.	1. In partnership with other agencies (e,g. SPC-SOPAC), assist NMSs to establish and improve MHEWS, and enhance integration across government agencies and communities.
2. Conduct inventories and needs analyses of national MHEWS. 3. Develop hazard response plans and standard operating procedures for MHEWS at national and community levels. 4. Develop and implement comprehensive programme for community awareness and preparedness. 5. Provide back-up systems/redundant systems for detection and warning. 6. Develop inter-agency agreements (for example between some small island states' (SISs) NMSs and the Fiji Meteorological Service/RMSD Nadi) for the exchange of meteorological information and preparation of warnings for some Pacific Islands, including contingency measures in case of natural disasters and other disruptions.	2. Promote regional coordination to support MHEWS, including: • Coordinate capacity assessment of national and regional MHEWS. • Develop operating procedures and back-up systems for MHEWS.
7. Install and/or upgrade technological processes, tools and techniques to improve capability of national MHEWS.	3. Identify tools and methods to assist MHEWS, including: • Work with developed country NMSs and other institutions with seasonal tropical cyclone forecast capabilities to provide information on their forecast products to Pacific Islands. • Explore the use of ensemble techniques in tropical cyclone forecasting and probable forecasts. • Identify availability and/or coordinate development of a combined storm surge and wave model(s).
8. Provide a national contribution towards a database for cyclones.	4. Coordinate the work related to the southern hemisphere cyclones database.
9. Build the link between THORPEX TIGGE and the Severe Weather Forecast and Disaster risk reduction Demonstration project (SWFDDP) for the Pacific Islands region.	5. Coordinate GIFS TIGGE products for cyclones and heavy rainfall relevant for the Pacific Islands region.
10. Support studies on socio-economic benefits of MHEWS.	6. Identify institutional and financial mechanisms to ensure the continuity and sustainability of the SWFDDP for Pacific Islands

PACIFIC KEY OUTCOME (PKO) 5:

Improved early warning system for floods (EWS-Floods).

PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
1. Establish and/or strengthen institutional capacity for EWS-Floods 2. Ensure that EWS-floods are integrated into government policies, decision-making processes and emergency management systems at both national and community levels. 3. Complete inventories and needs analyses of national EWS-Floods ensuring inputs from all stakeholders including women, children, disabled people, taking into full consideration traditional knowledge; and upgrade and/or redesign national EWS-Floods to cater for these special needs. 4. Joint programmes with NDMOs including conduct public awareness, education and analyses of socio-economic impacts of floods and benefits of EWS-Floods. 5. Strengthen relationships between NMSs and hydrological agencies that may have responsibility for issuing flood warnings.	1 In partnership with other agencies (e,g. SPC-SOPAC), assist NMSs in developing and strengthening EWS-Floods, including: • Coordinate regional support for the implementing EWS-Floods. • Coordinate development of guidelines for EWS-Floods. • Identify and coordinate sharing of available tools or methodologies including GIS, satellite information and hazard mappings for EWS-Floods.
6. Identify hydrological monitoring resources (satellite etc) that may aid in flood warnings.	
7. Support studies on socio-economic benefits of EWS-Floods.	2. Coordinate analyses of socio-economic benefits of EWS-Floods.

PACIFIC KEY OUTCOME (PKO) 6:

Climate information and prediction services, including drought prediction, in the PICTs' region are improved.

PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
1. Develop NMSs strategies for delivery of climate services at national and local community levels, reflecting implementation of GFCS.	1. Promote and develop a plan for regional coordination of climate information and prediction services and drought prediction including the implementation of GFCS and establishment of RCCs for the Pacific Islands region.
2. Prepare national reports on existing and future requirements for improving climate information and prediction services, and drought prediction schemes.	2. Coordinate preparation of national reports on existing and future requirements for climate information and prediction services, and drought prediction.
3. Establish and/or strengthen climate services and drought predictions at national level. 4. Ensure climate services, including drought prediction, are integrated into government policies at national and community levels. 5. Develop operating procedures for climate information and drought prediction at national and community levels. 6. Install and/or upgrade technological processes, tools and techniques along with human resources, to improve capability of national climate and drought prediction schemes. 7. Establish drought early warning system including end-to-end system of data collection, advisories and product dissemination. 8. Utilize ENSO, Monsoons, ITCZ and MJO related products and services at the national and local levels (with appropriate training).	3. Coordinate assistance to improve climate and prediction services in the PICT's region, including: • Coordinate capacity development to assist NMSs improving climate services and drought prediction. • Support development of a simple dynamic model that can be run with limited resources. • Support additional research on drought prediction, including the effects of La Nina and El Niño on drought around the region. • Coordinate ENSO related regional products and services and make them available to Pacific Islands NMSs. • Coordinate MJO based information, products and services and make them available to NMSs.

9. Establish and organize regular dialogue between NMSs and users of climate and drought prediction services. 10. Put in place processes and tools for translating requirements of users of climate and drought prediction services into information and products that are tailored to local needs. 11. Conduct public education or awareness activities on climate prediction and services, including forecast confidence and uncertainty. 12. Develop capacity to be able to provide information on sea level, storm surge, tropical cyclone activity etc and strengthen ties with sea-level monitoring projects. 13. Develop national "talking points" on local effects of climate change, particularly sea level rise, precipitation changes, etc.	4. Identify and develop ways to improve the presentation and usefulness of climate prediction services, including: • Identify processes and tools to translate requirements of users of climate services into useful information and products. • Promote climate services applications and drought prediction schemes in key socio-economic sectors. • Develop coordinated response to regional questions about climate change, global warning, sea level rise (e.g. develop "talking points" for media and other enquiries).
14. Promote the benefits of GEOSS at the national level. 15. Advocate among national government Ministers for membership with GEO.	5. Promote the benefits of GEOSS in Pacific Islands region. 6. Assist Pacific Islands in preparing to sign and join GEO membership, and assist GEO Secretariat in making contact with Pacific Islands. 7. Address the lack of GEO netcast coverage over the Pacific.
16. Support studies on socio-economic benefit of climate services and drought prediction schemes.	

PACIFIC KEY OUTCOME (PKO) 7:

Improved quality of observations and coverage of networks in the Pacific Islands region.

PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
1. Ensure that observing stations compile and transmit meteorological data / messages according to existing WMO regulations. 2. Provide profiles of national observing systems for evaluation against WIGOS standards. 3. Develop plan for implementation of WIGOS at the national level. 4. Promote the WIS concept at the national level, including development of WIS implementation plans. 5. Provide and sustain adequate observations with the required quantity and quality for all meteorological services (including climate).	1. Coordinate stocktaking and evaluation of existing national and regional observation networks, including survey of existing synoptic stations and needs-analysis. 2. Coordinate the evaluation of existing national and regional plans and activities aligned to WIGOS. 3. Coordinate the development and implementation of a regional WIGOS plan, ensuring that all countries and territories are integrated (not only WMO members). 4. Promote and coordinate regional development and implementation plan for WIS. 5. Coordinate integration between WIS and WIGOS 6. Coordinate and prepare regular evaluation report of Pacific based observing systems for reporting to UNFCCC and other international fora.
6. Improve quality of data and increase density of spatial data coverage (e.g. by resurrecting quiet stations in their respective networks). 7. Promote investment of resources in the further development of ocean observing systems to address the increasing needs for climate applications and services. 8. Improve the availability of ocean surface wind vector data as well as other microwave data and satellite radar altimetry (wave height) data. 9. Provide for automated data stations.	7. Coordinate assistance to maintain and extend coverage and quality of observation networks, including: • sustainable mechanism (including funding) for maintenance and calibration of observation networks. • Explore expansion of the AMDAR programme to include regional, national, and budget air carriers to increase coverage of aircraft observations in the Pacific Islands region. • Promote Reference Stations in the Pacific to support data quality. • Coordinate the implementation of standards for hydrological observations and processing, aimed at the compatibility of monitoring results within the framework of the WMO QMF.

10. Coordinate with national communication administration on regulatory issues for meteorological related communications.

11. RICs/RCCs to communicate with NMSs.

8. Support access to information, data and communication networks, including:
   - Develop a user plan in cooperation with relevant satellite operators to ensure smooth transition to the use of new and advanced satellite systems.
   - Coordinate the development of a strategy to mitigate the termination of MTSAT direct broadcasting.
   - Coordinate communication between Pacific Islands NMSs and RICs/RCCs.

PACIFIC KEY OUTCOME (PKO) 8:

PICTs' historical climatological data are preserved.

PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
1. Develop national programmes/plans for climate data rescue and preservation.	1. Coordinate the development of programmes/plans for data rescue and data management.
2. Digitizing paper records of climate data.	2. Coordinate information, data rescue and management tools and make information available to Pacific Islands' NMHSs.
3. Electronic digitizing (with appropriate software) or key entry of climate and hydrology data.	3. Support the development of CDMS for Pacific Islands NMHSs.
4. Develop climatology data policy.	4. Coordinate the development of a regional climatology data policy to assist NMSs.

PACIFIC KEY OUTCOME (PKO) 9:

Atmospheric chemistry observations and assessment meet regional needs.

PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
1. Make data and information from GAW stations available to Pacific Islands NMHSs.	1. Coordinate the assessment of existing and future needs for expansion of monitoring stations networks in the Pacific Islands region.
2. Make available observations of GHG, aerosol measurements, reactive gases (carbon mono-oxide, sulphur dioxide, nitrogen oxide and volatile organic compounds) and UV measurements available to Pacific Islands NMHSs.	2. Coordinate the reporting on these atmospheric gases and agents.

PACIFIC KEY OUTCOME (PKO) 10:

Regional and NMSs are more capable and effective.

PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
1. Develop and implement operational plans for NMSs, with appropriate legislative mandate.	1. Coordinate the development of a regional strategy for building capacity of meteorological services in the Pacific Islands region.
2. Directors/PRs participate in high level national /regional /international meetings and advocate effectively for Pacific Islands' NMSs and improved services in the region.	2. Coordinate NMSs participation and advocacy in relevant regional and international fora including: • WMO meetings • SPREP/regional meetings • Thematic meetings on relevant issues such as climate change, tourism, agriculture etc
3. Participate actively in the PMC and articulate and document national mandates and requirements.	3. Organise and provide secretariat for the PMC meetings
4. Collect data and case study information on socio-economic impacts of weather and climate and the benefits of effective NMSs at national level.	4. Develop socio-economic case studies and data to underpin regional and national initiatives to mobilize additional resources for NMSs from: • National governments (mainstreaming) • Technical partners • Donors • International funds (e.g. GEF) 5. Contribute case studies and other material on socio-economic benefits of public weather services to the WMO socio-economic website: http://www.wmo.int/socioec

PACIFIC KEY OUTCOME (PKO) 11:

Education, training and capacity development activities in the fields of meteorology, climatology in the PICTs region are coordinated and improved.

PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
1. Promote the need for scholarships for meteorology and climatology studies at undergraduate and postgraduate level along with relevant technical training. 2. Promote opportunities to include weather and climate teaching topics into primary/secondary school level curricula.	1. Work with donors to ensure scholarship allotment toward meteorology undergraduate and postgraduate courses, and relevant technical training. 2. Assess opportunities for development of meteorology at undergraduate level at Pacific tertiary institutions (USP, FNU, etc.) and encourage cross-institutional cooperation and use of remote communications and distance learning technologies to achieve common accreditation for meteorology related course work. 3. Promote opportunities to include weather and climate teaching topics into primary/secondary school level curricula across the region.
3. Identify suitable qualified personnel, reflecting the principle of gender equality: • To join the NMSs as a career path. • For training to meet the minimum education and experience level for the "Secondary Level AMP Competence Description and Related Criteria" for AMO and AMF. • For training to qualify as meteorologists, meteorological technicians, climatologists, climatological technicians.	4. Coordinate capacity development for Pacific Islands NMHSs personnel to meet the "Secondary Level AMP Competence Description and Related Criteria" for AMO and AMF. 5. Coordinate with relevant training institutions currently providing training courses for meteorologists, meteorological technicians, climatologist, climatological technicians.

PACIFIC KEY OUTCOME (PKO) 12:

Donor funding is coordinated efficiently and effectively in PICTs.

PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
Advise the PMDP Secretariat of development needs and potential overlaps.	Advocate for Pacific Islands NMSs needs at high level donor coordination discussions.
Provide information to the PMDP Secretariat on weather and climate development projects at the national and local levels (national, bilateral or regional funding).	Maintain database of regional and bilateral development programmes and projects.
Develop and implement projects at the national level.	Promote coordination of development partners' and donor agencies' inputs into the development of weather and climate services in the Pacific Islands region.
	Coordinate development of new regional projects.

PACIFIC KEY OUTCOME (PKO) 13:

Enhanced strategic partnerships and collaboration with UN, regional and national organisations and agencies.

PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
1. Maintain and build national level partnerships with donor agencies.	1. Maintain and build partnerships with a range of multi-lateral and bilateral donors and agencies, including: • UN agencies • National governments • Aid agencies and philanthropic organisations • International funding mechanisms such as the GEF or Multilateral Fund, and their implementing agencies.
2. Maintain and build national level partnerships with technical support agencies, particularly in relation to climate change and disaster management.	2. Maintain and build partnerships with technical support agencies (e.g. SPC-SOPAC) in the development and implementation of regional projects in the areas of weather, climate and water.
3. Develop national level project proposals and support regional project proposals.	3. Develop regional project proposals and support national project proposals.

PACIFIC KEY OUTCOME (PKO) 14:

The PMC is an effective and efficient body

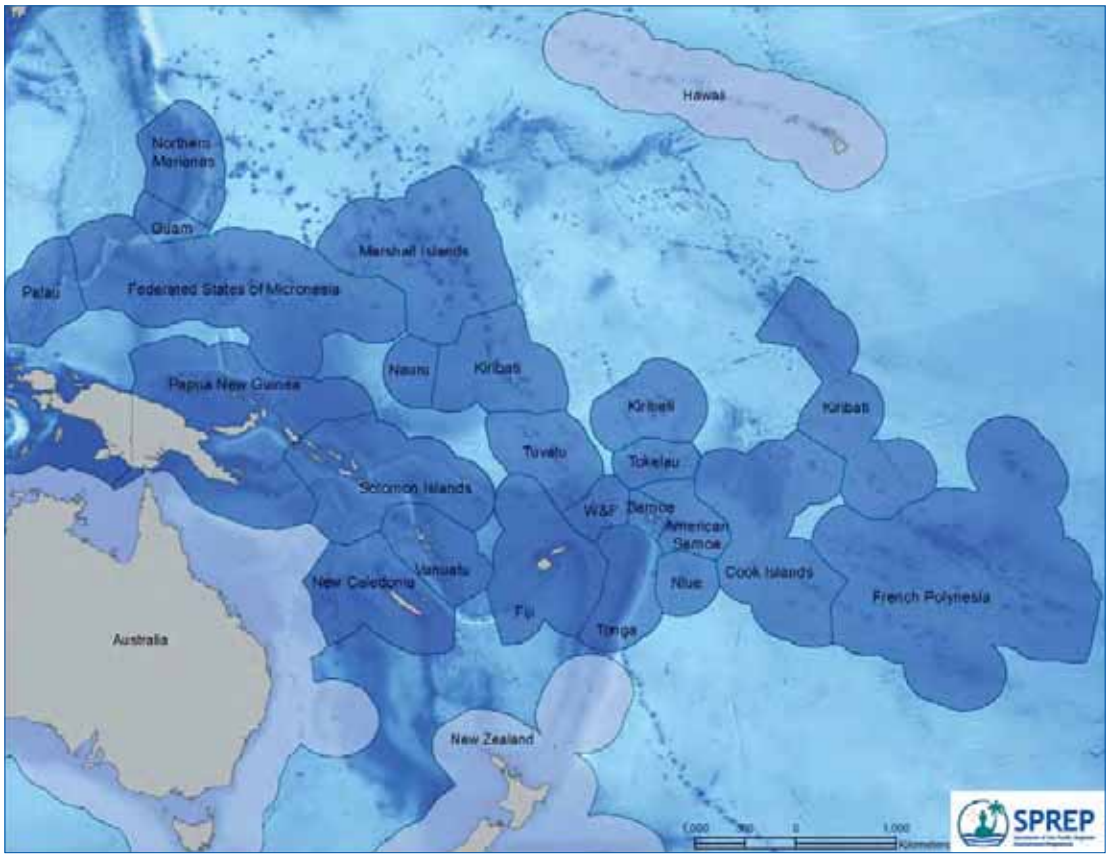
PACIFIC NATIONAL PRIORITY ACTIONS	PACIFIC REGIONAL PRIORITY ACTIONS
1. Provide appropriate information and support for the PMC and PMDP.	1. Maintain full reporting and accountability to the PMC and SPREP.
2. Participate actively in the PMC.	2. Organise and support PMC meetings efficiently and effectively.
3. Promote the work of RA V Working Groups and the PMC at the national levels. 4. Promote gender equality principles in the areas of weather, climate and hydrology.	3. Promote consistency between the PMC and PMDP programmes, projects and activities of WMO programmes and institutions, including: • Advocate for Chair of the PMC to be a member of, or observer to, the RA V Management Group. • Foster the involvement of the Leads of RA V Working Groups in the work and meetings of the PMC. • Coordinate preparation of reports and present to the WMO Executive Council, RA V and its Working Groups. • Promote work of RA V Working Groups and ensure equity of participation of Pacific NMHSs taking into full consideration gender principles. • Develop joint programmes/projects for the PMC and RA V Working Groups.

Glossary

AMDAR	Aeronautical Meteorological Data Relay
AMF	Aeronautical Meteorological Forecaster
AMO	Aeronautical Meteorological Officer
BoM	Bureau of Meteorology
CDMS	Climate Data Management System
ENSO	El Nino Southern Oscillation
EWS	Early Warning Systems
FNU	Fiji National University
GAW	Global Atmospheric Watch Programme
GEF	Global Environment Facility
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems
GFCS	Global Framework for Climate Services
GHG	Green House Gas
GIFS	Global Interactive Forecast System
GIFS-TIGGE	GIFS – THORPEX Interactive Grand Global Ensemble
GIS	Geographical Information System
ICAO	International Civil Aviation Organization
IOC	Intergovernmental Oceanographic Commission
ITCZ	The Intertropical Convergence Zone
ITIC	International Tsunami Information Center
JCOMM	Joint Commission for Oceanography and Marine Meteorology
JICA	Japan International Cooperation Agency
NDMO	National Disaster Management Office
METAR	A format / code for reporting weather information
M&E	Monitoring and Evaluation
MHEWS	Multi-hazard Early Warning System
MJO	Madden-Julian Oscillation
MSNZ	Meteorological Service of New Zealand Ltd (MetService)
MTSAT	Multifunctional Transport Satellites
NIWA	National Institute of Water and Atmospheric Research (New Zealand)
NMHSs	National Meteorological and Hydrological Services
NMSs	National Meteorological Services

NOAA	National Oceanographic and Atmospheric Administration (USA)
Pacific HYCOS	Pacific Hydrological Cycle Observing System
PASO	Pacific Aviation Safety Office
PICTs	Pacific Island Countries and Territories
PIMS	Pacific Islands Meteorological Strategy 2012 – 2021
PKO	Pacific Key Outcomes
PR	Permanent Representative to the WMO
PMC	Pacific Meteorological Council
PMDP	Pacific Meteorological Desk Partnership
PTWC	Pacific Tsunami Warning Center
PTWS	Pacific Tsunami Warning & Mitigation System
QMS	Quality Management System
RA V	WMO Regional Association Five (South-West Pacific and South East Asia)
RCC	Regional Climate Center
RIC	Regional Instrument Center
RMI	Republic of the Marshall Islands
RSMC	Regional Specialized Meteorological Centre
SIGMET	Significant Meteorological Information
SIS	Smaller Island States
SOPAC	Applied Geoscience and Technology Division of SPC
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
SPECI	'Special' weather report
TAF	Terminal Aerodrome Forecasts
THORPEX	The Observing System Research and Predictability Experiment
UN	United Nations
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNFCCC	United Nations Framework for the Convention on Climate Change
USA	United States of America
USP	University of the South Pacific
UV	Ultra Violet
WIGOS	WMO Integrated Global Observing System
WIS	WMO Information System
WMO	World Meteorological Organization
WWIS	World Weather Information System

THE PACIFIC ISLANDS REGION



This map is indicative only of agreed and potential maritime jurisdictional limits within the Pacific region. It does not imply the expression of an opinion by SPREP on the legality of any boundary shown.

SPREP Members comprise 21 Pacific island countries and territories, and four developed countries* with direct interests in the region:

American Samoa, Australia*, Cook Islands, Federated States of Micronesia, Fiji, France*, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, New Zealand*, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, United States of America*, Vanuatu, Wallis and Futuna.

The Pacific Regional Environment Programme (SPREP) is the primary intergovernmental environmental organisation working in the Pacific. SPREP has 25 Members with direct interests in the region. SPREP works to promote cooperation in the Pacific region and provide assistance in order to protect and improve its environment and to ensure sustainable development for present and future generations.

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