

**Independent Progress Review
Climate and Oceans Support Program in the
Pacific (COSPPac)**

Final

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Acronyms

AusAID	Australian Agency for International Development
BCSC	Bureau COSPPac Steering Committee
CGPS	Continuous Global Positioning Sensor
CLiDE	Climate Data for Environment
COSPPac	Climate and Oceans Support Program for the Pacific
COMP	Climate and Ocean Monitoring and Prediction Project
CD&C	Capacity Development and Communication
DRR	Disaster Risk Reduction
ENSO	El Niño-Southern Oscillation
FINPAC	Finnish-Pacific project (on weather, climate and early warning services)
GA	Geoscience Australia
GFCS	Global Framework for Climate Services
IPR	Independent Progress Report
LSD	Lands and Survey Department
NGO	Non-Government Organisation
NIWA	National institute of Water & Atmospheric Research
NMS	National Meteorological Services
NOAA	<i>National Oceanic and Atmospheric Administration</i>
OCOF	Online Climate Outlook Forum
PACCSAP	Pacific-Australia Climate Change Science and Adaptation Planning Program
PASAP	Pacific Adaptation Strategy Assistance Program
PCCSP	Pacific Climate Change Science Program
PICPP	Pacific Island Climate Prediction Project (previous phase)
PICS	Pacific Island Countries OR Pacific Islands Climate Services Panel
PMDP	Pacific Meteorological Desk Partnership
SCOPIIC	Seasonal Climate Outlook for Pacific Island Countries
SLCMP	Sea Level and Climate Monitoring Project (previous phase)
SOPAC/SPC	Applied Geoscience and Technology Division (SOPAC Division of Secretariat for the Pacific Community)
SPREP	South Pacific Regional Environment Program
TORs	Terms of Reference
USP	University of the South Pacific
WMO	World Meteorology Organisation

Executive Summary

'COSPPac is very useful to Samoa and other Pacific Island Countries for our own livelihoods and for predicting what might happen in terms of climate and oceans. The partnership with Australia and particularly the Bureau of Meteorology is important and highly valued. The information provided under this Program is extremely relevant to all sectors in Samoa – agriculture and food security, energy production for example - and it informs decision-making in both the Government and the private sector. Overall the Program is going well and we want it to continue.' (Hon Faamoetaulua Lealaialoto Taito Dr Faale Tumaalii, Minister for Natural Resources and Energy in Samoa)

The Climate and Oceans Support Program for the Pacific (COSPPac) is a large regional aid program, funded by the Australian Government and implemented by the Bureau of Meteorology in partnership with 14 national meteorological services (NMSs) of Pacific Island countries and regional organisations. This phase of ongoing support commenced in 2012 and is due to complete in June 2016 with an original budget of \$A31.5m.

The Program provides high quality technical and related support to Pacific Island NMSs so accurate, timely and essential weather, climate and ocean information is collected and analysed. The Program supports NMSs' communication of this information to other Government agencies, service providers, private sector organisations, NGOs and communities so that it can be used in diverse ways.

Climate and oceans information assists countries to make sound decisions relating to economic development and the well-being of citizens. Weather and climate data and information are the heartbeat of all NMSs. When accurate and timely information is communicated to and understood by stakeholders, they are able to prepare effectively for seasonal and other variations, better manage their resources and contribute to economic activities. For example, when shared appropriately, information about:

- **tides and sea levels**, maximises the efficiency of shipping services and other ocean-based and coastal economic activities, such as fishing, mining and infrastructure construction and maintenance. Also, enables communities to take decisions relating to safety and access to natural food and other resources
- **seasonal climate outlooks**, influences the quality of planning and responses in agriculture, energy and water supply, as well as tourism, industry, transport and event management
- **droughts or risks of flooding**, enables communities, businesses and governments to prepare for and minimise damage to infrastructure and loss of life
- **extreme weather events**, helps reduce the incidence of vector and water borne diseases such as malaria, dengue etc. and reduce costs to the health system
- **traditional knowledge** helps communities to determine reliability of forecasts and plan accordingly.

COSPPac is a package of targeted support to contribute to Pacific Island NMSs' capacity to communicate accurate information to national and regional stakeholders. Australian and Pacific Islanders work collaboratively in this Program. Pacific Islanders participate actively in Program governance, reflecting the principle that local leadership and ownership is required for any Program to be relevant, effective and provide sustainable benefits. Australia plays a key role as contributor to locally determined priorities, contributing funding, research, advice and technical assistance in this context.

Progress against COSPPac plans was delayed in the first two years because of a number of factors related to Bureau of Meteorology corporate and program management systems. After agreements were reached to carryover funds, the Program is now on track to achieve its plans and objectives, as amended.

COSPPac's work is more relevant now than it was at the time of the design, given social and economic pressures on fragile environments as well as growing awareness of the need for accurate and timely climate and oceans information for planning, policy and decision-making. The Program is highly effective in many different ways across 14 partner countries. While it attempts to use a mix of regional and national customised approaches, the IPR found some issues associated with trying to deliver support to suit diverse contexts.

The key Program stakeholders, Pacific Island NMSs, consistently identified positive and substantial benefits in all areas of programming. In part, this is because COSPPac is the current phase of a long history of cooperation in this sector, so has built on previous efforts, relationships, knowledge and capacity. The Program's results so far are also a reflection of a substantial budget and a large dedicated Program implementation team.

The good practice development principles and approaches used within the Program have been the most important contributor to the achievement of relevant, practical and useful results to date. In particular, shared governance and decision-making structures have been consistently recognised as critical to success. Efforts to maximise responsiveness to individual country contexts and priorities are also highly valued by all stakeholders. The coordinated yet flexible planning and delivery of a range of diverse activities has also contributed to effectiveness and coherence.

A small number of stakeholders noted the large budget for this Program compared with activities supported from other countries to date. There is no doubt that the budget is large, but the TORs for this Review did not allow for a comparative analysis to be made of alternative management options and costings or to make a detailed cost-benefit analysis. With a large contingent of Australian Program staff and the addition of a Corporate Overhead at the 20% rate for Cost Recovery (consistent with Australian Government approaches), the costs of management are inevitably higher than would be the case if the Program was managed within a Pacific Island setting.

The location of the Program within the Bureau of Meteorology is largely favoured by national Pacific Island stakeholders but raises a number of efficiency and aid effectiveness issues. The Bureau's technical expertise and resources are clearly valued by Pacific Island stakeholders. However, there are mandate and structural limitations associated with locating Program management and coordination within an Australian Government agency rather than in a Pacific organisation. There is increasing momentum towards Pacific Island based coordination of major donor funds in this sector, although some mandate and management issues are still to be resolved before a definitive decision could be made about the location of coordination for future funding. This could be a focus of the planning for future Australian assistance.

The climate and oceans services sector in the Pacific Islands region is increasingly crowded with donors and development partners, so coordination is becoming more critical. Efforts to minimise duplication and extra workloads for Pacific agencies are needed. The COSPPac Program is well coordinated with WMO and the two relevant and mandated Pacific regional organisations, SPREP and the SOPAC Division of SPC (SOPAC for ease of reference). There is scope to strengthen coordination with other agencies such as NIWA, NOAA and USP, as well as Governments of Korea and Japan, particularly as at least three new and highly relevant Centres are likely to be established in the next few years. All relationships in this area need to prioritise trust, mutual respect as well as a focus on benefits for the NMSs.

There are many reasons to justify ongoing Australian support for climate and oceans activities and partners in the Pacific Islands region: a combination of national interests (as expressed in the new aid program policy), demand from and commitment to partners as well as Australia's international obligations. While there are clear signs that shifting coordination of support in this sector from Australia to a Pacific Island location should be considered, a strong partnership connection should be retained with the Australian Bureau of Meteorology, given its technical resources, history and expertise in the Pacific region.

Stakeholders consistently reported a major concern that support for the use and updating of climate and oceans products developed through Australian aid could cease at the end of this Phase. The disruption this could cause to Pacific Island countries is dramatic and must be avoided, not least to retain Australia's reputation in the region.

This Independent Progress Report addresses a wide range of issues related to Program implementation at the mid-point of COSPPac, to inform management of the remaining two years of activities and prepare for future support in this sector.

1. Introduction

The provision of reliable climate and oceans information is critical for all Pacific Island countries, given high levels of reliance on natural resources for survival as well as economic and social development. The collection and analysis of climatic information from the Pacific Islands region is also relevant to Australia's own climate, as well as part of Australia's global obligations. Australia is an active and respected Member in the World Meteorological Organization (WMO) and as the largest and best-resourced country in the Oceania region, has particular responsibilities in this regard.

COSPPac was intended to provide high quality technical and related support to Pacific Island countries so essential weather, climate and ocean information is collected and analysed, both by Pacific Island NMSs and Australian organisations. The Program supports NMSs' communication of this information to other Government agencies, service providers, private sector organisations, NGOs and communities so that it can be used in diverse ways, for economic and social benefit.

COSPPac is the current phase of a long history of previous cooperation. At the time of its design, the Program combined new phases of previous aid-funded activities with several new elements, reflecting lessons learned from previous phases and a consultation process in 2011. COSPPac commenced in 2012 and is a large regional aid program, funded by the Australian Government and implemented by the Bureau of Meteorology. The Program is delivered through a partnership with 14 NMSs of Pacific Island countries as well as arrangements with one Australian Government agency (Geosciences Australia (GA)) and two Pacific regional organisations. This phase of support is expected to finish in June 2016.

As part of the Australian Government's performance assessment process, an Independent Progress Review (IPR) was commissioned in early 2014, the mid-point of the Program. The IPR has two purposes: to assess the progress of COSPPac against its design, including any modifications agreed by its partners through Annual Workplans; and to consider how Australia can best support Pacific NMSs after 2016. In particular, the IPR was intended to assess the relevance and effectiveness of new work. Another emphasis is on COSPPac's management and organisational systems, which are different from previous phases. The IPR is also expected to provide advanced information to contribute to decisions about future Australian funded work with Pacific Island partners in climate and oceans support. This will allow for thorough planning and preparation for subsequent investments by Australia in weather and climate services.

The primary users of the IPR are expected to be the COSPPac Steering Committee members: the Directors of the 14 NMSs; decision-makers in Australian Government partner agencies (including DFAT, the Bureau of Meteorology, Geoscience Australia); Pacific Regional organizations (including SPC, SPREP and USP) and development partners, particularly NZ National Institute of

Water and Atmospheric Research (NIWA), US National Oceanic and Atmospheric Administration (NOAA), Germany's GIZ, Government of Japan and WMO.

1.1 Review Methodology

DFAT appointed a team of three to undertake the Review.¹ The Team developed a detailed Review Plan (Annex 1) which included approaches and questions for each of the respective stakeholder groups. The Team approached the Review process as facilitators of a process of reflection and self-analysis among those involved, while gathering data to inform this report.

In summary, the Review included analysis of extensive documents, attendance at regional meetings and targeted consultations during the period May to August 2014 with:

- Senior and mid-level officials from 14 Pacific Island NMSs
- Representatives from other Pacific Island Government agencies which use data from NMSs, including Lands and Survey Departmental officials where available²
- Australian officials from the Bureau of Meteorology, DFAT and GA involved in overseeing and implementing various elements of COSPPac in Canberra, Melbourne and Adelaide
- Officials from Pacific regional organisations with interests and expertise in climate and oceans issues, particularly SOPAC, SPREP and USP
- Officials from other agencies with specific interests in climate and oceans work, particularly NIWA, WMO and NOAA

In addition, the Review process included the development of two detailed case studies (Kiribati and Samoa) to draw out examples of the relevance of climate and oceans data for drought monitoring and energy provision respectively, and COSPPac's contributions.

The Review was undertaken in 5 stages as follows:

Stage 1: Preparation of the Review Plan; home-based review of reports

Stage 2: Briefing with DFAT officials and other COSPPac stakeholders

¹ The IPR Team comprised two independent consultants, Ms Deborah Rhodes and Ms Lesley Hoatson and one self-nominated representative of Directors of Pacific NMSs, Mr Mulipola Ausetalia Titimaea (Samoa).

² Previous phases of support were more focused on the work of LSDs than COSPPac, so while some officials from such agencies were contacted for this Review, consultations were largely focused on officials from NMSs.

Stage 3: Attendance at the COSPPac Annual Planning meeting in Fiji (May) to observe and meet regional stakeholders; visits to consult USP as well as Managers, Technical Officers and the COSPPac Regional Officer based at SPC.

Stage 4: Visits to Kiribati and Samoa to develop case studies; consultations (by phone and email) with Directors, Senior Climate Officers and others from NMSs ; meeting with Pacific-based WMO representative and leaders of the SPREP, Pacific Meteorological Desk Partnership and Council Secretariat as well as DFAT and other donors; visits to The Bureau of Meteorology (Melbourne), National Tidal Unit (Adelaide) and Geoscience Australia (Canberra).

Stage 5: Analysis of findings, preparation of draft elements of the report, discussion of findings with stakeholders and completion of report.

Analysis of the findings was undertaken by the IPR team, through identification of themes from both document review and notes from the wide range of consultations. Prior to finalization, the draft report was distributed to stakeholders for feedback.

1.1.1 Review Questions

The terms of reference (TORs) for the IPR identified it will address COSPPac’s relevance, efficiency and effectiveness after two years of implementation. Indicative questions were:

1. **Appropriateness:** How relevant is COSPPac in meeting the national priorities of Pacific Island NMSs in delivering climate services to their governments and communities?
2. **Effectiveness:** How well is COSPPac achieving outcomes at both a program and project level? How well does the management structure, including unit responsibilities, support implementation of the objectives?
3. **Impact:** In what different ways are NMSs and other relevant in-country agencies using seasonal climate, ocean and sea level products as a result of COSPPac? What are the unintended outcomes of the COSPPac program?
4. **Cost effectiveness:** How cost effective are the program activities? Are the three components and the CMU appropriately resourced?
5. **Coordination:** How well is COSPPac working together with other meteorological agencies (NOAA, NIWA, Japan Meteorological Agency, WMO, Finnish Meteorological Institute etc) and other partners of the NMSs in order to capitalise on efficiencies and synergies?
6. **Legacy:** How well positioned are NMSs and Lands and Survey Departments (LSDs) to distribute and/or develop locally appropriate products for existing and emerging needs? What provision should be made for future weather and climate support for the region?

The Review Team allocated these broad evaluation questions across the range of stakeholders, adding other questions for context and to generate details (see Annex 1).

The following additional points to be considered by the IPR Team were also included in the terms of reference (TORs):

1. Assess the importance of and need for ongoing support to NMSs so they can deliver services effectively to their countries. Based on this, the Team will make recommendations for Australia's future contributions to the support of NMSs
2. Recommend whether the NMSs of Northern Pacific Island countries should join the Program for the remainder of this phase
3. Recommend a process for determining whether future support is best located.
4. When further work to develop applications, introduce products and deliver training should be undertaken under the management of COSPPac. Recommendations on this issue should include a **suggested process** for reprioritising current and proposed additional activities within the existing financial approval.

1.2 Limitations of methodology

The IPR Team comprised three personnel, one of whom (Team Leader) had been involved in drafting the COSPPac Program Design in 2011 and another of whom, the Pacific Island representative (from Samoa) is an active participant in the strategic governance of the Program through its Steering Committee and in effect a 'beneficiary' of the Program. Detailed team understanding of the particular background and context of the Program has considerably assisted with the review process. The perception of any conflict of interest has been managed through ensuring that a robust data collection and analysis methodology has been used and that conclusions drawn by the team are jointly agreed.

The IPR Team was not able to travel to all countries, or meet or communicate directly with leaders or representatives from all participating NMSs in the time-frame available. Observation at the annual Planning Meeting, however, was a useful means to hear the views from representatives from most participating countries. Despite best efforts, a few senior officials from NMSs and lands and survey offices were not able to be contacted by email or phone for planned interviews. This reflects limited time, broader challenges with communications generally across 14 partner countries, limited numbers of people in each NMS and frequent international travel undertaken by senior officials in this sector.

Not all members of the team participated in all data collection processes, given travel and time-availability.

Finally, despite best efforts, the IPR Team spoke with only a small number of representatives from agencies outside NMSs, particularly Lands and Survey officials. There have been two sets of limitations on their participation: first, direct participation by Lands and Survey has not been highly or consistently prioritised in this phase of the program; and second, for these agencies, COSPPac is one of many activities in their scope and many individuals are therefore only

peripherally involved in the Program. While stakeholders have been given the opportunity to review this report in draft form and raise issues through their representatives on the Steering Committee, Lands and Survey officials are not included in the Steering Committee and their views may not have been adequately reflected in this review. GA notes this limitation to both COSPPac's implementation and the review.

2. Context

The people of the Pacific Islands region have a long history of successfully coping with and adapting to seasonal and climatic events and variations – 'traditional knowledge' has been developed over centuries relating to food security and environmental management for example. Contemporary changes in climate which are reflected primarily in global warming, sea level rise and ocean acidification, combined with other factors such as erosion and increased population density, mean that the habitats, lifestyles and social and economic development prospects of Pacific Islands' communities and nations have recently become and will be increasingly more vulnerable. The effects of these changes are highly variable, depending on a wide range of geological, geographic, economic, political and environmental factors. Weather, climate and other natural hazards cross international boundaries, so regional and global cooperation are essential. The huge size of the Pacific Ocean means that weather patterns in this region influence global patterns, for example, the El Nino Southern Oscillation (ENSO).

The generation of accurate and relevant information about variations in seasonal climate and trends is crucial for enabling Pacific Island countries and communities to determine how best to respond nationally and in each geographical location. In particular, accurate information is required about variations in climate trends and predictions across the region, the interaction between these and non-climatic changes (such as erosion and direct human activity), the diversity of impacts in different locations and for different sectors, and the opportunities for adaptation in different sectors are based on this information.

Access to accurate information about climate and oceans is highly relevant to all aspects of economic and social development, including agricultural and fishing production (related to food security as well as private sector growth and trade), tourism and aviation services, infrastructure development and other types of land use. It is also directly relevant to water use, energy supply, community safety, small and large businesses and community well-being. There are many examples from the region of the negative implications of a lack of accurate information, such as the high costs of importing drinking water for the populations of Tuvalu and Kiribati when droughts occurred in 2012-13, damage to jetties and other infrastructure where sea level inundation has occurred, loss of life and damage to housing and agricultural crops during floods and king tides or other extreme weather events and loss of food crops.

2.1 Meteorology services

Climate activities in this sector are now considered within the Global Framework for Climate Services (GFCS) which ‘provides a worldwide mechanism for coordinated actions to enhance the quality, quantity and application of climate services³’. GFCS is a UN-led initiative spearheaded by WMO to ‘guide the development and application of science-based climate information and services in support of decision-making in climate sensitive sectors’. Thirteen heads of state or government, 81 ministers and 2500 scientists unanimously agreed to develop the GFCS in 2009⁴.

All Pacific Island countries, except Nauru, have National Meteorological Services. During the past decade there has been significant development and general strengthening in their technical and organisational capacity and capabilities, though there is diversity in the nature and extent of this capacity. Globally, meteorological services generally require at least two sets of technical skills: those required for **weather services** which 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); and those required for **climate services** which 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 inter-annual predictions and climate change projections (scenarios).

NMSs vary in their mandates, organisational relationships, specialist and other personnel, equipment, communications outreach and linkages. For example the Fiji Meteorological Service, headquartered in Nadi, is well resourced, has strong capacity, and is designated by the WMO as a Regional Specialized Meteorological Centre. Some NMSs receive funding for salaries from external sources and are relatively well equipped, such as Federated States of Micronesia, and Republic of the Marshall Islands, Republic of Palau. Some NMSs, such as those in Solomon Islands, Papua New Guinea, Vanuatu and Samoa are nationally funded and have varying levels of resources for forecasting. Tuvalu, Kiribati, Cook Islands and Tonga NMSs are nationally funded and receive project funding. Other NMSs – Nauru and Niue have minimal operations and resources and are partly funded nationally and receive external financial support⁵.

There is a strong network of expertise in this sector, with Pacific Island NMSs working closely together with Australia, France, New Zealand and USA (members of the Secretariat of the Pacific Regional Environment Program (SPREP)), as well as China, Italy, Denmark, Finland, Japan and the UK. A global network of meteorological infrastructure and services is provided through WMO and others.

³ <http://www.gfcs-climate.org/>

⁴ World Climate Conference 3, Geneva

⁵ Holland, P. 2014, Economic Dimensions of Improved Meteorological Services in the Pacific, WMO & SPC

While there is diversity between countries, one recent review (Chapman et al 2010⁶) observed the following:

- Poor telecommunications infrastructure in some countries delaying data transfer to the WMO Global Telecommunications System and other international networks, restricting the effectiveness of Global Telecommunications System implementation and creating uncertainty about delivery and receipt of telecommunications
- Insufficient funds in some countries to pay for reliable internet connection to provide information (including warnings) to end-users
- Lack of NMS priority access in some countries to reliable internet connection to provide information (including warnings) to end-users
- Inadequate access by some NMSs to resources for equipment, infrastructure, maintenance, skilled staff and training
- Inadequate or poorly articulated statutory authority for NMS roles and functions
- Insufficient and/or inadequate meteorological observation networks

The Pacific Islands Meteorological 2012-21 Strategy identified that ‘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’.

2.2 Previous phases of assistance

Australia is a major donor in the Pacific Islands region in the area of support for climate and oceans services including the application of climate and oceans data for economic development purposes. With a wide range of stakeholders involved and many changes taking place at international and regional levels, high levels of coordination are required and Australia is in a position to contribute to such coordination.

Previous Australian Government-funded programs⁷, including the Pacific Island Climate Prediction Project (PICPP) (since 2004) and South Pacific Sea Level and Climate Monitoring Project (SPSLCMP) (since 1991) have contributed to the capacity of Pacific Islands’ NMSs to provide quality climate services to government agencies, other private sector stakeholders, NGOs and the general public. This assistance has contributed to the provision of quality data, data analysis products and related capacity, as well as the development of professional networks and relationships in the region.

⁶ Chapman, B et al, 2010 Reviewing Weather and Climate Services in the Pacific, SPREP
<http://www.wmo.int/pages/prog/dra/vcp/documents/Inf2PacificWeatherServicesFinalReport.pdf>

The demand for climate prediction information and for increased capacity of NMSs has increased substantially since 2002. Sea level data collected since 1991, combined with other climate prediction data, is now of sufficient validity, quality and duration to be useful and helpful for Pacific Island countries in determining their responses and adaptation processes. However, NTC claim that at least 50 years of continuous data is necessary to produce reliable predictions. The same data is also useful for Australia, given the impact of climatic conditions in the region, such as cyclones and drought conditions, on Australia's weather. Continuous data collection and quality assurance of the data from the Pacific Islands region have been undertaken by Australian scientists working collaboratively with Pacific Island NMSs: this work needs to be sustained for the foreseeable future.

After four phases of a sea level data collection project and two phases of a climate prediction project, many lessons have been learned which fed into the design of COSPPac in 2012. Another related Program, PACCSAP, also designed at the same time as COSPPac, focused on scientific research in climate change and adaptation strategies. This Program was a major component of the Australian ICCAI initiative and is expected to be closed in March 2015.

Previous phases and related Programs have deepened evidence and understanding. Activities associated with climate prediction have helped to translate scientific data and make it available in the form of practical advice for some Pacific Islands' climate sensitive industries. COSPPac has continued to build on this foundation by contributing to strengthening the capacity of NMSs to communicate to and engage with national stakeholders on climate issues. Other lessons relating to capacity development, institutional strengthening, effective partnerships, the communication of scientific information and the importance of local ownership and leadership were reflected in the design of COSPPac.

2.3 COSPPac

COSPPac is a four year program (July 2012 – June 2016) with a budget of approximately \$31.5m. It is delivered by the Australian Bureau of Meteorology in partnership with 14 Pacific Island NMSs. Its overall objective is to enable NMSs and other relevant in-country agencies to understand and use climate, ocean, sea level and geodetic products for the benefit of island communities and governments.

The Program includes Cook Islands, Fiji, Federated States of Micronesia, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of the Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

The **goal** for COSPPac is: '**Pacific Islanders have adapted to the variability in their physical environment.** The **objective** for COSPPAC is '**to develop the capacity of Pacific Island scientists, decision-makers and planners to apply climate and ocean products to benefit adaptation responses.**'

The four anticipated **outcomes** of COSPPac are:

- Enhanced organisational capacity in NMSs relevant to climate and ocean information service delivery
- Maximised communications of climate and ocean information, services and products to regional organisations, governments, major sectors and island communities
- Increased capacity of NMSs to understand climate processes, especially climate prediction, to use monitoring devices and predictive software to monitor and predict ocean and climate variability
- To sustain operations and maintenance of sea level monitoring stations, data systems and information services

At the time of design, COSPPac comprised three components:

- The **Climate and Oceans Monitoring and Prediction Project Phase 3 (COMP: \$7.5m)** continues the work of the Pacific Islands Climate Prediction Project (Phases 1 and 2), helping 10 Pacific Island countries to develop their capacity in seasonal forecasting. Long range (3 – 9 months) seasonal forecasting is tailored to the needs of farmers, water resource managers, public health authorities and other users. Forecasting capability is being extended, new products and tools developed and introduced, and forecasts are being used for specific practical applications.
- The **Pacific Sea Level Monitoring Project Phase 5 (PSLM: \$12.5m)** continues the work of the South Pacific Sea Level and Climate Monitoring Project (Phases 1 to 4), recording, analysing and disseminating highly accurate data on sea levels from tide gauges hosted by 13 Pacific countries. GA and the SPC's SOPAC Division are subcontracted to carry out some of the work. Data is used by the international scientific community to monitor climate change and by Pacific Island countries and their development partners in developing practical applications. Geodetic data is collected to verify absolute sea levels and it was envisaged would be available to test other potential applications in this phase.
- The **Capacity Development and Communications Project (CD&C: \$7.3m)** coordinates capacity development with Pacific Island countries' meteorological services' staff. Training, workshops, attachments and exchanges address the priorities of NMSs, enabling them to continue to provide essential services to their governments and communities. This project coordinates the introduction of new products and services generated by COMP and PSLM to participating NMSs.

Each of these projects has been managed by a separate section within the COSPPac Team, under a Program Manager and **Program Management Unit (PMU: \$4.2m)**. In late 2013, a decision

was made to add a separate **IT Section**, dedicated to ensuring quality, relevance and consistency of IT services across the whole Program.

COSPPac is designed to address priorities identified by the Pacific Meteorological Council through the Pacific Islands Meteorological Strategy (PIMS), where Australia is well placed to assist. It enables Australia to fulfil some of its commitments as a developed country member of WMO to developing country members in our region. Australia also contributes to the work of Pacific Island NMSs through support for WMO-led activities including the Global Framework for Climate Services (GFCS), core funding for SPREP and other small activities.

PSLM and COMP outcomes and activities were expected to lead to the broad goal of “COSPPac products, information and data are relevant and accessible”. COMP and CD+C activities and outcomes are intended to contribute to the specific goal: “COSPPac partners have the understanding and skills to access and use the products and information” (which sits underneath the Program-wide goals listed above).

3. Findings

This section summarises the Review findings under the six categories included in the TORs. Section 4 below analyses key issues included in the TORs and Section 5 lists recommendations based on this analysis.

3.1 Appropriateness

In the Pacific Islands context overall, the work of the COSPPac Program is now more relevant than it was at the design phase in 2012, because of two major changes: increasing understanding of the significance of climate and oceans information for the economic and social development of Pacific Island countries; and increasing ownership by Pacific Island countries of climate services responsibilities. In addition, there is both increasing regional coordination and stronger networks of Pacific Island NMSs, facilitated and supported by regional organisations. A combination of factors such as population increases, ocean inundation and ongoing pressure for economic growth influences countries’ ability to manage changing seasonal weather patterns. In addition, evidence of increasing communications between Pacific Island NMSs and other national stakeholders about climate and oceans data and information, suggests that the relevance of the Program is now much broader than the NMSs themselves. The collection and dissemination of accurate weather, climate and oceans information is increasingly prioritised by Governments in their national economic plans, recognising the strong links with development prospects. In particular, deepening understanding of the need for resilience in communities and

infrastructure in the face of extreme climate-related events, confirms the increased relevance of support in this area.

COSPPac has sought to apply a balance of regional and customised national approaches to planning and delivery of activities. A regional approach has benefits associated with cost-efficiency, ease of planning and coordination and equity in funding division, but limitations in terms of relevance for each participating country. In the case of COSPPac, use of regionally agreed priorities has meant that some activities are more relevant for some countries than others. For example, at the Tonga NMS, major priorities are the construction of a cyclone-proof building and more training at local levels for observers, and while it benefits somewhat from the provision of international training and software, this is lower down on their priority list. When COSPPac was initially designed, decisions were made about what could be included and what could not, but the implications of this are that some countries are more likely to benefit than others. For most countries, however, the fact that NMS Directors have worked closely with COSPPac management to determine priorities, has meant there is generally a good match between Program activities and national priorities.

The climate and oceans data generated within COSPPac remains of high relevance to Australia, both in terms of national climate patterns and Australia's role as a major provider of data in the global climate context. In particular, the sea level data collection and analysis of services provided under PSLM are of direct relevance to Australia and to global scientific understanding.

COSPPac has supported Pacific Island countries to collect, access, predict and communicate accurate information about details, patterns and likely seasonal and longer-term changes in climate and oceans at local levels. This is vitally important for the governance and development of all Pacific Islands, as they depend on ocean-based resources to some extent, including fisheries, and all are subject to weather and climate events that can significantly influence livelihoods and community life, short-term and long term economic growth and thus poverty.

COSPPac is increasingly relevant as Pacific Island Governments have raised their own awareness of the impact of weather and climate events and changes on their countries and particularly on economic development prospects. With each cyclone season, economic losses undermine gains achieved through long-term development efforts. Backward steps are caused by increasing numbers and severity of droughts and floods, limits on agricultural productivity, increases in disease outbreaks and the costs of bringing in water or fixing damage to infrastructure. When national financial and specialist resources are insufficient, donor agencies are often needed to assist with disaster responses and reconstruction costs, thereby potentially reducing the availability of funds for longer term development activities, or at least constraining them achieving such objectives. For example, the recent floods in Solomon Islands not only caused loss of life and damage to critical infrastructure, but also delayed other long-term development programs. Severe droughts in Tuvalu and Kiribati resulted in the expensive mass importation of bottled water at short notice. With stronger prediction capacity, NMSs are able to warn

Governments of impending events so that risk reduction strategies can be activated, costly crisis-driven responses are avoided and damage to assets is minimised.

The products provided by COSPPac and its predecessors have contributed to Pacific Island capacity in this context. Comments from NMS Directors indicate the Program has largely been able to meet the diverse priorities expressed by each country. Accurate collection, aggregation and analysis of data, requires substantial infrastructure, specialist skill and costs. With the combination of good governance, the Bureau of Meteorology's technical expertise, COSPPac's substantial resources, and a commitment to responding to Pacific Island countries' priorities, the IPR Team found that the Program has succeeded in remaining relevant.

NMSs have the mandates in each Pacific Island country to provide accurate information to respective Governments and communities to help them prepare for and navigate these processes. However, specialist and sustained resources are needed for generating, analyzing and communicating accurate and meaningful information as well as integrating it with neighbour country information. In small Pacific Island countries with small NMS teams, maintaining such resources is often impossible and thus collaboration with countries with larger resource bases and specialist infrastructure is essential.

COSPPac's particular focus, building on previous phases of activities, has been on supporting NMSs to engage with other Government and some private sector agencies so that climate and ocean data is practical, useful and targeted to suit national priorities. Examples include:

- Use of weather and climate data to assist the Samoan hydro-energy provider to plan ahead in relation to demand and supply
- Use of weather and climate data to develop predictive information about malaria outbreaks in Solomon Islands for health services
- Use of tide gauges data to inform coastal fisheries, small business activities (e.g. shell collection for handcrafts), tourism and transport businesses and other coastal services in Tuvalu and Samoa
- Use of seasonal climate outlooks to prepare for droughts and inundations in Kiribati
- Use of seasonal climate outlooks to assist agricultural industries in Fiji.

The communication of accurate, useful and customised climate data by NMSs to other Government agencies within each Pacific Island country is particularly crucial. If information is unreliably collected, inaccurately analysed or not timely, it will not be useful for stakeholders and could have negative economic effects. The process of communicating meaningful information requires different skills from those used in general climate observation and reporting. As Pacific Island Governments and communities have increasingly recognized the role of the climate in economic and social development, there is growing demand for accurate and relevant information to be made available. COSPPac is assisting NMSs to have the confidence and skills to generate and share accurate data and information. Some countries show good

evidence of this bearing results, for example in Samoa, Fiji and Vanuatu, and others are keen to start the process, for example Tonga.

The structure of the Program, as originally designed, has largely remained valid and relevant, with only minor changes required as a result of lessons learned and issues emerging during implementation.

Given the importance of dedicated expertise in these areas for this phase of cooperation, COSPPac included a new separate project called Capacity Development and Communications (CD&C). This project has consolidated and extended training undertaken in previous phases. Overall, the Review found that these contributions have been considerable, well-regarded and integrated with technical aspects of the Program. The following well-regarded elements were highlighted by stakeholders:

- a. **Capacity Mapping**, using a strengths-based approach, which was well-received by Directors
- b. **Regional and national training workshops** which the majority of review stakeholders reported to be appropriate. A small number of NMS Directors noted that they regarded some courses as being too complex, with some participants not always able to apply or use learning in the reality of their home settings, although others were creative in maximizing the chances of relevance
- c. **Attachments** for selected personnel to the Bureau of Meteorology or to other Pacific Island NMSs for the purpose of training/mentoring staff in particular aspects of service delivery, were consistently regarded as positive experiences
- d. **Conference attendance**, for which participants were grateful and gained confidence and experience from presenting papers or posters.

Records from COSPPac indicate that a large number of training and related activities have been organised and delivered by the CD&C project to contribute to capacity on NMSs. These are summarized below:

- In country workshops on science, stakeholders and media in:
 - Cook Islands (2013)
 - Kiribati (2013)
 - Samoa (2013)
 - Niue (2013)
 - Solomon Islands (2013)
 - Papua New Guinea (2014)
 - Tuvalu (2014)
 - Fiji (2014)
- Traditional knowledge workshops, covering planning, database and indicators in:
 - Vanuatu x 3 (2013)

- Solomon Islands (2014)
- Samoa (2013)
- Niue (2014)
- Regional workshops and Conferences, including:
 - Fiji Regional Observers Workshop (2014)
 - Greenhouse Conference and Science Writing (2013)
 - FIG Symposium(2013)
 - Climate Adaptation (2014)
 - COSPPac Regional Workshop (2014)
 - SCOPIC Drought Module (2014)
- Attachments
 - Cook Islands to Melbourne (Auditor training) (2014)
 - Samoa to Vanuatu (Traditional Knowledge Workshop) (2014)
 - Samoa to Melbourne (CAWCR Workshop) (2012)
 - Solomon Islands to Vanuatu (Traditional Knowledge) (2013)
 - Marshall Islands to Melbourne (SCOPIC) (2014)
 - Tuvalu to Melbourne (SCOPIC) (2014)
 - Cook Islands to Melbourne (SCOPIC) (2014)
 - Solomon Islands to Melbourne (SCOPIC) (2014)
- Other
 - Climate-Malaria Workshop, Solomon Islands (2014)
 - Funding for 6 Participants to PADCLIM
 - In-country technical training for Lands and Ocean Surveyors through GA in 14 countries (2014)

Programs are more likely to succeed when there is a coherent and customised mix of learning opportunities, when efforts are made to strengthen local capacity to deliver future learning activities and when monitoring processes are used to contribute to continuous improvement⁸. This is especially the case when there is local leadership commitment to changes in capacity, which is largely the case in Pacific Island NMSs. In the remaining period of COSPPac, there will be value in NMS officials making opportunities (e.g. adding agenda items to regular staff meetings) to reflect on any changes in their own capacity since the earlier capacity mapping processes. They could consider the extent and nature of the contribution that COSPPac and other contributions made to any changes in capacity. This reflection process could help to identify priorities for subsequent collaboration with aid projects.

⁸ According to the experience of the review team members (see Rhodes, D. 2014, *Capacity Across Cultures: Global Lessons from Pacific Experiences*) and evidenced in multiple reports such as <http://www.dfat.gov.au/aid/how-we-measure-performance/ode/Documents/lawjustice-ode-brief-organisational-capacity-building.pdf>

In COSPPac, a number of issues have limited the benefits of CD&C efforts, including lack of previously experienced specialists within the Bureau of Meteorology and perhaps too much separation from the other technical sections. The majority of training has been undertaken in-country (around 20 courses) and this is commended. Participants in regional courses have rated them highly. Some NMSs Directors expressed the view that such courses are not sufficiently customised for the respective skill levels and country priorities so some participants have trouble relating their learning back to practical position responsibilities. This situation is not unique to this sector, and the majority of COSPPac activities are actually delivered in-country to maximise relevance. WMO noted that from their experience that in-country customised capacity strengthening work is more effective than intensive one-off regional training.

3.1.1 Relevance at regional level

COSPPac is highly relevant to the Pacific Islands at the regional level, with its focus on issues considered by most stakeholders within and beyond the region to be of the highest importance. At the time of the design of COSPPac, there was emerging interest within the region about greater local coordination of Pacific Island climate and oceans support activities, particularly in the shape of the newly formed Pacific Meteorological Council (PMC) as a subsidiary body of the SPREP Meeting. While it was decided in 2011 that Bureau of Meteorology would play the central coordination role for Australian support, it was envisaged that changes during the 2012-16 period would likely influence the location of future support.

Since the commencement of COSPPac's implementation, there has been increasing Pacific Islander-led activity relating to the coordination of and policy for climate and ocean services. The PMC, representing Directors of NMSs and other relevant regional and international stakeholders has formulated the Pacific Islands Meteorological Strategy 2012 to 2021 (PIMS)⁹ which identifies agreed priorities across the region. This Strategy is a comprehensive document which includes agreed outcomes, national priority actions and regional actions, as well as principles, institutional arrangements and partnerships. It also includes broad monitoring and evaluation approaches and coordination structures at the regional level.

The Strategy provides a regional policy framework for the work of COSPPac: there is a strong correlation between COSPPac's activities and most of the priorities expressed in the Strategy. In particular, COSPPac's work is directly or indirectly contributing to the following key outcomes included in PIMS:

- Marine weather services are improved
- Public weather services are improved

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<http://www.sprep.org/attachments/Publications/PacificIslandsMeteorologicalStrategy.pdf>

- Multi-hazard early warning systems for tropical cyclones, storm surges, waves and tsunamis are implemented and improved
- Improved early warning systems for floods
- Climate information and predictions services, including drought prediction, are improved
- Improved quality of observations and coverage of networks in the region
- Historical climatological data are preserved
- Regional NMSs are more capable and effective
- Education, training and capacity development activities in the fields of meteorology and climatology are coordinated and improved
- Donor funding is coordinated efficiently and effectively
- Enhanced strategic partnerships and collaboration with regional and national organisations and agencies

In summary, the IPR found consistent positive evidence about the relevance of the work of COSPPac in meeting the national priorities of Pacific Island NMSs in delivering climate and ocean services to their governments and communities. The products and tools provided under COSPPac were regarded as particularly relevant. There is also a high level of relevance of COSPPac at the regional level. COSPPac is appropriate in that it closely aligns with international frameworks (GFCS) and regional frameworks (PIMS) and is moderately aligned with national priorities (e.g. NAPA in Samoa). In addition, key stakeholders are generally highly satisfied with the Program's focus, processes, quality and outcomes. Section 4.4 below addresses issues associated with future regional coordination of climate and oceans services supported by Australia.

3.2 Effectiveness

This section addresses how well COSPPac is achieving outcomes at both a program and project level and whether the management structure, including unit responsibilities, have supported implementation and achievement of objectives. The section considers the approaches taken to implementation and what activities have been undertaken. It is worth noting here that COSPPac is the latest in a long history of collaboration in this sector, so in many cases, stakeholders reflected on a much longer period than the most recent two years.

The long history of collaboration between Australia and Pacific Island countries in this sector has contributed to strong mutually respectful partnerships. The open-ness of partners to collaborate with each other as equals, wherever possible, is a key factor in COSPPac's effectiveness. When combined with the high degree of relevance (noted above in Section 3.1), Pacific Islanders' involvement in decision-making and a well-resourced Program, it is not surprising to find that the majority of stakeholders consider the Program to be highly effective.

3.2.1 Approaches

A major finding of this IPR is that the Program's relevance, effectiveness and efficiency is strongly related to the high quality and appropriate **approaches** which have been taken during implementation. Several NMS Directors noted that the approaches used within COSPPac were highly valued and the best they had encountered, particularly in relation to respecting and responding to national priorities, issues and voices. They noted that Directors had more say than ever before in Program activities and that this contributed to improved effectiveness as well as relevance and impact. The Program Management group is commended for their understanding of development principles and use of high quality development approaches. Stakeholders noted the following:

Management and governance

'This Program is relevant and effective because of the mutual partnership approaches that have been used. We have been impressed with the responsiveness of the COSPPac Management. This helps us know that the Program will actually bring about the right results for us.' (NMS Director)

- Commitment to Pacific Islander governance at the strategic level by the Program Steering Committee and respect for the collective strategic advice and leadership provided
- Understanding of the regional context
- Outcomes-oriented leadership and management by the COSPPac Program Manager and the PMU team
- Use of collaborative, trust-based and respectful partnerships with Program stakeholders
- Comprehensive and detailed planning and review processes allowing for flexibility and responsiveness to lessons learned, monitoring information and emerging issues
- Transparency in terms of financial management and decision-making, albeit with room to improve
- Understanding and respect for the diversity of Pacific Island contexts and cultures
- Effective use of monitoring processes and risk management strategies
- Timely delivery of activities, according to agreed plans, except when circumstances require changes and stakeholders are informed appropriately

Quality of products and service delivery

'This is the only project in this sector that makes a long-term commitment to climate and oceans services, whereas others' efforts are piecemeal' (NMS Director)

- Commitment to development of good quality climate products, which go through a detailed process of design, testing, refinement and completion and are driven by the requirements of users
- Commitment to delivering relevant and practical training and organizing complementary activities to respond to priorities identified in capacity mapping and to contribute to strengthening NMS and others' capacity
- Support for countries to produce their own climate forecasts and related information
- Support for countries to engage regionally for their own benefit (e.g. communicating with neighbouring NMSs about climate and oceans patterns relevant to their own context)
- Commitment to sustained high quality climate and oceans data collection and analysis
- Ongoing maintenance and calibration of tide gauges and CGPS infrastructure
- Use of contemporary approaches to contributing to capacity, albeit with perhaps an over-emphasis on regional training courses
- Use of a mix of formal and experiential learning approaches, for example in enabling NMSs to build confidence and skills in communicating with national stakeholders
- Promotion of the role of women in climate science, reflected in more than 50% participation by women in training programs
- Use of flexible funds to assist NMSs to fund small to moderate climate activities for which other sources of funding are not readily available
- Promotion and use of transparent, accessible and effective communications methods to share information between NMSs and other stakeholders

Partnerships

'COSPPac is a major project in this sector and it works collaboratively with partners to maximise coordination and coherence. While other donors are now coming into the sector, Australia will continue to be an important partner'. Regional organisation official

- Understanding and commitment to maintaining respectful and effective relationships and partnerships with other stakeholders in this sector, albeit with some room for better coordination
- Occasional use of and access to highly specialized peers and colleagues available within the Bureau of MeteorologyBureau of Meteorology, but outside the COSPPac team

The way that the COSPPac team has combined these approaches in its work to date is impressive, particularly for a largely technical organisation for which aid management is not core business.

The provision of IT support was raised as a major priority, especially in relation to open-source software and support for some NMSs to be able to tailor make their own products. Some stakeholders considered that providing some basic types of IT support from Melbourne was not

the most efficient arrangement, while recognising the highly specialized skills, data and other resources required for building new models such as SCOPIC, Ocean Portal and TK Database. The IT capacity mapping conducted by COSPPac for 10 NMSs, SPREP and SOPAC contributes to detailed understanding on the diversity of existing capacity and the feasibility of shifting some responsibilities to regional organisations. The COSPPac team has already begun to take steps to plan for the handover of some software to SPREP, SOPAC and USP. SCOPIC is now a mature, low maintenance software product which can be relatively easily handed over to the competent IT team in SPREP, as long as technical advice and organisational support is provided for them to in-turn support NMSs in the long-term.

In most cases, the Ocean Portal uses global data that can be sourced from the public domain. However, the distribution of some of the datasets, as well as any value-added products and services that are based on those datasets, such as BLUElink and AUSWAVE, are subject to intellectual property (IP) considerations by the Bureau of Meteorology. In future, part could be used by regional organisations and part retained within the Bureau of Meteorology, subject to negotiated agreement.

3.2.2 Activities undertaken

COSPPac has planned, undertaken and monitored a large number of activities, in each of the sub-projects, since 2012. Overall, despite some early delays and underspending, the Program is now meeting plans and in some cases completing tasks early. Other tasks may need to be rushed to complete them before mid-2016, but given the ongoing nature of collaboration between Australia and the region in this sector, it makes sense to focus on quality and sustainability, rather than completion of tasks in a rushed manner. Given the complexity of working in a diverse region across a mix of activities, the Program appears relatively coherent and well-organised.

There is consistently positive feedback from stakeholders about the quality of COSPPac products, tools and services, reflecting the fact that their development is largely driven by the users' requirements. A number of issues about specific elements were raised by stakeholders but are relatively minor overall.

Activities are detailed in extensive reporting provided to DFAT (formerly AusAID) and are summarised in Table 1 below:

Table 1: Key activities of COSPPac

Area	Key activities
COMP	<ul style="list-style-type: none"> • Development of tools which are useful not only for NMSs but also SPREP and SOPAC and others such as NIWA • Development of protocols and systems for communicating seasonal rainfall forecasts for Samoa's national energy production (see Case Study

	<p>at Annex 3)</p> <ul style="list-style-type: none"> • Development of a tool to provide climate based information about malaria outbreaks for vector borne disease surveillance program • Development of a much-needed and highly regarded Ocean Portal (because no NMSs have oceanographers but there is a huge interest in this information), to the stage that it is ready for training in 2015-16 • Development of SCOPIC so that NMSs can undertake credible climate forecasting, building on previous data collection capacity • Technical and other support for production of Kiribati national drought response plan (see Case Study at Annex 3)
PSLM	<ul style="list-style-type: none"> • Upgrading and maintenance of existing 14 tidal gauges so that data is reliable and accessible (and complements additional 14 gauges located in Australia) • Organisation of new tide gauge for Niue • Arrangement of systems to provide real-time sea level and tide data to NMSs (completed in 8 months) • In-country technical training for surveyors in 14 countries • Effective working relationships with GA and SOPAC, based on funding provision and shared objectives, to undertake international-standard maintenance, calibration, data collection and analysis as well as communication of quality data (NB GA does not have a mandate to operate outside Australia so would not have the funds to undertake this role if aid funds were not available, even though the data collected reflects national contributions to global data sets and Australia's reputation would be at risk if this work ceased) • Strengthening Pacific and establishment of the Pacific Surveyors Council • Effective monitoring of tides and sea level, which is critical for people living on low-lying islands <ul style="list-style-type: none"> ○ 'in the last ten years, since continuous use of GPS has occurred, the influence of land movement on sea levels is clear – we can see and now estimate trends in land movement for the global reference framework' (GA specialist)
CD&C	<ul style="list-style-type: none"> • Completion of capacity mapping in selected countries • Delivery of workshops and training courses for over 400 individuals • 6 in-country NMS workshops have provided hands-on seasonal climate and communications training for 81 people (21 women) • 9 NMS staff have participated in 2-week intensive attachments (3 women) • Sponsorships provided for 33 people (5 women) to attend conferences and courses on topics including land surveying, climate, quality

	<p>management and science communication</p> <ul style="list-style-type: none"> • 94 key climate stakeholders (29 women) have attended in-country NMS workshops on interpreting climate outlooks and the local climate • 29 people (11 women) attended 2 major COSPPac regional workshops on 1. climate and communications and 2. observations and calibration • More than 250 in-country community members – including many elders and chiefs - have attended traditional climate and oceans knowledge workshops • Development of an innovative and original traditional knowledge database and establishment of four traditional knowledge pilot projects • Wide range of communications products and services (e.g. newsletter, distribution of calendar)
IT	<ul style="list-style-type: none"> • Release of SCOPIC version 3 ahead of time • Development of a new and accessible Ocean Portal • Assessment of IT capacity strengths in NMSs to ensure all products and support are practical and accessible • Responsiveness to IT queries from NMSs on regular basis

The approach that COSPPac uses to developing new products has proven to be well-regarded and effective. New products have been developed and trialed in several countries (e.g. drought prediction in Kiribati, malaria prediction in Solomon Islands and recording of traditional knowledge about seasonal changes and their implications), with the intention they are transferable to some smaller countries, on demand. This contributes to sharing the benefits, once software bugs have been resolved. COSPPac expects product development processes will be finished in time for stakeholders to be trained in use prior to the end of COSPPac in mid-2016.

The most serious concerns were raised about the future support, updating and sustainability of tools such as CliDE and to a lesser extent SCOPIC (see Section 3.2.2), if future funding is not forthcoming: these issues are well understood by COSPPac officials. While CliDE has not been the responsibility of COSPPac to date, it is clear that this software and support for its ongoing use is of critical importance to NMSs. Annex 2 provides a separate discussion of the serious issues raised during the IPR process in relation to CliDE.

3.3 Impact

A great deal of evidence generated through this IPR confirmed that COSPPac is making a significant contribution to its intended outcomes in relation to use by NMSs and other relevant in-country agencies of seasonal climate, ocean and sea level products. No substantial

unintended outcomes were identified during the review, although some of the benefits listed below at national levels may not have been specifically expected. At a global level, a key impact is the production of accurate, aggregated and analysed data on Pacific sea levels which is now available for COSPPac stakeholders and the rest of the world¹⁰. While scientists note that many more years of data collection is necessary to make accurate predictions, the collection of continuous data over the past 20 years means that there it is now possible to estimate the rate of sea level rise over a longer timeframe, and this information can greatly assist community and infrastructure planning in these countries.

Two case studies – Kiribati and Samoa - were developed as part of the IPR. They are included as Annex 3 and provide good examples of the ways in which Kiribati and Samoa have used data and information generated by products developed through COSPPac. In particular they highlight the relevance of climate and oceans information for Pacific Island countries, the diversity of contexts and the diversity of possible uses of this type of information. They also highlight the benefits that can be achieved through a customised approach, which responds to the specific contextual priorities in each Pacific Island country.

Benefits of COSPPac are wide-ranging and include:

- Widespread use of reliable and high quality products - data bases and software systems (SCOPIC, Ocean Portal and tide calendars) for storing, analysing and communicating data and information, which are central to the effectiveness of everyday NMS work
 - All countries identified this as a key benefit for NMSs
- Use of relevant and practical products for specific purposes in mainly larger NMSs to meet specific climate information needs
 - Selected countries identified individual products, depending on their level of involvement
- NMSs now play a stronger role in national development governance contexts as they are increasingly able to provide useful and tailored information for government and stakeholders and increasingly asked to contribute to wider development plans and processes
- Access to accurate and reliable real-time and historical data about tides and sea levels, which affect both Pacific Island economic and social life, including:
 - understanding of the history of tsunamis
 - ability to warn communities about impending storms as well as fluctuations that affect fish stocks and land use

¹⁰ This data is available from

<http://www.bom.gov.au/oceanography/projects/spslcmp/data/monthly.shtml>

An example of recognition in an internationally peer reviewed journal that the data is high resolution and high quality includes: <http://www.publish.csiro.au/paper/SP11006.htm>

- information to assist hydrologists involved in ground-water resources and the effect of sea levels on fresh water lenses under atolls as well as those involved in hydrographic surveys related to mineral exploration, jetties and navies
- information to assist tourism and sea transport services, particularly to outer islands
- Contribution by Australia to global climate, scientific and research contexts, reflecting obligations as well as shared interests – for example through the Global Sea Level Observing System (GLOSS)
- New knowledge and skills for all personnel involved – from NMS Directors to local staff – on using software and data bases as well as conceptual knowledge and practical skills related to use and dissemination of information to other sectors
- Increased understanding and skills relating to the contribution of NMSs to research science and publications
- Access to regular (monthly) expertise related to interpretation of information generated by SCOPIC, providing essential quality assurance in relation to reliable climate predictions
- Raised the credibility of and confidence in NMSs in national context
- More effective and targeted communications between NMSs and other Government, private sector and community organisations
- More effective data storage and backup, addressing key risks
- Increased ability of Pacific Island NMSs and Australia to meet international WMO obligations
- Building tools that will inform international climate fraternity both for short to medium term weather forecasting and long term climate predication
- Contribution to higher retention rates among NMSs staff (through training and succession planning).

In addition to the two case studies, country specific stakeholders identified other benefits, including:

- COSPPac has enabled the Tuvalu Meteorology Service to significantly ‘speed up achievement of our plans’ and enhance the quality of its work and outreach. They reported ‘COSPPac has fulfilled our dream to provide climate and tidal predictions to our people’ and ‘we are confident to run software to generate accurate information’ and can now ‘tell our people about impending droughts or rainfall which helps us monitor national water supplies’
 - With COSPPac funds, they have recruited a Climate Officer who is now trained to do observations, data collection, analysis, reporting and filling in ‘all the gaps’ in relation to climate information
 - with this information, they now produce a daily weather forecast and simple monthly newsletter for the public in local language which has proved to be very useful for the fishing and marine industries

- the tide calendars have also proven particularly useful and popular, for example women running small businesses by collecting shells on the reef and making handcrafts are now able to plan their visits by knowing when low tides are predicted
- In Tonga, the NMS noted that COSPPac is the only Program they have worked with which supports NMSs to move beyond the science to make information relevant to sectors, communities and governments and this is very important, although the country is only just at the beginning of this process. As a result of COSPPac (and its predecessors') support, Tonga now has effective climate forecasting services.
- In Solomon Islands and Vanuatu, the development of software for storing traditional knowledge about seasonal climate and potentially comparing it with scientific data, has been particularly welcomed, as a sign of respect as well as scientific interest. Other countries are also interested in using this software

These benefits are substantial for Pacific Island countries and are confirmed in broader recent research and analysis. For example, Holland (2014) noted 'investment in meteorological services can generate widespread benefits for a community. These may take the form of small daily improvements in the lives of citizens and businesses (such as improved farming outlooks) as well as occasional benefits from improved planning for severe events'. She referred to one project which demonstrated that 'a 1% reduction in damage from improved warnings could generate cash savings of US\$3.62 million' and a 1% reduction in damage to Fiji commercial cash crops alone would generate an estimated payoff US\$2 to every dollar invested.' She also referred to a World Bank (2006) report that identified the most common disasters affecting Pacific Islands are weather related and they accounted for 76% of disasters from 1950 to 2004 and 79% of fatalities (not including PNG).

Finally, additional benefits relate to stronger relationships and cooperation between Pacific Island NMSs, as well as between NMSs and regional bodies. Related benefits include: greater understanding within Australia about the work of Pacific Island NMSs: improved Australia's capabilities to develop specialist products and services in future; and better relationships between Pacific Island NMSs and Australia.

Notwithstanding the extensive evidence of positive impact associated with the work of COSPPac to date, some relatively minor limitations associated with benefits to date include:

- Issues with the pitch (level of complexity, extent of relevance) of the small number of regional training courses and thus contributions to capacity among diverse participants, recognising that by far the majority of training is customised to suit in-country stakeholders
- Benefits cannot be sustained unless there is ongoing support with the use of products, particularly training for new staff and technical back up

- Uncertainty about the future of CliDE, which while not funded by COSPPac to date, is seen as a priority by NMS Directors for future COSPPac funding to ensure it continues
- Communications and training of stakeholders is limited to those institutional representatives selected by NMSs to date as participants in COSPPac-funded activities (NB Following agreements between COSPPac and the Finnish-Pacific project (FINPAC) project teams, engagement at community level is the responsibility of the latter).

3.4 Cost effectiveness

The bulk of funding for COSPPac (80%) is allocated to the Bureau of Meteorology in Melbourne (including a line allocation to the National Tidal Centre in Adelaide). Funding is also provided to GA in Canberra (12% of the total budget) and SOPAC Division of SPC in Fiji (8%) for specific tasks related to maintaining tide gauges and associated GPS equipment required for calibration. At present, funds distribution and oversight arrangements are coordinated by the Bureau of Meteorology.

Overall, there is widespread agreement among stakeholders that COSPPac is a very well-funded and well-resourced Program. For most stakeholders, the size of the Program is regarded as a welcome and substantial sign of Australian commitment and support: NMSs are consistently satisfied with their ability to participate in planning for its activities. Several small NMSs mentioned that the Program places a lot of demands on their time – responding to questions, organizing participants for regional training for example. When training is provided at regional levels, there is an ongoing uncertainty about relevance and efficiency, compared with in-country training. One Director noted that he sends the same staff to multiple courses, because he only has a few staff. For him, greater streamlining and more in-country work would be more cost-effective, but preferably *‘not a string of separate visitors coming one after the other’*. Overall, however, the overall approach taken by COSPPac to ensure Program decisions taken reflect Pacific Island advice and approval, is well-regarded.

Management by Bureau of Meteorology

All Review respondents noted the high level of benefits accruing at the country and regional levels as a result of the effort by the COSPPac team in the Bureau of Meteorology. However more than a few Pacific Island stakeholders expressed the view that the costs of this Program (original budget \$31.5 million, currently budgeted at \$30.6m) are disproportionately high. The scope of the Review did not permit a benchmarking process. As an Australian Government agency, the costs of project management by the Bureau of Meteorology were based on Government ‘standard cost recovery guidelines’ and the Bureau of Meteorology’s costing/pricing tool and agreed by AusAID (now DFAT) at the time of negotiating the respective agreements. The decision was made within Government that the Bureau of Meteorology would

manage the Program without a competitive tendering process, so no comparative assessment was made at the outset against commercial project management options.

For the record, the Bureau of Meteorology will receive approximately \$19.3m for the costs of managing the 4-year Program, including:

- salaries for all Program personnel (except one, based in Fiji) at relatively senior level Australian public servant rates including:
 - direct staff salaries budgeted at \$9.9m
 - on-costs and external contractors budgeted at \$3.3m
- a charge to cover a proportion of the Bureau of Meteorology's ICT and property and operating expenses costs (e.g. rent, utilities, energy, fire, electrical servicing, rubbish removal, cleaning, rates and security) totaling \$2m
- a management fee charged by the Bureau of Meteorology, totaling \$4m.

In addition to these costs, \$5m is allocated for direct expenditure on Bureau of Meteorology's staff travel, procurement and capital equipment.

The Bureau of Meteorology noted that its management of the Program entails additional non-funded costs such as the costs of recruitment, replacement and training of staff who move from other positions into the Program, and that these costs are significant because experienced staff are often replaced by less-experienced staff.

Being housed within the Bureau of Meteorology has enabled the COSPPac team to access a wide range of specialist skills and the Bureau has provided significant institutional support. However, there was also clear evidence that the internal structures and systems have created major difficulties for the Program team. For example, Australian public service constraints have resulted in a lack of flexibility relating to the recruitment of specialist personnel recruitment: only internal candidates could apply for all Program positions and appointment processes have been extremely slow. Public-service wide limits on travel have hampered effectiveness, even though Program funds were available and travel is absolutely necessary to implement Program activities. Also, double or triple financial management and narrative reporting have meant that the Program has not been able to meet its work-plan in a timely and efficient manner and has not been as effective, responsive and agile as it could be. In addition, personnel management issues inside the Program management team have resulted in considerable and ongoing tension which has affected work relationships, schedules and quality. It seems that the team has largely been able to shield partners from these issues aside from some delays. The Bureau of Meteorology considers that these issues seem to have been resolved but will be continuously monitored.

Given changes since the design of COSPPac described elsewhere in this Review Report, and the opportunity to reduce costs and contribute to sustainable Pacific Island capacity in the longer term, it is appropriate to consider that some Program management roles could be undertaken

by Pacific Islanders. However, the Review team appreciates the complexity associated with such a move and recommends that DFAT, the Bureau of Meteorology and regional agency representatives negotiate agreements on what is most feasible and appropriate in practice, both in the remaining period of COSPPac and in the longer-term.

A team of up to 21 full-time core personnel in the Bureau of Meteorology office, many with little prior experience of international aid program management, working with complex plans and according to different systems and agendas from those usually applied to Bureau staff, require appropriate institutional support. It appears this has not always been provided throughout the life of the Program. While the individual Program team members have worked hard, from an external perspective, both considerable reductions in costs and significant benefits in sustainable Pacific Island capacity could be achieved if at least some of the positions were located in the Pacific Islands region.

Protecting Program resources from consistent requests from other parts of the Bureau of Meteorology has been time-consuming and distracting for the COSPPac team. While reporting is an essential element of any project management, COSPPac staff have been required to prepare multiple regular, detailed narrative and financial reports both to the Department of Foreign Affairs and Trade¹¹ and to the Bureau of Meteorology (in different formats and for different agendas) which has distracted them from Program delivery priorities. For aid funds to be used for staff time for this purpose is questionable. A Federal Government agency does not have systems which are well –suited to aid program management.

Now that circumstances have changed in aid policy terms (with a new focus on value for money) and regional capacity, the IPR considers it is appropriate to reconsider Program management options, at least for future support. Every option for funding project management has strengths and limitations. In the context of a reducing global aid program budget, consideration should be given to reduce Australian-focused costs and fees associated with COSPPac, without affecting the quality of services provided to Pacific Island countries, in the remaining period. See Section 5 below for discussion of future Program options and recommendations.

DFAT officials noted ongoing concerns that the funding provided for COSPPac was subsidizing other areas of work. It is not surprising that the Bureau of Meteorology and GA denied this suggestion and pointed out that the Bureau was more likely to be subsidizing the project. Continual monitoring is required of the situation whereby some personnel part-funded by the Program are also involved in Australian-focused data collection, analysis and service provision, to minimise risk of subsidization of Australian salaries from the Australian aid program.

¹¹ It would be reasonable for reporting to DFAT to be simplified in the remaining period of COSPPac and that it should focus on outcomes and changes to plans.

GA considers that the funding provided through COSPPac for their inputs (\$3.68m over four years) is adequate. It covers the following costs:

- salaries over 4 years (for 2.5 full-time equivalent staff) = \$3.04m
- costs of travel and other direct expenses = \$0.56m
- capital equipment = \$0.07m.

GA considers that transferring their responsibilities to a Pacific regional institution would be inefficient and require a long-term commitment (10 to 20 years) to training and technical support, including provision of highly specialist equipment, given the highly technical nature of its work. Experience¹² confirms that availability of highly specialized services and equipment maintenance systems are difficult to sustain in the region, given many factors, including limited budgets, staff turnover and natural disasters. The Review Team, GA specialists and the majority of NMSs consulted consider that the risks to generation of accurate data, by allocating responsibilities to diverse organisations, are too great.

SOPAC regards funding provided through COSPPac to be adequate for their technical and other responsibilities. The COSPPac Regional Officer's (CRO) role, based in SOPAC, has proven to be particularly well-regarded and offers excellent value for money. All stakeholders affirmed the importance of this role in providing local context and contacts, in building a strong relationship between the Bureau of Meteorology and SOPAC and in providing local perspectives on draft documents and plans. In particular, this role has assisted with the efficient operations of the PSLM project, supporting SOPAC staff who are working with the specialist Australian teams. The CRO role was located in SOPAC due to historical and partnership reasons and a liaison role should continue to be located in SOPAC given the critical importance of the ongoing partnership, particularly in relation to PSLM. However, now that SPREP is hosting the PMDP and PICS and is increasingly considered as the key agency for overall coordination of meteorological services, there is value in the placement of at least one, if not more additional Program personnel in SPREP to undertake related liaison and program coordination/communications roles, including with FINPAC. Ensuring coordination between Program-supported personnel in both SOPAC and SPREP, for the sake of maximizing the effectiveness of Australian aid will be a key requirement of any future arrangements as well as during any agreed transition phase.

Despite the issues raised above, the particularly strong working relationships between COSPPac team, NMS officials and regional stakeholders have supported cost-efficiency. Within respectful and trust-based relationships, particularly among individual COSPPac and NMS officials, relevant activities, and therefore relatively cost-efficient activities, have been organised. In future, it will be important to maintain such relationships, so that increasing benefits can be achieved. (see 3.5 Coordination below).

¹² By GA and many other specialist sectoral agencies

A great diversity of views emerged about options to improve cost-efficiency. Some stakeholders encouraged consideration of re-allocating funding from Program personnel in Melbourne to placements in regional organisations, particularly SPREP. This may not only reduce costs (since it is likely that salaries, on-costs and management fees would be lower than those charged by the Bureau of Meteorology), but also and perhaps more importantly, generate greater local ownership, relevance and potential for regional coordination and sustainability. Others expressed concern about shifting in this direction, based on prior experience of problems associated with regional-based project implementation. Others expressed concern that Australia could consider cutting the budget as a response to discussions about cost-efficiency issues and that the quality of Program activities should not be placed at risk by raising the issue.

In terms of the resource allocations within COSPPac, the initial budget was spread across three areas of work: CD&D, COMP and PSLM and in 2014, an additional area, IT, was added. During consultations, no project teams identified a shortage of funds to undertake their work plans. Until recently, there was significant underspending at times, caused by slow recruitment processes and consequent impact on the delivery of planned activities, as well as the fact that some activities have been over-budgeted. Plans to absorb underspent funds in the last 2 years of Program implementation have now been agreed upon by the Planning Committee and subject to approval by the Steering Committee in November 2014.

3.5 Coordination

A number of specialist and related international, regional and national agencies operate in the area of climate and oceans support. These include: WMO, NOAA (US) and NIWA (NZ) which operate in the Pacific Islands region. Regional organisations with a mandate in this area include SPREP and SOPAC. Particularly important entities associated include the SPREP, Pacific Meteorological Desk Partnership and the newly-formed Pacific Islands Climate Services Panel, which have a major role in coordination of activities in this sector from a regional perspective. Donor countries operating in this sector include Japan, Korea and Finland. Coordination among these agencies is important, both in order to capitalise on efficiencies and synergies and to reduce negative impacts of competition and complexity for Pacific Island countries.

There is general agreement among stakeholders that coordination in the climate services context is relatively good and COSPPac's Management team is commended for their efforts in stakeholder engagement. Given increasing numbers of donor agencies and programs, the situation is becoming more complex and coordination efforts will continue to be important. COSPPac is well aware of the broader context and tries hard to avoid duplication or creating parallel systems for NMSs. However, other stakeholders in the sector see evidence of competition between donor countries in software development which causes confusion in some countries. There are apparently different cultural perspectives within donor countries about the issue of access to data, with some countries preferring more open approaches, some preferring

privatization approaches and others setting up a range of barriers to open access. This diversity creates challenges for small Pacific Island countries.

COSPPac has considered ways to ensure that its work is consistent with the GFCS, which emerged in 2009 as the major global framework for enhancing climate services at national, regional and global levels. It has also sought to align program activities with PIMS, which is a strategic plan for enhancing meteorological systems and services. COSPPac's active participation in international and regional coordination efforts is commended.

Across the Tasman, there are many layers of communications between NIWA (New Zealand) and the Australian Bureau of Meteorology generally, based on a long history of cooperation. On COSPPac specifically, NIWA officials identified that regular communications had taken place and the products and data created under COSPPac were critical to their own work in the region. The relationship was described as 'not entirely satisfactory' for a number of reasons. First, NIWA officials usually initiated contact and were not routinely informed of relevant upcoming events. Second, NIWA were sometimes not informed about decisions which had direct impact for their own work. Third, NIWA perceived that there was little scope for NMSs to adjust Program activities in the field, once decisions had been made in Melbourne: for example about practical issues identified within discussions by NIWA and Pacific Island NMSs. Concerns were raised about the ways in which CliDE has been managed and the fact that funding for CliDE had come to an end. While COSPPac has not been directly responsible for CliDE to date, NIWA rightly noted that 'CliDE is such an essential component of the work we are jointly working on, it requires multi agency carriage and co-ordination.' The fact that consideration is being given to future funding for CliDE through COSPPac, suggests that multi-agency coordination on this issue is appropriate.

From an outside perspective, even though regular communications occur, there seems to be potential for overlap and competition between Australia and New Zealand in this sector. There is a difference between Australian and New Zealand approaches, resources are uneven and different frames of reference exist. Over time, long-standing arrangements have been affected by changes in Government policies and funding allocations. It is important that transparent communications take place between Australia and New Zealand organisations in this context to avoid negative implications of poor relationships for Pacific Island countries. COSPPac team members currently participate in NIWA's monthly climate discussions.

In the case of a new program in climate services funded by the Finnish Government, coordination efforts seem to have worked well. Successful negotiations between COSPPac and FINPAC, based at SPREP, resulted in a complementary/different focus for the latter. Earlier, it had appeared there were overlapping interests in strengthening the capacity of NMSs to provide weather and climate services in Pacific Island countries. The FINPAC project will now focus on information provision to rural communities, whereas the COSPPac Program will continue its focus on private and public sector stakeholders. There is still potential for overlap, contradictory

messages and confusion for NMSs, so ongoing coordination is required. This coordination would be assisted by locating a program-funded regional position in SPREP, if that is agreeable to all parties.

The centralized management arrangement under COSPPac did not exist during previous phases, so it is now easier for a central point to communicate with and maintain coherence in the relationships from an Australian Government perspective. Ongoing coordination at all levels (diplomatic, technical, organisational and in terms of software systems) is needed in order not to confuse and overwhelm NMSs in the region and create more work than benefits.

COSPPac personnel have participated in multiple regional activities in the climate and oceans sector in order to maintain coordination and minimise duplication. WMO, NOAA and NIWA officials keep abreast of COSPPac activities and vice versa. Alignment with WMO and PMC in the Pacific region is also critical. The dominance of Australia's Bureau of Meteorology in strategic and programming decision-making was raised as a concern by some stakeholders, reflecting the sheer size of Australia's inputs/resources relative to other organisations. However, the Program's strategic direction and work-plans are approved by the Steering Committee which comprises 11 NMS Directors, two regional organisation representatives and three Australian representatives.

Three limitations affect the ability of the COSPPac team to coordinate effectively:

- challenges associated with being located within and managed by the Bureau of Meteorology which are oriented to an Australian national agenda, rather than a Pacific Islands' agenda, and which distract the team from core Program tasks (as noted above)
- challenges associated with being located in Australia, rather than in the Pacific Islands region
- competition between countries and agencies in an increasingly crowded sector, given international interest in climate change.

In terms of coordination between COSPPac and the two major Pacific regional organisations, a number of issues arose during the IPR (see also Section 4.4 below). SPREP considers the work of COSPPac to complement its own work in this sector and commends the high level of coordination to date. The Deputy Director of SPREP described considerable increases in the organisation's capacity in the previous two years, particularly in terms of the agreed mandate and plans relating to meteorology services, reflected in PIMS, increased dedicated personnel in the Pacific Meteorological Desk Partnership, strong links with other donors and programs and access to new resources. He particularly noted new Centres focused on climate services to be funded by other donor Governments which will be based at SPREP: APEC Climate Prediction Centre (APCC) (funding from Government of Korea) and a Pacific Climate Change Centre (funding from Government of Japan). Both will include some similar elements as COSPPac in the areas of climate services and both will be located within SPREP. The new Pacific Climate Change Centre will be a major new entity and is likely to have a significant influence in this sector,

although details of its services are yet to be confirmed. By the time COSPPac is due to complete in mid-2016, the Centre is likely to be well established and coordination between Australia and other donors in this area will be increasingly important to ensure coherence.

Coordination with SOPAC has been a particular feature of the PSLM and CD&C projects of COSPPac, and is covered by an MOU. SOPAC hosts the COSPPac Regional Officer and also receives funds for the technical specialist services which support the regular tide gauge and GPS equipment maintenance and calibration cycle. Coordination seems to have been professional, efficient and effective.

Coordination with USP has been a fairly recent addition. USP's Pacific Centre for Environment and Sustainable Development (PACE-SD) has been endorsed by the WMO to take up a role as a regional training centre in climate and meteorology services and plans are well underway to bring in a new curriculum and other resources for this purpose. USP has not recently provided training in meteorology or technical aspects of climate and oceans services. By 2016, however, this centre, as part of a global WMO network, could provide a central source of and venue for customised technical training, particularly if funding is available for specialist personnel and course delivery.

Section 4.4 also below addresses coordination issues with Pacific regional organisations.

Within the COSPPac team, which includes those working in Adelaide at the Tidal Centre and for GA in Canberra, indications are that co-ordination was adequate and from some perspectives better than in previous phases of assistance, but still could be improved. Some Adelaide and Canberra based team members expressed the view that it was difficult to participate in overall Program management processes, given their distance, but the Bureau of Meteorology noted that they were able to express their concerns through their respective senior representatives.

3.6 Legacy

The IPR Team found that there is clear evidence of increased capacity (in the broad sense of the word) in NMSs and Lands and Survey Departments (LSDs) as well as other stakeholders, to produce and use climate and oceans information for priority development purposes and while it is early, there are signs of sustainability. This increased capacity is in part related to the work of COSPPac. NMSs are increasingly skilled and confident in the distribution and/or development of locally appropriate products for existing and emerging needs, but some countries are just beginning this process and others are at more mature stages. While the benefits and signs of outcomes related to climate and oceans information and communications to national stakeholders are clear, it is also evident that without ongoing support, many of the gains achieved would fairly quickly be lost.

As is evident from analysis above, in most settings, strengthened capacity is only just emerging and overall, the nature and extent of capacity varies widely across the region. Smaller or poorly resourced NMSs have little chance of sustaining the quality of services needed to generate reliable data for their governments and communities without ongoing support. Larger or better resourced NMSs seek ongoing technical advice and support to remain credible and keep up to date with new technology and increasingly sophisticated demands for information. In small countries, there is also significant staff movement so trained people are often lost.

There is clear demand from all NMSs for ongoing critical partnership-based support for this work given a wide range of contextual resource and technical issues. It is in Australia's interest to continue to work in partnership with Pacific Island countries on these issues, given shared experience of seasonal climate and ocean services and shared commitment to development in the region.

Dedicated efforts to strengthen the capacity of LSDs and other Government agencies which use and apply climate information is not a major focus of COSPPac although LSDs are included in the PSLM component and as participants in CD&C's training attachments on COSPPac products and services. The major focus on COSPPac is on the capacity of NMSs to engage effectively with these agencies. Representatives of LSDs and other agencies consulted for this review consistently expressed their valuing of the improved information available for them. For example in Samoa, the Electric Power Corporation in Samoa (a state owned enterprise), with its commitment to maximise the use of technology and innovation to provide reliable and affordable electricity, placed high value on the rainfall information provided in relation to its 5 station hydro electricity generation services. This information enables the services to plan for water releases and storage, to ensure reliable electricity supplies.

GA expressed disappointment that COSPPac has not sufficiently prioritised the work of LSDs, given its focus on NMSs. Previous phases of collaboration have given greater attention to the use and potential use of CGPS information for example. However, with coordination of COSPPac being within the Bureau of Meteorology and because of decisions made during the design process, they considered that this work was not prioritised. DFAT advised that the Steering Committee may be an appropriate avenue to raise this matter, as it is possible that there is flexibility for re-prioritisation if this is agreed by the Committee, however GA point out that the Steering Committee comprises NMS representatives who would be unlikely to prioritise funding to other offices.

In terms of long-term **sustainability** of COSPPac contributions, it is clear that some benefits could be sustained by NMSs themselves but many would not, if partnerships ceased and funding was withdrawn. Many Pacific Island NMSs do not and will not have the complete and reliable resources and capacity to develop climate products requiring high level IT resources and skills as well as detailed up-to-date climate knowledge and will continue to value technical support for this purpose in the long-term.

COSPPac is not a Program that sought to achieve a particular development ‘result’ by a fixed time, but rather it is a collaborative effort which requires partnership, specialist expertise and ongoing refinement in the shared space of climate and oceans information for a diverse range of organisations in the region. Climate and Ocean products would quickly become useless if they were not maintained and supported technically and in terms of training/data management. Pacific Island countries share a major concern about the significantly negative impact that withdrawing support for the products introduced under COSPPac and its predecessor projects would cause to them. It could be said there is an obligation for Australia to remain in the picture – the implications of ceasing assistance would cause significant backlash and undermine the efforts of decades in the region.

Future Australian specialist climate and oceans support is crucial given no other large country in the region has such extensive expertise, contextual knowledge and tools. As technology and science in this area are changing at a rapid rate, ongoing learning, technology and upgrading of knowledge are required.

To ensure Australia’s international obligations in relation to climate and oceans data and information sharing are met, continued engagement with and support with Pacific Island countries is essential.

4. Analysis of key issues

4.1 Program management

As noted above, the COSPPac Program Management Team has worked hard and with dedication and commitment, since the commencement of this phase of cooperation. The team has planned for and achieved a long and complex list of activities which have contributed towards overall outcomes, in partnership with Pacific Island and other stakeholders.

A number of Program management issues were identified during the IPR which influenced internal perceptions of effectiveness, although from the Pacific Islands’ perspective, the impact has been negligible.

Management systems and processes for high quality international aid delivery require specialist experience and approaches. While individuals working within the COSPPac team have generally understood and sought to build capacity in this area, their organizational context has not necessarily supported good practice. It may be worth considering that in future phases of support, the Bureau of Meteorology would best be used as a source of technical advice and expertise within partnership or sub-contracted arrangements, and that specialist Program Management services be contracted or organised through alternative sources.

On balance, the IPR Team considers that the COSPPac Program Management Unit has done an excellent job in implementing the Program to date, but for a number of reasons, including value for money considerations, the IPR recommends a gradual shifting of Program staff roles to a Pacific Island's location. An internationally agreed principle in aid effectiveness is that strengthening the capacity of local institutions is more effective than establishing parallel and unsustainable systems. Another principle is that collaborative partnerships, based on alignment with local plans, shared values, respect and trust, are more likely to contribute to sustained benefits.

The IPR Team acknowledges that despite these principles, many Pacific Island NMS Directors think Australian funding support, through any future Program, should not be managed in the region because of their perception that programs have not been well managed in the past. They remember that in previous programs, there have been negative experiences related to responsiveness, quality, transparency and sustainability. It is worth noting that an Independent Review of SPREP in 2014¹³ found that many of handling many of these issues had improved. For example the report found:

'Substantial improvements in performance are evident across all aspects of the Secretariat's operations. This includes more efficient delivery of increased services and other assistance to members, guided by scripts first ever Strategic Plan and the Annual Work Programs and budgets, and as documented by the new process of producing annual performance monitoring and evaluation reports. A majority of questionnaire respondents regionally, considered that SPREP is responding adequately to the prioritised needs of their country or territory.' (p iii)

NMS Directors are also aware of the lack of clarity about the relationships between 'competing' organisations in the sector and the lack of resources currently allocated for quality program management.

The IPR team considers that project management, coordination and reporting capacity should be considered when identifying roles for the future management of Australia's program in this sector. The IPR team also notes that discussions about transition issues have already commenced with SPREP, SOPAC, and PACE-SD at USP.

4.2 Extension of COMP to North Pacific Island Countries

NMSs in northern Pacific Island countries, including Republic of Marshall Islands (RMI), Palau and Federated States of Micronesia (FSM) were not explicitly included in the COMP and CD&C components of COSPPac from the outset, a decision taken by AusAID (now DFAT). The decision

¹³ http://www.sprep.org/attachments/Circulars/sprep_icr_final_report.pdf

was based on a perception that these countries received substantial assistance from US agencies. However, representatives from these countries have participated to varying levels in a range of other regional COSPPac activities to date (as well as in previous phases of cooperation). Support from previous phases of Australian programs included provision of tide gauges for RMI and FSM, and these continue to be calibrated as part of the SLMP. The NMS from RMI is currently included in the monthly on-line climate forum, however, their participation in other COMP activities has not been clearly defined. This has caused unnecessary uncertainty both for the Governance group and officials of those three NMSs. The IPR was asked to consider the costs and benefits to Australia of extending these activities to the North Pacific Island countries. However, in the May 2014 Steering Committee meeting, it was agreed that RMI, Palau and FSM would be included in some COMP and CD&C activities for the remaining period of COSPPac.

Each northern Pacific Island country has weather services, for which staff salaries are provided under current US Government arrangements, but this funding is due to phase out completely by 2023. Northern Pacific Island country NMSs also receive relatively minor support from NOAA in the form of participation in regional research and data sharing, but NOAA is strongly supportive of their inclusion in COSPPac, to generate greater regional coherence. Each of the northern Pacific Island NMSs is working towards sustainable national meteorological services, including through active cooperation in regional programs and organisations related to climate and oceans information and reporting.

US and NOAA funding does not extend to consistent support for seasonal forecasting services or ongoing contributions to capacity. RMI is particularly keen to be included in COMP and CD&C elements of COSPPac: its Director attends most COSPPac meetings and advocates for this support. There is a perception among a small number of NMSs that these three countries receive substantial assistance from US agencies and should not be receiving additional support from Australia at the expense of independent countries. However, assistance provided to these NMSs from the US is currently for staff costs only and even these funds are being progressively reduced as the end of funding looms. None of the services currently provided through COSPPac are available to the three NMSs from other sources.

The three northern Pacific Island countries' capacity to operate locally relevant services and to communicate with local stakeholders has to some extent been constrained because of their reliance on US headquartered services and lack of access to regionally relevant software. The systems and information available through COSPPac is considered by the three northern Pacific Island country NMSs to be critical to their effectiveness and particularly to their future sustainability as US funding is withdrawn. Given the shared climatic and oceanographic experiences of NMSs across the region, and the relevance of climate and oceans information from the whole region for all individual countries, there seem to be only benefits associated with their inclusion.

All stakeholders consulted during the IPR expressed support for the inclusion of the three NMSs in relevant activities undertaken by COSPPac in its remaining 2 years. According to plans, it was already planned that they would participate in PSLM component and CD&C activities. The COSPPac Program Manager noted that adding countries increases the scope, costs and complexity of the Program to some extent; there are management and human resource implications and; the quality of products could be compromised due to an increase in workload. The Review Team considers these implications can be managed within existing resources given that the expectations of the three NMSs are relatively low in terms of their participation. It was agreed at the Steering Committee in May 2014, that the COSPPac team will present a work plan and budget for consideration at the next Steering Committee meeting in relation to this issue.

4.3 Potential expansion of scope to include new science and products

The aid-funded Pacific Australia Climate Change Science and Adaptation Planning Program (PACCSAPP) and its predecessor projects (the Pacific Climate Change Science Program and the (PCCSP) Pacific Adaptation Strategy Assistance Program (PASAP)) produced a large body of new scientific data and information about climate change as well as tools, portals and products, much of which is relevant to the current and future work of Pacific Island NMSs. The IPR was asked to consider, in consultation with Pacific Island stakeholders, whether further work to develop applications, introduce products and deliver training should be undertaken under the management of COSPPac. It was asked to make recommendations on this issue and include a suggested process for re-prioritising current and proposed additional activities within the existing financial approval.

The COSPPac Planning Meeting and Steering Committee (April 2014) considered and approved plans for Program supported activities for the 2014-15 financial year in detail, during this IPR Process. The issue of which additional activities should be considered under COSPPac was discussed appropriately by this Committee. There was a shared agreement that any underspent funds from COSPPac should be allocated to ensuring CliDE was completed and sustained. Despite this clear agreement from NMS Directors, the issue of funding for and management of CliDE became substantially more complex after that time.

The IPR team found the issue to be challenging to address within the review process and endorses the steps taken to undertake a detailed review prior to determining next steps.

4.4 Roles of Pacific Regional Organisations

Two Pacific regional organisations have mandates in the climate and ocean services sector: SPREP and SOPAC Division of SPC (called SOPAC for ease of reference). Each has a different frame of reference, different emphasis and different set of skills, systems and relationships. The

distinction between the mandates of the two organisations is not clear to external audiences in relation to climate issues. This reflects the fact that the importance of climate change to the region post-dates the creation of each organisation. As a result of the lack of clarity, relationships between the two are complex: there is cooperation in some areas and there are challenges in others. There is a long history of officials and Governments trying to work out the different frames of reference and management approaches given the critical nature of climate for the region.

The mandate for SPREP is to *'promote cooperation in the South Pacific region and to provide assistance in order to protect and improve its environment and to ensure sustainable development for present and future generations'*. The mandate for SOPAC, is *'to contribute to sustainable development, reduce poverty and enhance resilience for the peoples of the Pacific by supporting the development of natural resources in particular non-living resources, investing natural systems and management of vulnerability through applied environmental geosciences, appropriate technologies, knowledge management, technical and policy advice human resource development and advocacy of Pacific issues.'*

Some officials talk of the different focus on 'living' resources (in SPREP) and 'non-living' resources (in SOPAC), but fundamentally, there is an overlap of mandates that the region itself needs to resolve. While resolution of the mandate issue is the responsibility of Pacific Island governments themselves, Australia should support efforts to bring about clarity and coherence as well as cost effective ways of achieving both. Until such time as clarity is achieved, coordination processes for programs such as COSPPac will continue to require ongoing subtle and respectful support for and navigation between existing organisations.

In practical terms, SPREP has the primary **coordination** mandate related to climate **policies and services**. The Secretariat for the PMC is hosted and located in SPREP in Apia. The PMC is considered as a specialized subsidiary body of the SPREP Meeting, which is the regional decision-making body of member countries. The Pacific Meteorological Desk Partnership (PMDP) assists the PMC and NMSs in securing resources to implement the Pacific Islands Meteorological Strategy 2012-2021 (PIMS). SPREP has expressed interest in expanding the functions of its PMDP. The PMDP would be a logical host for a COSPPac Regional Officer to ensure that COSPPac activities are aligned to other efforts to support NMSs as well as contribute to the overall PIMS priorities.

PMDP is expected to 'take responsibility for ensuring coordination at the regional level and for advocating and monitoring the Strategy' (PIMS p15). It is also expected to '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.' (p15). This raises the question of whether SPREP has the specialist technical capacity to deliver (as opposed to coordinate) a large-scale Program and provide the specialist inputs requested by NMSs, so in any future arrangement, the

Bureau of Meteorology's expertise is likely to be required – perhaps on a sub-contracted, on-tap partnership arrangement.

SPREP has a team of approximately ten staff focused on climate change, with a dedicated Meteorology and Climate Officer and a newly appointed specialist focused on Global (and Pacific Island) Ocean Observing Systems (GOOS). There are strong relationships between SPREP and international partners in this sector, with new funding currently being negotiated for a number of major new centres of direct relevance to the work addressed by COSPPac. In particular, SPREP has been in negotiations with the Government of Japan on the establishment of a Pacific Regional Climate Centre since 2012, the goal for which would be to facilitate support to Pacific Islands on climate matters, including science, negotiations, adaptation and mitigation (see Section 4.4 below).

SPREP has IT capacity which is currently focused on internal SPREP systems rather than providing technical or advisory support for partner countries. SPREP currently does not have the capacity to develop new information and data products that have been identified by NMSs as high priorities for their governments, industries and communities, but does act to coordinate the delivery of these services to NMSs. The FINPAC project, which is aligned with and coordinates closely with COSPPac, is managed by SPREP.

At present, the SOPAC Division of SPC has, among other things, the mandate to undertake **research and technical work** related to disaster risk reduction and to hold geospatial data for the Pacific Islands region including bathymetry, tidal, climate and oceans data. SOPAC has sophisticated IT capacity and a great deal of experience in supporting countries in this area as well as in using IT systems for regional research and programs. Among other things, SOPAC technical officers work alongside GA specialists on the maintenance and calibration of the 13 earth monitoring stations linked to the tide gauges, funded by COSPPac. SOPAC also hosts the COSPPac Regional Officer who is a member of the CD&C team and provides local knowledge and cultural advice. The position was earlier focused on communications when it commenced under the SPSLCMP project.

To support its highly technical mandate, SOPAC has extensive and specific expertise in relevant IT systems. It also has a dedicated and experienced team, partly funded by COSPPac, responsible for leveling tide and geodetic gauges in collaboration with Australian Tidal Centre specialists. SOPAC is a heavy user of COSPPac products for its work, including in water and sanitation, disaster risk reduction, oceanographic, hydrographic and other geo-scientific research programs. SOPAC has also worked closely with partners in this sector, including WMO.

Currently, COSPPac has good relationships with both SPREP and SOPAC. It works closely with SPREP and the PMC on coordination and policy level issues. The COSPPac Regional Officer position is based in SOPAC, as a liaison point between COSPPac and the region. This position has proved to be significant for maximising Program relevance, effectiveness and efficiency as well

as for communications within the region and the incumbent has been highly successful in this regard.

University of South Pacific (USP) is also an important Pacific regional organisation with a new and potentially significant role to play in the next two years in training for officials of NMSs and related agencies in meteorology and climate services. Current indications are that USP (through PACE-SD) will establish a Pacific Regional Training Centre as part of a global WMO network. Potentially, this Centre could provide not only qualifications for pre-service and in-service meteorology and climate specialists but also customised training in climate and oceans services. USP could thus provide a potential conduit for Australian support to regional NMSs in capacity development if deemed feasible.

Future coordination efforts will need to take into account several newly emerging Centres with potential for substantial overlap or complementary mandates with Australia's support:

- The new USP Regional Training Centre (auspiced by WMO, with some initial partnerships with USA)
- The new Pacific Climate Change Centre (funded by Government of Japan), to be based at SPREP will both link climate work with disaster risk reduction activities and potentially have data storage capacity relevant to NMSs as well as provide a means for other technical and IT support for NMSs
- The new Climate Prediction position, to be based at SPREP (funded by Government of Korea), will be based on existing Korean software that uses dynamical modeling, rather than statistical data¹⁴.

In summary, following discussions with a wide range of stakeholders, the IPR team considers that coordination in this sector is going to become more necessary and more complex than it currently is, in the next two years. Future strategic level regional coordination in climate services seems most likely to be located within SPREP in the medium to long term, with key responsibilities given to the PMDP and the PICSP. SOPAC is likely to remain critical for the scientific and technical aspects of meteorology and ocean services. USP is likely to become an increasingly relevant regional organisation in the provision of formal and customised training and education for Pacific Island NMSs and other relevant organisations. Australian assistance will need to take these different roles and responsibilities into account and consider how to best navigate and support relationships between the respective organisations to ensure its contributions are relevant and effective.

¹⁴ The Bureau of Meteorology has indicated that COSPPac is already undertaking training and delivery of dynamic model outputs through SCOPIC, and acknowledges the risk of duplication if COSPPac and APCC activities are not closely coordinated. Future coordination is considered appropriate.

For the purpose of maximizing strategic coordination and coherent communications, the IPR Team recommends that consideration be given to the creation of an additional COSPPac Regional Officer position in SPREP, as part of the transition planning process (see Recommendation 3). The IPR Team considered the option of moving the existing position from SOPAC to SPREP but concluded that strong and ongoing liaison is required with both organisations, so an additional position is recommended. The position at SPREP, if considered feasible, would focus on policy coordination, while the position at SOPAC would focus on ensuring effective working relationship between COSPPac and SOPAC's technical specialists particularly in relation to the PSLM component.

In terms of future Australian Government support in this sector, decisions about the next phase of funding should consider the following criteria:

1. Which arrangements enable Pacific Island NMSs to maximise joint leadership over decision-making on Program approaches and activities?
2. Which mix of regional organisations should be responsible for coordination, implementation and monitoring of climate and oceans support?
3. Which coordination arrangements maximise the chances of complementarity between Australian support and other donor-funded programs and partnerships?
4. Which arrangements will maximise the chances of consistency with outcomes included in PIMS, as well as national and global climate and oceans support agendas?

When considering the roles of regional organisations and national organisations (such as The Bureau of Meteorology, NIWA and NOAA), it is probably necessary to consider that different organisations can play different roles in supporting Australia's program of cooperation and a mix of organisations could be responsible for some roles. Depending on which future activities are prioritised for future funding, the following questions might be asked:

- Which regional organisation has been designated by Pacific Island leaders to play the strategic and coordination role in climate and ocean services?
 - This would help determine where Program management is based
- Which organisation has the relevant organisational structure and support systems (including HR, IT and financial management systems) to maximise quality delivery of activities funded by the Australian government?
 - This would help determine where Program implementation is based
- Which organisation has the relevant technical capacity to ensure the quality of scientific data collection, analysis and communications of information is assured?
 - This would help determine how to proceed with tide gauge maintenance and calibration in future
- Which organisation coordinates donor support for NMSs?

- This would help determine how coordination with other donors is best undertaken
- Which organisation has sufficient respect and trust from NMS Directors?
 - This would help determine whether Australian support should be provided through a regional organisation or remain an Australian organisational management responsibility.

When considering program management options, the following questions might be asked:

- Which program management mechanism offers the best quality of technical and capacity development services to suit NMSs?
- Which program management mechanism offers the most effective partnerships for maximizing quality services for the diversity of Pacific Island NMSs?
- Which program management mechanism offers the best value for money?

5. Conclusions

COSPPac has been implemented well to date and is delivering good results (see Table 2 below which summarises achievements). The Program is highly regarded by stakeholders, despite a few misgivings, and puts Australia in a positive light in the region and globally. Part of its success can be attributed to the substantial funding provided, but at the same time, there is a concern among stakeholders about costs of the Program. This is related to the fact that a disproportionately high proportion of funding is allocated to Australian public service personnel and Bureau of Meteorology fees. Another key element in the Program’s success is the fact that Pacific Island stakeholders are directly involved in strategic level planning and approving annual work-plans. The certainty generated by this engagement process has contributed to high levels of relevance and effectiveness.

Table 2: Summary of achievements against expected outcomes

Program objective	Achievements	Management consequences
To develop the capacity of Pacific Island scientists, decision-makers and planners to apply climate and ocean products to benefit adaptation responses.	There has been a clear contribution made by COSPPac to the capacity of Pacific Islanders and their organisations to use and apply information about climate and oceans.	Continued support for this specialist area of capacity is required for the foreseeable future, given the critical role of climate and oceans information for the economic viability of Pacific Island countries.
Expected outcomes		
1. Enhanced organisational capacity in NMSs relevant to climate and	Capacity of all NMSs has increased in relation to climate and ocean	Continued collaboration is necessary to sustain and enhance achievements, given dynamic and

ocean information service delivery	information service delivery.	specialist nature of issues and ongoing capacity issues for NMSs.
Maximised communications of climate and ocean information, services and products to regional organisations, governments, major sectors and island communities	Communications from NMSs to other stakeholders has begun to improve as skills, confidence and accessible information increase.	Coordinated contributions to enabling NMSs to build on progress to date are essential, to make the benefits useful for Pacific Island governments and communities.
Increased capacity of NMSs to understand climate processes, especially climate prediction, to use monitoring devices and predictive software to monitor and predict ocean and climate variability	NMSs report they have increased technical capacity and confidence to use devices and software.	Software maintenance is essential. Ongoing technical collaboration is required to support ongoing staff development, ensure data quality is maintained and maximise usefulness of data and communications about the data.
To sustain operations and maintenance of sea level monitoring stations, data systems and information services.	Sea level data has been collected and communicated to internationally acceptable standards. Pacific Islands have access to historical and current data.	Ongoing data collection and analysis is essential for Pacific Islands, Australia and global stakeholders. Expertise in Australia and lack of sufficient specialist capacity in Pacific countries, mean that this element should remain an Australian contribution.

While the IPR has raised a number of issues, it is not proposed that major changes take place that deviate from currently approved plans for the remaining two years, since the plans have been approved by the Steering Committee. However efforts to gradually shift resources, build skills and transfer delivery responsibilities from Melbourne to Pacific regional organisations, as has already commenced, should continue. This is consistent with an expectation that future assistance is more likely to be coordinated within the region rather than within an Australian organisation in future.

Program management issues raised during the IPR largely relate to internal processes within the Bureau of Meteorology, as there is a high degree of satisfaction among external stakeholders. Some NMSs consider the capacity development activities are not as well pitched as they could be and that the over-emphasis on regional training reduces optimum levels of relevance and pitch. This could be improved with reduced emphasis on intensive short-term, one-off

Melbourne-based training courses and increased emphasis on in-country customised learning processes.

5.1 Future support

It was agreed at the commencement of COSPPac that the Government of Australia will determine whether further support for NMSs remains a priority for the aid program towards the end of the current phase. At the mid-point, it is clear that there are significant benefits to Australia and Pacific Island countries in continuing a Program of technical and financial support for climate and oceans work in the region. This support, aimed to contribute to increased capacity, quality data and improved communications of climate and oceans information, as well as maintenance of essential long-term data collection processes, is essential for strengthening economic and social development processes and outcomes. It is also beneficial for Australia, in terms of understanding the influence of Pacific oceans and climate patterns on our own climate, supporting quality bilateral and Pacific Islands' regional relationships and helping both Australia and Pacific Island countries to meet international reporting obligations.

The *elements* of future support may need to vary from the current Program, depending on negotiated priorities and the focus of emerging new programs in the region, but continuity of most is likely, since they are already in line with the outcomes included in PIMS. Within this broad context, a few specific issues include:

- All IT based products provided in future should be suited to Pacific Islands capacity, use open-source software to minimise the issue of proprietary (for cost effectiveness and sustainability reasons), be supported by skilled technicians and should include ongoing training
- The Bureau of Meteorology's National Tidal Centre will continue to be needed for future data management and tide gauge calibration. Given that data is collected from a network of 28 gauges (14 in the Pacific Islands region and 14 in Australia) every three minutes, there is a need for sophisticated and large-scale systems that are beyond the capacity of Pacific organisations or countries in the foreseeable future
- Ongoing specialist technical inputs from GA and SOPAC are essential for CGPS observations and geodetic leveling, to ensure tide gauge information is accurate – this involves maintenance services and specialist technology that would not be feasible for Pacific regional organisations of individual countries to sustain, particularly in terms of achieving the scientific integrity required to meet global obligations about data quality

COSPPac's work is entirely focused on contributing to the relevance, effectiveness and efficiency of NMS efforts. Its work to enable NMSs to engage effectively with national stakeholders in public and private sectors as well as communities, is crucial for sustainable economic livelihoods in the Pacific Islands. COSPPac's approaches and activities for the remaining two years need to continue to ensure that support is relevant, well-targeted, efficient and effective. Pacific Island

NMSs wish to continue to have free access to CliDE and for it to be modified and updated through collaborative processes, recognising they have contributed their expertise and data to the software system, that its development has been intended for them as primary stakeholders. Such an approach is also required to enable NMSs to continue to provide quality climate and oceans services in their respective countries.

Partnerships between the Bureau of Meteorology and Pacific Island NMSs have been developed over decades. Even though there are a variety of options for the coordination of support services into the Pacific Islands region (each with strengths and limitations), the Bureau's expertise and resources are regarded as essential in any work of this nature. One Pacific Island NMS Director said 'we cannot update and host regional climate databases by ourselves: we need continuous updates and support for climate and ocean products, because of our location in a vast and complex environment. For example, what happens in one country nearby is likely to be relevant to our own climate soon, so we need to have regional information, which is beyond our national capacity.'

The area of climate and oceans data collection, analysis and communications is highly dynamic, with new products and technology continually being made available. Pacific Islands seek ongoing training to keep up with changes in ideas, tools and approaches to assist them. While many Pacific Islands have increasing IT capacity, partly as a result of previous phases of this Program, there is ongoing need for strengthening national programming capacity as well as product development.

The principle of working with existing local organisations rather than establishing unsustainable parallel or external structures is well-known in development practice. In this sector, Pacific organisations are now in a stronger position to coordinate climate and oceans services themselves than when COSPPac was designed in 2011. While there is still some uncertainty about the distinction in mandates between SPREP and SOPAC in the area of climate, it is clear that SPREP supports and plays the role of secretariat for the Pacific Meteorological Council and is responsible for coordinating implementation of the Pacific Islands Meteorological Strategy. It appears, at the time of this Review, that SPREP will be the focus of international support to the Pacific Islands in climate services and coordination of those services, that SOPAC has the mandate for oceans services and USP will have ongoing critical roles in technical and education/training aspects of this work.

5.2 Recommendations¹⁵

¹⁵ These recommendations were drafted by the IPR and revised following inputs from the Bureau of Meteorology, Department of Foreign Affairs and Trade and the Program's Steering Committee members at a meeting in November 2014.

1. Australian Government support for Pacific Island NMSs should continue beyond the current end of COSPPac in July 2016, to reflect ongoing shared national, regional and global interests, subject to budgetary considerations.
2. Prior to the design process commencing no later than July 2015¹⁶, discussions between senior officials from Australia and SPREP, SPC and USP should negotiate agreements about an agreed Pacific Islands location for the coordination and Program management of any future support.
3. Transition planning should be undertaken and a plan considered by the Steering Committee in May 2015 (as already agreed). Transition arrangements could include shifting a number of Program management and administration roles from the Bureau of Meteorology to SPREP and/or other regional organisations (particularly SPC and USP) over the remaining two years of the Program, if considered feasible within the existing budget. Consideration should include the recommendation of this IPR that an additional liaison position be located within SPREP.
4. The next phase of cooperation should be based on a comprehensive and consultative planning and design process, taking into account other donor supported programs and Centres, as well as issues emerging during the transition arrangements. Key stakeholders in the process should include the Bureau of Meteorology, Pacific Island NMSs and other relevant Pacific Island government agencies as well as regional organisations (SPREP, SPC and USP). Consultations with other development partners and stakeholders including NIWA, NOAA, WMO and the Governments of Japan, Finland and Korea will also be required.
5. Regardless of the agreed Program management location, future cooperation between Australia and the Pacific should consider funding and support for The Bureau of Meteorology to play an ongoing partnership role. This might include tasks such as provision of advice, implementation of selected activities or collaboration on joint activities.
6. Future support should continue to recognise the great diversity among NMSs and Pacific Island stakeholders, such as Land and Survey Divisions and ensure the availability of flexible funding to suit each country context to at least the level of current annual allocations (\$36,000). Future support should maximise country-specific engagement (e.g. in-country activities) and avoid 'one-size-fits-all' support and training.
7. In terms of specific issues for COSPPac until mid-2016, the following should be considered:

¹⁶ This will involve at least: development of TORs, selection, contracting and briefing of design team, preparations for and delivery of a major design workshop, process for consultations with other stakeholders, approving design and organizing transition arrangements.

- a. Support for extending communications skills among scientists (who have already benefited from previous COSPPac-funded communications training) so they can work more effectively and extensively with communities and public/private sector stakeholders
 - b. Strengthening of SCOPIC (Seasonal Climate Outlooks for Pacific Island Countries) to include dynamical model outputs such as POAMA (to complement statistical models) (while remaining aware that new Korean software using dynamical modeling may obviate the need for SCOPIC to do so).
8. In terms of specific issues for post-2016 support, the following should be considered:
- a. Use of Pacific Islands institution(s) for the coordination and delivery of ongoing training and education (including both formal and informal, pre and in-service customised training) rather than dependence on external trainers
 - b. Continued funding and engagement with GA and the National Tidal Centre for data collection, calibration and maintenance of essential equipment in Pacific Island locations
 - c. Increased responsibility within SOPAC for supporting the ongoing use of ocean focused software products as well as work with tidal gauges, land-based GNSS stations, surveys and calibration
 - d. Ongoing maintenance of CliDE Database, subject to detailed further review.