BARRIERS TO EFFECTIVE ADAPTATION AND RESILIENCE PLANNING IN THE PACIFIC: AN INFORMATION MANAGEMENT PERSPECTIVE With specific reference to Fiji, Tonga and Vanuatu

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EXECUTIVE SUMMARY

Climate change poses a major threat to the health and well-being of people and the sustainability of communities and their local and national economies. Along with other stressors, adapting to climate change impacts is an imperative in all sectors with major implications for, among other things, long term infrastructure planning, urban development and food security. In recognition of the increasing pressures from a rapidly changing climate, and the significant exposure and vulnerability faced by developing countries and Small Island Developing States (SIDS) in particular, Pacific Island Countries and Territories (PICTs) are working in collaboration with regional bodies and development partners to improve their capacity for adaptation and resilience planning and to be able to consider and implement appropriate adaptation options.

There is a growing appreciation in the Pacific of the important role played by climate change data and information management in effective adaptation and resilience planning, with a number of regional bodies and PICTs moving towards addressing this issue through policy. In support of this process, the Australian Government Department of Foreign Affairs and Trade (DFAT)-funded Pacific iCLIM project has worked with the Secretariat of the Pacific Regional Environment Programme (SPREP) and the Governments of Fiji, Tonga and Vanuatu to identify regional and national-level barriers to climate change data and information management in the Pacific. Based on a prior situation analysis carried out by the iCLIM project, barriers were identified and characterised as either:

- **Policy Barriers -** related to a lack of supportive government or institutional policy or strategy.
- Institutional Barriers related to a lack of institutional champions, key roles or partnerships.
- **Operational and Human Resource Barriers** related to a lack of documented or formalised processes being implemented to support solutions, as well as staff roles and skill sets to carry out operational activities.
- Information and Communication Technology Barriers related to a lack of appropriate einfrastructure and IT systems.

With continual growth in the development of new approaches and technology for managing, delivering and utilising data and information, PICTs have a real opportunity to seize emerging concepts and practices associated with best practice information management, open data and intellectual property rights and integrate them into adaptation and resilience planning. There are now several regional and national initiatives underway that are beginning to consider climate change information management, as well as parallel initiatives looking at regional guidance on ICT.

The current challenge for PICTs and regional bodies is to work together to ensure that systems, policies and procedures are in place to leverage current interest in climate change information management, as well as take advantage of emerging information management concepts and technologies. In particular, this report highlights the role that regional organisations can play in changing institutional cultures so that barriers to the successful management of climate change data and information can be successfully addressed.

In recognition of the above, the iCLIM project has worked in collaboration with both SPREP and PICTs to explore how regional bodies and PICTs could take the first steps in addressing some of the more systemic challenges to climate change information management in the Pacific. Based on the above-mentioned

barrier themes, the major recommendations of this report are outlined below (with country-specific summaries provided in Annexes 1-3 and possible tasks for responding to the recommendations in Annex 4).

Policy Recommendations

- 1. SPREP to investigate options for establishing a regional policy framework that can guide climate change and disaster risk reduction information management activities in the Pacific.
- 2. Governments of Fiji, Tonga and Vanuatu to investigate options for providing national policy guidance for best practice climate change and disaster risk reduction information management.

Institutional Recommendations

- 3. SPREP to investigate options for establishing a formal working group to coordinate and guide policy and practices for climate change data and information management in the Pacific.
- 4. SPREP and the Secretariat of the Pacific Community (SPC) to establish a formal agreement to guide their collaboration on the integration of climate change and disaster risk reduction data and information into climate change-related activities.
- 5. SPREP to work with climate change focal points in Fiji, Tonga and Vanuatu to promote a culture of climate change information sharing by raising national-level awareness of the benefits of climate change data and information sharing.

Operational and Human Resource Recommendations

- 1. SPREP to establish and host a Regional Coordinator position for climate change information management.
- 2. SPREP to work with Governments of Fiji, and Tonga and Vanuatu to identify and develop guidance material and resources to support national level sharing of climate change data and information.
- 3. Governments of Fiji, Tonga and Vanuatu to establish whole-of-government working groups to facilitate best practice national climate change data and information management.
- 4. SPREP to work with Governments of Fiji, Vanuatu and Tonga to identify options for funding a climate change information management officer in each country.

Information and Communications Technology Recommendations

- 1. SPREP to work with Governments of Fiji, Tonga and Vanuatu to investigate regional or cloud hosting options for national climate change portals.
- 2. Governments of Fiji, Tonga and Vanuatu to conduct whole-of-government stocktakes of climate change data and information, including the capture of adequate metadata descriptions.
- 3. SPREP to offer Governments of Fiji, Vanuatu and Tonga the option of upgrading their current national climate change portals to a standardised Drupal architecture package.

ACRONYMS AND ABBREVIATIONS

AusGOAL	Australian Government Open Access and Licensing Framework	
BOM	Australian Bureau of Meteorology	
CC	Climate Change	
CDKN	Climate Development Knowledge Network	
CMS	Content Management System	
COSSPac	Climate and Oceans Support Program in the Pacific	
CCCPIR	Coping with Climate Change in the Pacific Islands Region	
DFAT	Australian Department of Foreign Affairs and Trade	
DRR	Disaster Risk Reduction	
FAIDP	Framework for Action on ICT for Development in the Pacific	
FCCD	Fiji Climate Change Division	
FAO	Food and Agriculture Organization	
GEF	Global Environment Facility	
GOKH	Global Open Knowledge Hub	
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit	
GPFD	Government Partnerships for Development Program	
HFA	Hyogo Framework for Action	
JNAP	Joint National Action Plan	
MEIDECC	Tonga Ministry of Meteorology, Energy, Information, Disaster Management,	
	Environment, Climate Change & Communications	
MFAIC	Fiji Ministry of Foreign Affairs & International Cooperation	
M&E	Monitoring and Evaluation	
NAB PMU	Vanuatu National Advisory Board on on Climate Change and Disaster Risk	
	Reduction Project Management Unit	
NGO	Non-Government Organisation	
NIWA	National Institute of Water and Atmospheric Research, New Zealand	
PACCSAP	Pacific-Australia Climate Change Science and Adaptation Planning Program	
PARBICA	Pacific Regional Branch of the International Council on Archives	
РССР	Pacific Climate Change Portal	
PCCR KMWG	Pacific Climate Change Round Table Knowledge Management Working Group	
PCCSP	Pacific Climate Change Science Program	
PDN	Pacific Disaster Net	
PICs	Pacific Island Countries	
PICTs	Pacific Island Countries and Territories	
PIFS	Pacific Islands Forum Secretariat	
PIFACC	Pacific Islands Framework for Action on Climate Change	
PRISAP	Pacific Regional ICT Strategic Action Plan	
PRRP	Pacific Risk Resilience Program	
RTSM	Regional Technical Support Mechanism	



Secretariat of the Pacific Communities
Applied GeoScience and Technology Division, Secretariat of the Pacific
Community
Strategy for Disaster and Climate Resilient Development in the Pacific
Secretariat of the Pacific Regional Environment Program
Small Island Developing States
Tonga Climate Change Department
Third National Communication to the United Nations Framework Convention
on Climate Change
United Nations Development Program
United Nations Environment Program
United Nations Framework Convention on Climate Change
United Nations International Strategy for Disaster Reduction
United Nations Office for the Coordination of Humanitarian Affairs
University of South Pacific
Vanuatu Meteorology and Geohazards Department
Voice Over Internet Protocol

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1. INTRODUCTION

As a global issue, climate change poses a significant threat to the long-term sustainability of human societies throughout the world. It is now widely accepted that the early impacts of climate change will be felt first and most severely by developing countries.

For Pacific Island Countries and Territories (PICTS), climate change is expected to exacerbate existing developmental challenges and expose already vulnerable people to more frequent and severe extreme environmental and weather events. In particular, climate change threatens to disrupt current living conditions in the Pacific region, with key livelihood factors such as safe infrastructure, food security, health and access to economic opportunity all likely to experience negative impacts.

In response to this threat, the past decade has seen PICTs working in collaboration with regional organizations, donors and NGOs to fund the development and implementation of numerous climate change adaptation and resilience projects in the Pacific. With investment in adaptation and resilience planning set to continue through large-scale initiatives such as the Green Climate Fund (GCF), the Pacific is beginning to face a number of issues around how to effectively manage the large volume of climate change-related data and information being developed.

Adaptation and resilience planning and decision-making requires access to a wide and deep range of data and information types including seasonal forecasts of weather conditions and extreme weather events such as cyclones, long term future climate, potential sea level rise and associated coastal flooding, information about vulnerabilities and risks in different sectors, and information about adaptation options and the results of long term monitoring of adaptation responses. We use the term 'climate change data and information' here to encompass this richer understanding.

To ensure that the maximum benefit is extracted from past, current and future adaptation and resilience projects in the Pacific, fundamental changes in the way climate change data and information are managed is required. It is anticipated that with the right approach and support, PICTs will be able to more easily discover, access and utilize quality climate change data and information. This will significantly enhance the quality and implementation of adaptation and resilience plans.

Although a number of existing initiatives in the Pacific are already touching on the issue of climate change data and information management, few of these have fully addressed traditional catalysts for and potential barriers to change such as policy requirements, institutional arrangements, and capacity needs.

1.1. Pacific iCLIM Project

The Pacific iCLIM Project has been funded by the Australian Department of Foreign Affairs and Trade (DFAT) through the Government Partnerships for Development (GPFD) program, to support the regional management of climate change information in the Pacific. The project is being implemented by Griffith University in collaboration with the Secretariat of the Pacific Regional Environment Programme (SPREP) and the Governments of Fiji, Tonga and Vanuatu.

The aim of the Pacific iCLIM project is to support SPREP to develop and implement a regional approach to climate change data and information management for the Pacific, with a specific focus on:

- 1. Building capacity and technology for effective climate change information management;
- 2. Developing tools that help complex data to be utilised for climate change decisionmaking; and
- 3. Ensuring a regional approach to climate change data and information management in the Pacific.

The Pacific iCLIM project is built on the rationale that effective climate change data and information management enhances the ability of decision makers, researchers and practitioners to develop and implement quality climate change resilience and adaptation plans. The goal of the project is therefore to enhance the ability of climate change resilience and adaptation planning in the Pacific, by supporting the discovery, accessibility and utilization of quality climate change data and information.

1.2. Barriers Assessment Overview

A key task for the Pacific iCLIM project is to identify barriers to the effective management of climate change data and information in the Pacific.

The first step of this process was a situation analysis, which involved collecting detailed information about current climate change information management practices in the three Pacific Island Countries (PICs). This was carried out during the second half of 2014, initially via a questionnaire to participating PICs and then through a follow-up workshop attended by representatives of relevant ministries and government departments from each country, along with the Knowledge Manager from SPREP.

Staff from following government departments participated in the questionnaire and workshops:

Fiji: Climate Change Division (FCCD), Ministry of Foreign Affairs and International Cooperation (MFAIC)

Tonga: Climate Change Division (TCCD), Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change & Communications (MEIDECC)

Vanuatu: Project Management Unit, National Advisory Board on Climate Change and Disaster Risk Reduction (NAB PMU), Vanuatu Meteorology and Geohazards Department (VMGD), Ministry of Climate Change and Natural Hazards

The situation analysis provided detailed information on existing policy frameworks, information management and information technology practices, national climate change portal management, barriers to good information management, and opportunities for improvement.

Based on analysis of the findings, barriers to effective climate change data and information management in the Pacific were identified and categorised as follows:

- **Policy Barriers** related to a lack of supportive government or institutional policy or strategy.
- Institutional Barriers related to a lack of institutional champions, key roles or partnerships.
- **Operational and Human Resource Barriers** related to a lack of documented or formalised processes being implemented to support solutions, as well as staff roles and skill sets to carry out operational activities.
- Information and Communication Technology Barriers related to a lack of appropriate e-infrastructure and IT systems.

Identified barriers to effective information management were then workshopped with a larger group of national and regional representatives in early 2015, forming the basis of this report.

1.3. Report Purpose

This report summarises current climate change-related information management practices in the Pacific, with specific focus on Fiji, Tonga and Vanuatu. Based on current practices, this report identifies key barriers to the effective management of climate change data and information at both the regional and national levels, and recommends how these can be addressed. In addition, the report highlights ways in which Pacific regional organisations are working to support climate change information management, and the barriers they themselves face and need to overcome.

The purpose of this report is to raise awareness of key issues in the Pacific that inhibit the inclusion of existing, best-practice climate change data and information in adaptation and resilience planning. The report aims to provide guidance on how both regional organisations

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and national governments in the Pacific can ensure they are implementing all the key components of a framework for managing and delivering climate change data and information.

In addition to the recommendations made by this report, a country-specific summary is provided for Fiji, Tonga and Vanuatu (Annexes 1-3), as well as a list of possible tasks for responding to the recommendations (Annex 4).

2. KEY CONCEPTS

The need for long-term, accessible, reliable and up-to-date information to support decisionmaking for climate change risk analysis, mitigation and adaptation has been stressed by a number of studies in the last 5 years (see e.g., Productivity Commission[1], UNISDR[2], SPREP[3], World Bank[4]). Reliable and up-to-date information can be seen as the bedrock upon which all climate change risk analysis, knowledge synthesis, tailoring, communicating, planning and decision-making should be based. Information relevant to climate change therefore needs to be treated as a valued asset, and should be stored, managed, protected and exploited in a manner that reflects its value[5].

Pacific Island Countries and Territories (PICTs) are particularly vulnerable to both climate change and natural disasters. Most PICTs are located in regions that experience tropical cyclones and (ENSO-linked) droughts; many are also vulnerable to non-climate related hazards including earthquakes, tsunamis, and volcanic activity[6]. SPREP, in a recent report on mainstreaming climate change, recommended that Pacific Island countries incorporate climate risk considerations into every aspect of the policy and project development process, and pointed out that "this requires a national systems approach where decision-makers can access data and information maintained by different agencies to make informed decisions" [3].

As the regional body responsible for climate change data and information management in the Pacific, SPREP is working to coordinate a regional approach to climate change data and information management. Throughout this process, there is recognition that ongoing efforts are required to improve the institutional capacity and technical solutions needed for effective climate change information management in the Pacific.

A key component of ensuring effective climate change data and information management in the Pacific is awareness of the key concepts that underpin good practice. This section summarises these concepts, in order to clarify both the processes and subsequent benefits associated with good data and information management.

2.1. Information Management

The iCLIM project defines information management as "the way in which an organisation plans, identifies, creates, receives, collects, organises, governs, secures, uses, controls, disseminates, exchanges, maintains, preserves and disposes of its information " [7].

Figure 1 outlines a typical information life cycle. Understanding this lifecycle is significant because it highlights that effective information management has a number of very tangible steps, while also having clear start and end points. The end point of the information lifecycle holds particular importance because it emphasises that information is managed for a

purpose, and when demand for this information reduces (such as without-dated information), options of archiving or in some cases disposal need to be considered. This demand focus reinforces that the aim of information management is to ensure that the right information is available to users, when and how they want it.



Figure 1: The Information lifecycle and key stages from creation to disposal

2.1.1. Guiding Principles

From a data and information management perspective, the effective management of climate change data and information requires that the following principles be upheld:

- Secure and sustainable storage Providing stakeholders with the capability to identify priority data and information and store them on stable infrastructure that will be available over the long-term.
- **Connectivity** Improving the capability of stakeholders to discover data and information through greater connectivity among information portals.
- **Discoverability** Ensuring that connected data and information is clearly described with standard metadata, making it more widely discoverable.
- **Reusability** Ensuring that baseline data, data produced from tools and information from studies and reports are formatted and described in a way that makes them reusable.

Extending on the above principles, information management practices tend to be more effective when data and information is:

- Recognised as a valuable asset.
- Securely stored.
- Easy to discover.
- Easy to use.
- Shared to the maximum extent.

However, it is important to note that the ability to carry out good information management practices is heavily dependent on a few key enabling requirements, such as:

- The inclusion of information objectives in policy and strategic plans.
- Adequate resourcing (staff and infrastructure) for implementing best practice.
- Strong leadership at the executive level.
- Guidance on best practice from information management specialists.

2.1.2. Implementing Best Practice

As highlighted in **Figure 2**, information management encompasses more than information itself. To be successful, it must also address all the systems and processes within an organisation that underpin the creation and use of information, such as people, processes, content and technology.

Figure 2: Key elements of good information management





Figure 3 ties together all the above-mentioned aspects of information management and details the inputs, outputs and outcomes that are required for best practice information management. It highlights that the critical inputs of people, process and technology must be underpinned by strategic planning and strong leadership. Only when all the inputs are successfully in place can the desired outputs of good information management be achieved.



Figure 3: Inputs, outputs and outcomes of best practice information management

2.1.3. Benefits of Good Information Management

Good information management practices enable organisations to control and administer information assets in a secure, efficient and accountable manner, and help ensure that the value of information is identified and exploited to its fullest extent.

When carried out effectively, good information management can:

- Enable evidence-based policy and decision making.
- Reduce staff time and effort required to locate and access relevant information.
- Avoid the need to continually re-create corporate knowledge.
- Protect the government's interests.
- Protect the community's interests.
- Create opportunities for innovation through the use and reuse of data.

2.2. Open Data

Open data can be defined as data that can be freely used, reused and redistributed by anyone [8]. To be fully open, data must be:

- Technically open: released in ways that allow any device or software to read it.
- Legally open: released under an open license that permits redistribution and reuse (see section 2.3 on copyright and open licensing).
- Accessible: available at a public internet address[4].

Open data is seen as a way of encouraging new and innovative uses of existing data. For example, topography data from one ministry could be combined with meteorological forecasts and river gauge data to build flood models to predict flood damage from future events. Open data can also help governments answer complex questions, such as 'Where should a government invest in retrofitting municipal structures?' and 'Which schools, hospitals, and municipal buildings are most exposed to the hazards that are most likely to impact the region?'

Open data has a range of implications for governments, particularly when data and information has previously been closed. Most of these centre around issues such as access, privacy, standards, metadata and stewardship [4]. Key questions associated with these issues are summarised below:

- Access who can view the data? Do some data need to be kept private for security reasons? Do licences or other terms of use need to be applied to data to tell people exactly what they can do with it?
- **Privacy** do the data reveal information about citizens that needs to be kept private? How can the data be released in ways that protect citizen privacy?
- **Standards** what is the national standard for certain data types? Do ministries use formats that are compatible with each other? If there are problems with standards and data translation, what is the standard that the nation will follow?
- **Metadata** how can users find the data they need? Metadata provides a common language to describe the data. In this way, experts in various specialties can define their vocabularies and enable others to find the data that they need.
- **Stewardship** who will be a steward of the data and ensure its quality and relevance? Data curators or information managers will be needed to manage, describe and refresh data collections.

An overarching open data framework can address these types of issues and provide guidance to governments and organisations embarking on the open data pathway. In Australia, for example, the Australian Governments Open Access and Licensing Framework (AUSGOAL) provides support to government departments and other sectors to enable open access to publicly funded information.

2.3. Copyright and Licensing

Copyright laws govern the use of information once it has been created. Under the global copyright regime, copyright automatically exists in all original works (which can be scientific, literary, musical, etc., and may include datasets) without any need for registration. Once an original work has been written down or recorded in some way, only the copyright holder of the work (usually the creator, but sometimes the publisher) has the right to reproduce or reuse the work. This continues for the life of the creator, plus 50 or 70 years depending on the country [9]. Copyright laws therefore mean that legally, other people or organisations can only reuse original works in limited ways, unless they get written permission from the copyright holder.

The Creative Commons licences are a set of standard licences that have been developed to enable a copyright holder to grant people or organisations extra permissions to reproduce or reuse their work. Use of a Creative Commons licence signifies that copyright is **not** being claimed in relation to a particular work, or being claimed only in certain conditions. For example, one type of Creative Commons licence allows others to use a work as long as the author is attributed, and another type allows the work to be used freely for non-commercial purposes. Other examples of licences are on the <u>Creative Commons</u> website creativecommons.org/licenses/.

The Creative Commons approach allows more flexibility than traditional copyright, and may offer the following practical benefits to the Pacific region [9]:

- Promoting universal access to research and education and full participation in culture that is currently being inhibited by copyright laws.
- Making public data and information more open to citizens and telling the public exactly what they can or can't do with information.
- Promoting the sharing and diffusion of donor data and information for the benefit of the region, while still protecting intellectual property rights.
- Less government time and money spent on administering and enforcing state-based copyright regimes.

Some development partners and agencies are moving towards the use of open licences, for example the World Bank has incorporated the Creative Commons Licence "CC BY" into its Open Access Policy and as a default for Bank-produced research and knowledge products via its Open Knowledge Repository. In addition, some United Nations materials (particularly educational resources) are now licensed with Creative Commons licences [10].

3. CURRENT INFORMATION MANAGEMENT ACTIVITIES

3.1. Regional Level

The Pacific is currently undergoing a transition towards joint action on climate change and disaster risk reduction (DRR), which is being carried out in parallel with a shift towards managing, sharing and delivering data and information at both regional and national levels. Regional organisations are taking a leadership role by supporting a range of information portals, partnerships and collaborative activities throughout the region. In particular, the Pacific Climate Change Portal (developed by SPREP and launched in 2009) acts as a regional hub for climate change information and knowledge sharing, and brings key regional organisations together in an advisory role.

Host	Information Source	Information Type
SPREP (Climate Change Division)	Pacific Climate Change Portal (PCCP) www.pacificclimatechange.net	Climate change related documents and resources, projects database, donor directory, details on the RTSM, events calendar, and a glossary of terms. Also provides access to the Pacific Environmental Information Network.
SPREP	Pacific Environment Information Network (PEIN) https://www.sprep.org/virtual-library	A collection of materials located in the SPREP Library & Information Resource Centre, plus digital documents drawn from a network of environment libraries throughout the Pacific.
SPC (Economic Development Division)	Pacific Regional Data Repository Prdrse4all.spc.int	National and regional energy data and project information, plus related publications.
SPC	Pacific DisasterNet www.pacificdisaster.net	Disaster risk management information resource for the Pacific. Provides documents, events, contacts, forum, training and tools.
SPC (Land Resources Division)	Maintains a number of information resources and knowledge sharing networks for agriculture, farming and forestry www.spc.int/lrd/	Statistics, publications, knowledge sharing
SPC (Statistics for Development Division)	PRISM – (including PopGIS 2.0 interactive mapping application) www.spc.int/prism	Statistics of the Pacific Island Countries and Territories
SOPAC/SPC	PacGeo www.pacgeo.org	Geophysical, geodetic and marine spatial data
SOPAC/SPC	GEONETWORK geonetwork.sopac.org/geonetwork/	Interactive maps, GIS datasets, satellite imagery related to oceans and islands
Australian	Pacific Climate Change Science	Publications, tools, and educational resources

Table 1: Selected regional and international organisations providing climate change-related information in the Pacific region

Government	www.pacificclimatechangescience.org	developed under the Australian Government's PCCSP and PACCSAP programs
Australian Bureau of Meteorology	COSPPac www.bom.gov.au/pacific/	"One stop shop" for Pacific Island weather and climate data; country homepages for 14 Pacific Island Countries.

Table 2 provides some select examples of climate change and DRR information services being provided in the Pacific and highlights that the landscape of climate change data and information services in the Pacific is already becoming highly populated. For instance, there are a number of key regional organisations operating in the Pacific region (most notably SPREP and SPC), that host either a climate change or DRR related data and information website, repository or portal. In addition, there are numerous inter-governmental organisations (e.g., UNOCHA, UNISDR, UNEP, UNDP, World Bank, FAO), NGOs and Pacific neighbours (e.g., BOM in Australia, NIWA in New Zealand) which provide web-based knowledge banks and data repositories.

3.1.1. Key Programs and Initiatives

In addition to the Pacific iCLIM project there are a range of key initiatives in the Pacific focusing on a variety of aspects of climate change data and information. These are summarised as follows:

- Coping with Climate Change in the Pacific Islands Region (CCCPIR) -- a German Federal Enterprise for International Cooperation (GIZ) funded project that focuses on enhancing the skills and capabilities of local populations in the Pacific, national governmental authorities and regional organisations to cope with the effects of climate change and combat its causes. A key aspect of this project supports regional and national-level coordination of climate change knowledge and information.
- **Global Open Knowledge Hub (GOKH)** Implemented by the University of Sussex, this project aims to improve the supply and accessibility of data and information that can be used for policy, decision-making and practice by development actors. SPREP recently joined the GOKH partnership and will work with them to develop metadata standards for sharing data and information with other GOKH participants.
- Pacific-Australia Climate Change Science and Adaptation Planning (PACCSAP) an Australian Government funded initiative that focuses on helping communities across the Pacific region better understand and respond to climate change impacts by; (i) improving scientific understanding of climate change; (ii) increasing awareness of climate science, impacts and adaptation options; and (iii) supporting better adaptation planning.

• Climate and Oceans Support Program in the Pacific (COSPPac) - an Australian Government project that supports the continued development of seasonal prediction capacity in Pacific Island National Meteorological Services (NMS), and includes the development of new ocean climate products and services. Although COSPPac focuses more specifically on shorter-term climate forecasting rather than longer-term climate change, the data and information developed by COSPPac are an important complement to projections of longer-term climate change.

3.1.2. Key Collaborations

There are existing collaborations on climate change data and information management in the Pacific, most of which are carried out via the Pacific Climate Change Portal (PCCP) Advisory Committee and Technical Sub-committee meetings. These meetings have been held quarterly since 2012, and include representatives from PIFS, SPC, USP, SPREP and individual PICTs.

As a result of the PCCP partnership and in preparation for the joint Strategy for Disaster and Climate Resilient Development in the Pacific (SRDP, currently in draft), a number of significant activities have been completed which will enable greater sharing of climate change data and information in the Pacific, and reduce duplication of effort by providing recommended specifications and strategies which can be used as a basis for new portal developments and upgrades. These are:

- Improvement and 'harmonisation' of metadata profiles and standards to be used for the PCCP, PDN and national portals of Fiji, Tonga and Vanuatu (to be adopted as part of the PCCP and national portal upgrade process).
- Creation of a controlled vocabulary of climate change and disaster risk management topics which will be used to categorise content as it is added to the PCCP, and which can be adopted by national portals.
- Creation of a glossary of climate change and DRR terms which will be available on the PCCP and will be used as a source of keywords for 'tagging' Portal content as it is added.
- Development (in consultation with GIZ's Climate Change and Education Officer) of a metadata profile and associated vocabularies specifically for educational resources, to enable improved search functionality and user interface options for educational materials on the PCCP and national portals.
- Development of a federated search facility (using SOLR indexing) which allows users to search a number of climate change portals simultaneously from within the PCCP, and is a flexible solution that can be adopted by other portals and repositories to link disparate information sources.
- Hosting of the PCCP mirror site with USP in Fiji, with the possibility of hosting the mirrors or backups of the national CC portals.

In addition to the PCCP, there are a number of knowledge sharing networks, (both virtual and physical) which are currently functioning in the Pacific Region, such as:

- Climate Development Knowledge Network (CDKN) and its Climate Knowledge Brokers group.
- Pacific Climate Change Roundtable Knowledge Management Working Group (PCCR KMWG).
- Pacific Solution Exchange Climate Change and Development Community.
- Pacific Regional Branch of the International Council on Archives (PARBICA) online discussion group.

3.2. National Level

Each of the three government departments participating in the Pacific iCLIM project manages a web portal for the provision of climate change-related data and information. These portals were established between 2012 and 2014 with support from the GIZ Coping with Climate Change in the Pacific Islands Region Program (CCCPIR). The context surrounding each country's climate change portal is summarised below.

3.2.1. **Fiji**

The Fiji Climate Change Division (FCCD) is based in the Ministry of Foreign Affairs and is the responsible national agency for addressing climate change issues. The FCCD works in collaboration with government agencies, statutory bodies and development partners on climate change issues. The FCCD manages the Fiji Climate Change Portal (established 2013), which aims to:

- Provide a "one-stop shop" for all climate change activities in Fiji as indicated by the National Climate Change Policy.
- Improve the collection and dissemination of climate change information in the country for informed decision making.
- Enable climate change information holders to share information.
- Contribute towards obtaining financial support for climate change activities in Fiji.

3.2.2. **Tonga**

The Tonga Climate Change Department (TCCD) coordinates climate change information management and provision in the Kingdom of Tonga. Located within the Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change & Communications (MEIDECC), the TCCD's mandate is to ensure the protection and proper management of the environment and the promotion of sustainable development. The TCCD is responsible for the Tonga Environment and Climate Change (ECC) Portal (established 2014). The core aim of the ECC Portal is to ensure that environment, climate change and disaster risk management information is readily accessible to stakeholders in a coordinated and accessible manner.

3.2.3. Vanuatu

In 2012 Vanuatu established a national advisory board (NAB) for the joint governance of climate change and disaster risk reduction. The NAB is managed by the Climate Change/Disaster Risk Reduction Project Management Unit (CC/DRR PMU), which sits within the Vanuatu Meteorology and Geohazards Department (VMGD). As Vanuatu's overarching policymaking and advisory body for all disaster risk reduction and climate change programs, projects, initiatives and activities, the NAB serves as an effective forum for information sharing among relevant ministries, departments and sectors.

The NAB PMU manages The NAB Portal (established 2012), which aims to:

- Provide a centralised site for CC/DRR information sharing, collaboration, advice, communication and outreach.
- Provide a database of all current and past CC/DRR programs, projects and activities undertaken in Vanuatu.
- Provide an up-to-date contact list of nationally available technical experts and international consultants relevant to CC/DRR programs.
- Capture traditional knowledge for incorporation into planning activities.

4. POLICY BARRIERS

Agencies collecting and managing climate change-related data and information face the challenge of working across governance, administrative, geographic and disciplinary boundaries. To overcome these challenges, agencies need explicit mandates to assist them to initiate, implement and support climate change information management activities.

High level policies and strategies can provide the necessary mandates, direction and frameworks for the development and implementation of information management plans, partnerships, projects and procedures both within and across agencies and jurisdictions. This section identifies key policy barriers and outlines the current policy environment at regional and national levels.

4.1. Key Barriers

At the regional level, key policy barriers to effective climate change information management include:

- Lack of regional information management policy framework to guide, inform and influence the development and implementation of information management policies and plans in the Pacific at both the regional and national level.
- Lack of agreements and guidelines on data and information sharing within the region, particularly with regards to issues of ownership, copyright and licensing, access to traditional knowledge, and concerns around commercial information reuse.

At the national level, key policy barriers to effective climate change information management include:

- Lack of whole-of-government policies or strategies outlining a vision for how information should be managed and shared within and between government institutions, and externally (with non-government agencies and wider public).
- Lack of clarity around national stance on 'open data' concepts, in particular the use of open licenses to maximise the sharing and reuse of government information for public purposes.

4.2 Regional Context

There are a number of Pacific regional policies and plans that reference and highlight the importance of access to data and information. Table 3 lists key regional plans and policies which relate broadly or specifically to climate change/DRM information management. With the exception of the draft Pacific Regional ICT Strategic Action Plan (PRISAP) 2015-2020, none of the policies summarised in Table 3 actually provide a framework or guidance on how to design and implement information management policies. However, it is important to note

that PRISAP 2015-2020 is not expected to address information management issues that relate specifically to climate change, leaving this as an outstanding issue in the region.

Table 2: Key Pacific Regional Plans and Polices Related to Climate Change/DRM Information	ı
Management	

Plan/Policy		Summary
	SPREP Strategic Plan 2011- 2015	Aims to gather, store, provide access to, and analyse regional environmental data and information.
	SPC Climate Change Engagement Strategy 2011-2015	Aims to assist PICTs through identification of risks and provision of relevant climate change knowledge, technical assistance and resources to enable informed policy and operational decisions.
R E G	Pacific Islands Framework for Action on Climate Change (PIFACC) 2006-15	Recommended the establishment of a Regional Clearing House on Climate Change Information and the promotion of improvements in telecommunications capacity across the region.
O N A L	Hyogo Framework for Action (HFA) 2005-2015	Priority Action 3: Use knowledge, innovation and education to build a culture of safety and resilience. Recommends the collection, compilation and dissemination of relevant knowledge and information on hazards, vulnerabilities and capacities.
	Draft Strategy for Disaster and Climate Resilient Development in the Pacific (SRDP)	Integrates climate change adaptation and disaster risk management into one strategic approach. Highlights the importance of collection and dissemination of information and knowledge for decision-making at all levels.
	Framework for Pacific Regionalism (endorsed 2014)	PIFS master strategy for strengthening cooperation and integration between the states and territories of the Pacific region. Recommends regional coordination to achieve open consultation and access to information; and coordinated application of shared, best- practice norms and standards.
	Framework for Action on ICT for Development in the Pacific 2010 (FAIDP)	Outlines seven themes for action aimed at effectively utilising ICT for sustainable development, governance, and improving the livelihood of Pacific communities Recommends the pooling of resources and expertise and a 'whole-of- sector' approach, based on the concept of 'many partners, one team'
	Draft Pacific Regional ICT Strategic Action Plan (PRISAP) 2015-2020	Describes the critical activities that promote open consultation and access to information and the coordinated application of shared, best practice norms and standards

4.3. National Context

The Governments of Fiji, Tonga and Vanuatu have a range of policy and strategy documents that indicate national-level recognition of the importance of information management in adaptation and resilience planning. Table 4 below presents a summary of key national plans and policies related to climate change data and information management or sharing in Fiji, Tonga and Vanuatu.

Collectively, the documents summarised in Table 4 highlight that there is both national- level understanding of the importance of good data and information management and a commitment to ensuring that good data and information management enhances adaptation and resilience planning. Each country has policies or plans that acknowledge the need to increase the level of information sharing, both between government departments and with the broader public, for the purposes of increased government transparency and to better serve adaptation and resilience decision makers.

However none of the countries has a generic, whole-of-government information management strategy or framework to provide direction for the development and implementation of information management activities, and none of the existing policies cover issues that arise once government information is made more open such as copyright, licensing, privacy, ethics, security and custodianship.

Table 3: Key Plans and Polices Related to Information Management, ICT and Climate Change
Adaptation/Disaster Risk Management in Fiji, Tonga and Vanuatu

Plan/Policy		Summary
F I J I	National Climate Change Policy (NCCP) 2012	 Data collection, storage and sharing strategies are specifically outlined in NCCP Policy Objective 2. Strategies include: establish clearing house mechanism within CCD for climate change data and information to foster data accuracy and efficient information sharing establish collaboration with relevant sectors and regional and international agencies on the collection and sharing of climate change-related data ensure data management is aligned with international best practice standards collaborate with relevant regional and international research and academic institutions encourage and promote robust research to provide sound climate change-related data.
	Roadmap for Democracy and Sustainable Socio-Economic Development (RDSSED) 2010- 2014	Recognises need to increase access to government information for the public in all areas of life, including climate change and disaster risk management information. Provides framework for Information Technology & Computing (ITC) Services commitment to using ICT as a tool to make government services more accessible to communities.
	Green Growth Framework for Fiji (2014)	Recognises the importance of timely information generation and dissemination for informed decision-making, and the need to establish an efficient system for collecting and disseminating market information.
	National Strategic Plan on Disaster Risk Management and Climate Change (in development 2015)	Aims to strengthen existing data and information management systems in place at all levels to provide timely and scientifically sound information for informed decision-making.

Plan/Policy		Summary
	National Information and Communications Technology Policy 2009	Provides a vision to encourage and support the use of ICT to predict, monitor and respond to disasters and in environmental management
	Joint National Action Plan on Climate Change Adaptation and Disaster Risk	Recognises the need to strengthen evidence-based decision and policy making through the application of relevant and updated information.

	Management 2010-2015 (JNAP-CCADRM)	Aims for effective use of ICT for climate change and disaster risk management information management.
T O N G A	Tonga National Strategic Development Framework (TSDF) 2011-2014	Aims to improve the performance of the information and communications sector, through free and fair availability of information, geographical coverage, and service affordability. Aims to utilise ICT as a mechanism to improve accountability and transparency.
	Tonga Freedom of Information Policy (effective June 2012)	Commits to providing the maximum amount of information to citizens as a right, subject to limited exceptions. Will be converted to legislation, meaning the Government will have a legal obligation to provide reliable and high quality information to the public. Specifies the development of improved records management systems, guidance manuals for use by public bodies, and training for information officers, records managers and archivists as part of the development of a whole-of-government information strategy.

Plan/Policy		Summary
V	Draft National Climate Change and Disaster Risk Reduction Policy – DRAFT January 2015	 Highlights 'knowledge and information' as one of six key priorities. Knowledge and information objectives are 'to meet knowledge information needs, improve understanding and communicate to empower action'. Specifies the establishment of an accessible and up-to-date database. Provides a policy framework for integrated CC/DRR activities, strategies and priorities in Vanuatu.
N U A	Priorities and Action Agenda 2006-2015	Encourages reform to enable the "free flow of information on government programs and services to Members of Parliament, citizens, civil society and development partners".
T U	Draft National ICT Policy 2011	Sets out a vision of "ICT for all". Includes the aim of educating all people about environment and climate change issues.
	Right to Information Policy (approved 2013)	Aims to provide a free flow of information on government programs and services to Members of Parliament, citizens, civil society and development partners. To be followed by Right to Information legislation which will formalise the policy arrangements to ensure that the Government actively releases information and provides information where it is requested by the public.



5. INSTITUTIONAL BARRIERS

The multi-disciplinary nature of information and data needed for climate change planning and adaptation activities means institutions tasked with climate change information management need to engage in inter-agency and cross-jurisdictional networking and cooperation, both at national and regional levels. Although this degree of cooperation may not yet be part of current institutional culture or practice in the Pacific, the benefits of such practices are becoming known.

Although technological advances are making information sharing vastly easier, there is still a need for formal networks, partnerships and guidelines to assist institutional culture in a move towards more organised information management, sharing and openness. Strong leadership at multiple levels is required to turn policy into practice and to incorporate information management into core business activities, with clarity around responsibilities and incentives to share information built into key roles.

As highlighted in Section 3 of this report, regional organisations are taking a leadership role in the Pacific by supporting a range of information portals, partnerships and collaborative activities. These efforts have made good initial steps towards making climate change-related information more widely available, and begun the process of standardising information management procedures in the region.

5.1. Key Barriers

At the regional level, key institutional barriers to effective climate change information management include:

- Lack of a formal cross-institutional working group or institutional arrangements for addressing climate change and disaster risk reduction information management in the Pacific.
- Regional institutions with different or competing priorities and agendas, leading to lack of collaboration and duplication of effort.
- Difficulties integrating disaster risk management and climate change information management activities under the new Strategy for Disaster and Climate Resilient Development in the Pacific (SRDP, in draft) due to historical disciplinary differences and procedures.
- Short-term, project-based funding of regional information sharing activities and initiatives, meaning that websites and repositories risk not being adequately resourced once projects are finished.

At the national level, key barriers to effective climate change information management include:

- Institutional cultures where information-sharing between agencies or with citizens has not been the norm, and where personal rather than formal relationships play a major role in access to, and sharing of, information and knowledge.
- A lack of formalised agreements (such as memorandums of understanding or data sharing agreements) between government institutions and with external agencies to assist with the collection of information for climate change portals.
- Institutional cultures where information management is not seen as a core business activity and therefore incentives for government employees or departments to share information are limited.

5.2. Regional Context

The past few years have seen the development of greater cooperation among regional bodies on climate change and DRR data and information management. In particular, this has been driven via the SPREP Pacific Climate Change Portal (PCCP) advisory and technical working groups, which provide a quarterly forum for regional bodies to meet and discuss how to better coordinate regional climate change and DRR data and information management activities.

However, the major limitation of these groups is that they are informal and have no actual mandate to influence either regional or national level decision-making. As such, participation in and actions from the PCCP advisory and technical group meetings tend to be voluntary and dependant on good-will, with no guiding formal framework specifying national and regional-level commitments, and subsequent required actions.

5.3. National Context

Within each country surveyed, there is demonstrated interest in, and donor-support for, increased information management activities.

5.3.1. **Fiji**

Within the Fiji Climate Change Division (FCCD), the Global Environment Facility (GEF) through the United Nations Environment Program (UNEP) is supporting 'Enabling Activities for Preparation of the Third National Communication under the United Nationals Framework Convention on Climate Change (TNC Project).'¹ Under the TNC Project, memorandums of understanding (MOUs) are currently being developed to facilitate cooperation and information sharing with relevant government departments and external organisations (e.g., NGOs, public utilities, private sector). It

¹ Fiji ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1993 as a Non-Annex 1 Party and became legally compelled to adopt and implement policies and measures intended to adapt and to mitigate the effects of climate change. The Global Environment Facility (GEF) through the United Nations Environment Program (UNEP) has provided funding for the development of Fiji's National Communications to the UNFCCC which are required to fulfil Fiji's obligation under the Convention.



is envisaged that the MOUs will have a three-year lifespan (until July 2017) and will serve as an important guide to long-term data sharing agreements developed under the iCLIM Project.

Elsewhere within government, the Fiji Geospatial Information Management Council is leading an information sharing initiative and has developed a draft National Geospatial Strategy to enable the sharing of standardised geospatial information. The Director of the Geospatial Division within the Ministry of Lands and Mineral Resources also stated recently that the Division is aiming to transition from selling geospatial information to making it freely available (*pers comm*, 14.4.15).

In May 2015 the Pacific iCLIM project facilitated a data sharing workshop with the FCCD, which was attended by government departments and agencies that create and hold climate change-related data and information. The workshop has increased awareness of data sharing issues and has initiated discussions between the FCCD and relevant agencies. Formal visits to individual agencies to begin the process of documenting available information are scheduled for mid-2015.

5.3.2. Tonga

The Pacific iCLIM project held a data sharing workshop in collaboration with the Tonga Climate Change Department (TCCD) in February 2015, which was followed by a Knowledge Exchange visit to Australia by the Directors of Climate Change and Information Systems within MEIDECC. Following these activities, the TCCD is investigating the development of MOUs or formal data sharing agreements to broker information sharing arrangements with other government departments and external organisations (e.g., NGOs, public utilities, private sector) and to formalise sharing activities and enable population of the Portal with a wider variety of climate change-related information. The iCLIM project will also visit Tonga mid-2015 to attend meetings with individual information custodians to discuss data sharing.

5.3.3. Vanuatu

The Vanuatu National Advisory Board's (NAB) role as overseer of all climate-change and DRRrelated programs, projects, initiatives and activities in Vanuatu means that it has strong networks and relationships with agencies holding relevant data and information. The NAB makes extensive use of its Portal to disseminate climate change and DRR information, and the Portal is strongly supported by management.

However the NAB PMU reports that there is currently minimal formal information sharing between the NAB and other government or non-government agencies. Some inter-governmental data sharing is taking place in other government agencies, a notable example being the National Statistics Office which has a number of formal data sharing agreements in place with other government agencies and makes a variety of statistics and documents available online. The Pacific iCLIM project co-hosted a data sharing workshop with the NAB in November 2014 to initiate discussions about formal information sharing with relevant agencies. This has set the scene for visits to individual information custodians scheduled for July 2015.



6. OPERATIONAL AND HUMAN RESOURCE BARRIERS

Effective operational guidelines and procedures can facilitate the flow of information internally (between government departments) and with external stakeholders (e.g., community groups, NGOs etc.), and mitigate sector-specific differences in information management processes and activities.

Where funding constraints limit the creation of new information management roles, targeted investments in guideline development and staff training can improve the ability of agencies to incorporate information management activities into existing roles and work flows. Training programs can be an important means by which staff from different departments and agencies can build core information management skills. Given the risk of workshop and informal capacity building 'fatigue' in the region, training programs that offer formal certification can be an important part of ensuring staff buy-in to the training process.

The summary below presents key operational and human resource barriers to effective climate change information management, and is followed by an overview of current operational and human resource arrangements in each country.

6.1 Key Barriers

At the regional level, key operational and human resource barriers include:

- Lack of core-funded, long-term information/knowledge management positions within regional organisations.
- Information management roles are unrealistically broad and inadequately resourced, with little time for skills development or training.
- Lack of ICT personnel with time or requisite training to support information management activities, portals and repositories.

At the national level, key operational and human resource barriers include:

- Standardised arrangements for data sharing are not available to assist in brokering partnerships within government departments and between government and non-government agencies.
- Lack of national-level operational guidelines for government departments regarding required information management procedures such as collection, storage, documentation, and legal and ethical sharing of information.
- Lack of division-specific guidelines and procedures for storage, filing and back up of information and data and to ensure information management is integrated into core day-to-day activities.
- Divisional staff with multiple responsibilities and limited time to dedicate to information management and training activities.
- Lack of staff with prior experience and/or formal training in information management

- Difficulties in securing funding for ongoing information/ knowledge management positions (as opposed to short-term, project based positions).
- Lack of IT support staff with the necessary technical expertise and/or time to support national climate change portals.
- Lack of user needs assessments to inform the development of climate change portals and websites, and lack of long-term monitoring and evaluation of their effectiveness.
- Lack of procedures that require consideration of national and global copyright laws when making resources available via portals.

6.2 Regional Context

While the importance of climate change data and information management is growing in significance in the Pacific, there are still no regional guidelines to help facilitate the implementation of key information management procedures and practices. While there is now capacity at the regional level to facilitate and guide the implementation of regional information management guidelines, skills in dealing with more complex issues such as intellectual property, copyright and licensing are still limited.

Over the past 12 months, the PCCP has made some positive inroads into regional-level metadata standards, by working with SPC, USP and PIFS to develop a standardised regional glossary and subject terms for defining climate change and disaster risk reduction content. Once implemented, these vocabularies will make the tagging and discoverability of climate change and disaster risk reduction content significantly easier.

6.3 National Context

6.3.1 Fiji

The Fiji Climate Change Division (FCCD) is working to provide data and information via the CCD Portal with limited human resources. Population and maintenance of the Portal is undertaken by a project officer in addition to their day-to-day communication and awareness responsibilities, and with no formal training in information management. This role is currently delivered on an *ad-hoc* basis, in the absence of standard operating procedures for data and information identification, collection, documentation and storage, or broader guidelines for information management activities within the Division.

There is significant information management activity taking place in regional organisations based in Suva, (e.g., GIZ manages content for the Fiji REDD+ website and SPC/SOPAC Division manages a number of geospatial data repositories) and staff at the FCCD may be able to take advantage of formal or informal communities of practice or knowledge sharing activities, thereby maximising the opportunity to share resources and expertise.

6.3.2. Tonga

While there has been significant national-level commitment in Tonga to increasing information transparency and sharing in recent years, minimal resources have been directed towards the Tonga Climate Change Department (TCCD) to assist with information management activities. The Departmental IT Officer is currently tasked with maintaining and populating the ECC Portal. The current officer has limited prior experience or formal training in information management and undertakes this role in addition to day-to-day IT responsibilities. In the absence of information management guidelines and standard operating procedures for data collection and documentation, this complex role is currently delivered on an *ad-hoc* basis.

There are a number of existing relationships and activities within the Department that provide opportunities for increased information sharing and these can be used to mainstream information management into everyday operations. For example regular departmental meetings with NGOs could be expanded to include a formal information transfer component, and project partners could be required to include data management and information sharing plans in their proposals.

6.3.3 Vanuatu

Within the Vanuatu National Advisory Board (NAB), there is on-going advocacy from senior and mid-level management for information management and sharing activities, but staffing constraints have limited activity and capacity-building in this area.

Responsibility for overseeing and adding information to the NAB Portal rests with one Communication and Outreach Officer who has multiple other responsibilities. The incumbent officer does not have formal training in information management, and, with the exception of a short manual on use of the Portal, there are no guidelines or standard operating procedures for information management activities. Technical assistance for the Portal and all other information management activities is provided by the VMGD IT manager, however this falls outside their core role, and the current IT manager has no specific training in the Drupal content management system used to build the Portal.

Given the breadth of the NAB PMU's role in information gathering and dissemination, in the longer term an appropriately trained, ongoing information/knowledge manager position will be needed. However with current staffing constraints, attention can focus on building strategic partnerships with information providers and using existing knowledge sharing activities as an opportunity to gather information for the Portal (e.g., Vanuatu Climate Action Network meetings, PRRP activities).

The NAB's formal role in CC/DRR project development and endorsement in Vanuatu also presents an opportunity to request the incorporation of formal information management and sharing activities into new projects. Many research funding bodies worldwide now require that grant recipients outline how they will make their outputs openly available at project completion, and the NAB could include similar requirements as a way of collecting and disseminating CC/DRR information.



7. INFORMATION AND COMMUNICATIONS TECHNOLOGY BARRIERS

The ability to store, communicate and share information across various platforms is fundamental to effective climate change information management. It is important to note that the cause of technological barriers can often be institutional and operational rather than technology limitations. However all countries face challenges based on limited, costly and unreliable national and division-level ICT infrastructure. Climate change portals require both suitable IT infrastructure and expert IT support to fulfil their core aims.

Each country's climate change portal is due for an upgrade following their initial development. Development work should be informed by a clear understanding of key stakeholders' priority content needs and how users prefer to discover and access information. This will be critical to improving usage and uptake of the Portals. Once these content needs are understood, climate change divisions can take advantage of similar work being done in the region (e.g., SPREP's Pacific Climate Change Portal) to make improvements to their Portals. This would likely include expanding and/or consolidating metadata profiles, ensuring recognised standards are used for information description, and making general user and search interface improvements.

The summary below outlines key technology barriers to effective climate change information management (as identified in the Situation Analysis survey – refer Section 1.2) followed by an overview of existing ICT infrastructure and information documentation methods.

7.1Key Barriers

At the regional level, key information and communication technology barriers include:

- Lack of local technical expertise in content management systems, particularly open data platforms used to build information and data repositories.
- High internet costs and bandwidth constraints on IT solutions in countries where regional organisations are based (e.g., SPREP in Samoa).
- Target audiences for regional portals may have limited computer access, or can only access the internet via mobile devices, meaning systems need to be built with responsive web design and be low bandwidth-friendly.

From an ICT infrastructure perspective, national barriers to effective climate change information management include:

- Lack of reliable, networked government infrastructure to host climate change Portals.
- High cost of internet access and slow internet speeds making information upload and download difficult and expensive.

- Information and data not securely and regularly backed up due to lack of infrastructure and/or formalised procedures.
- Limited number of IT personnel to support information management activities.
- Lack of local IT personnel with experience in the content management platforms being used to build and run portals (e.g., Drupal, Joomla).

From a resource discovery and access perspective, national barriers to efficient information management include:

- Poorly designed Portal user interfaces for information presentation, and limited search and browse functionality.
- Lack of detailed description and documentation for information resources stored in Portals (e.g., metadata profiles lack key descriptive elements such as subject terms) leading to decreased resource discoverability.
- Lack of use of common metadata standards and controlled vocabularies to document and describe resources.
- Large amounts of information and data that exist only in hard copy-form and are not documented in digital inventories.
- Where external information providers have been given the ability to add Portal content, there is a lack of control over resource types and descriptions being added.

7.2Regional Context

At the regional level, a number of positive steps have been made in recent years to improve ICT practices when dealing with climate change data and information. In addition, the release of the Pacific Regional ICT Strategic Action Plan (PRISAP) 2015-2020 will further guide coordination and collaboration on data and information management and sharing at the regional level in the Pacific. However, despite awareness of the benefits, there is still no regional guideline or protocol in place for dealing with complex data sharing for more complex and interdisciplinary topics such as climate change.

The current storage infrastructure for the Pacific Climate Change Portal (PCCP) is a local server at SPREP headquarters in Apia Samoa, with a mirror site hosted at the University of the South Pacific (USP) in Suva, Fiji. This multi-institutional and geographically separated storage setup is a good mechanism for avoiding PCCP outages and the possibility of data and information loss. The utilisation of local servers for portals or databases is common practice among most regional bodies, with very little utilisation of cloud storage at this stage.

The benefits gained from connecting multiple climate change related databases and portals have been known in the Pacific for some time, with particular awareness around benefits such as discovery, accessibility and utilisation. However, in the absence of a technical solution that connects regional and national portals, a harmonisation process has been implemented, which focuses on trying to get agreement and consistency in metadata profiles and standard vocabularies among portals. This harmonisation process reflects a desire at both the regional and national level to have interoperability between portals, so data sharing can at some stage be automated. For example, SPREP and SPC have worked together over the past couple of years to produce a joint climate change and disaster risk glossary of terms for their respective Portals.

Since commencing in March 2014, the Pacific iCLIM project has worked with SPREP to establish technology that facilitates *regional-regional, national-regional* and *national-national* portal connectivity. As a result a prototype is now in place that enables a single search across multiple databases at once, known as 'federated searching'. This prototype is now complete and being integrated more formally into participating portals.

There are currently a range of content management systems (CMSs) being used in the Pacific region, including Joomla, Drupal, Wordpress and Plone. Prior to the establishment of the federated searching prototype, there was a push to ensure that the SPREP PCCP and pilot country national portals were all utilising a common CMS, with Drupal seeming to be the preferred option. Given that the federated search prototype integrates with any CMS, the need for a common CMS is technically no longer necessary. There are however, still capacity issues in managing CMSs, with considerable skill, support and knowledge sharing benefits to be gained from utilising a single CMS.

Another regional ICT challenge in the Pacific is around data utilisation. While there is awareness of the benefits that can be gained from utilising complex data and information via decision support tools, there is minimal expertise in the area of software development of data utilisation tools and this work is typically outsourced to third parties. In addition, the ability to use online data utilisation tools can often be limited due to bandwidth issues.

7.3National Context

7.3.1Fiji

The Government of Fiji embarked on the Fiji e-Government Program in 2006, with the aim of providing Fiji citizens and government employees with up-to-date and accessible government information & resources. The Fiji e-Government program involves three main streams:

- Public Contact Centre (PCC) whereby citizens can call to clarify or register complaints.
- Government Information Infrastructure responsible for upgrading and maintenance of information infrastructure (e.g., implementation of VoIP across Government, connection of Government offices to the Government Network, GOVNET).
- E-Applications responsible for managing and developing government online applications and websites, and deployment via an e-Government SharePoint Framework.

The Climate Change Portal is currently hosted at an offshore commercial data centre, with development work delivered by an external consultant. It is envisaged that portal hosting will

migrate to the Government Data Centre in mid-2015. To take advantage of in-house Joomla CMS expertise, the portal will be rebuilt using Joomla, and content migrated from the current Drupal CMS.

From a resource discovery and access perspective, the CCD Portal currently provides information about national projects, news and events, and provides access to a small number of publications. Content items are described using limited metadata profiles. In particular, existing metadata profiles do not allow for the addition of descriptive subject metadata (e.g., theme or sector keywords). This potentially limits the discoverability of resources in the Portal and means that users do not have the option of browsing by topic or theme (a common feature of similar environmental information portals). Further Portal development work is planned for the second half of 2015.

7.3.2Tonga

Tonga faces a number of ICT and power infrastructure challenges that have implications for the ECC Portal. These include the high costs of satellite connectivity, high costs of ICT hardware, as well as the difficulty of ensuring connectivity of outer islands (Network Strategies 2010). To address these challenges, regional initiatives such as the Pacific Regional Connectivity Program (Phase 1 - Tonga-Fiji Connectivity Project), which aim to reduce the cost and increase the availability of international bandwidth, are already underway in Tonga.

Within the Climate Change Department, existing ICT infrastructure comprises a local server which provides staff with access to password-protected storage and daily data backups. Prior to 2015 there were plans to move the ECC Portal from its current offshore host (the databanks of Pasifika Technology) to in-house hosting within the Department. However, based on power and ICT infrastructure challenges in Tonga, and the ability of the offshore host to provide reliable, secure, 24-hour data access and backup, the decision was made to continue hosting the Portal offshore, and financing from GIZ is in place with Pasifika Technology to 2018. As part of their contract, Pasifika Technology has provided training in Portal maintenance and development to the division's IT officer, with the expectation that the Department will have full, back-end access to the Portal and take over this role.

From a resource discovery and access perspective, the ECC Portal has the capacity to become a user-friendly repository through expansion of the descriptive information (metadata) used to describe resources, and improvements to the user interface and search functionality available to users. Currently there is only a very basic metadata profile for describing resources stored in the portal. An expanded metadata profile would allow for more comprehensive resource description, which would in turn enable more sophisticated search and browse functionality to be added to the user interface and improve resource discoverability. This will become more important as the amount of material stored on the Portal increases. As of April 2015 Pasifika Technology, in collaboration with the Climate Change Department's IT Officer, has commenced work on expanding metadata profiles and search functionality of the Portal.

7.3.3Vanuatu

In 2012 the Vanuatu Government established Office of the Government Chief Information Officer (OGCIO). Under its iGOV Initiative, the OGCIO is working with Ministries to create agency-managed, sector-based information systems. This includes strategic planning and needs analysis, platform building and application development, and secure data hosting in a centralised data centre with cloud-based backup. The OGCIO aims to eventually store all Government data, with access via a Government data portal, and to have officers based in each Ministry to coordinate information management activities. To date, the NAB has not explored the services on offer from the OGCIO.

Within the NAB, existing ICT infrastructure comprises laptops and PCs connected to an in-house networked file server, which is shared by all VMGD Divisions. The NAB Portal is housed on a separate server. In late 2014, an attempt was made to move the NAB Portal onto the main VMGD server, however this was unsuccessful and a large number of document and project records were lost or corrupted. The NAB PMU has full back-end access to the Portal however due to lack of inhouse Drupal expertise and staff time constraints, major maintenance and development activities require the hiring of a Drupal consultant.

From a resource discovery and access perspective, the NAB Portal currently provides access to a calendar of events, a directory of organisational and professional contacts, a CC/ DRR projects database, a resource library and a set of "adaptation actions". The resource library and projects databases both have extensive metadata profiles which means a large amount of descriptive information can be potentially added by uploaders; however the quality and quantity of the existing resource descriptions currently available are highly variable. Some metadata fields are repetitive and could be combined to make uploading and searching for information easier.

A decision was made to give approved external information providers access permissions to upload their resources directly to the Portal; however limited resources are currently being added by approved agencies. The uploading process is time-consuming and complex, which may discourage potential providers. Allowing external providers to add resources to the Portal has the potential to build content faster, but it also means that quality control is lacking, as there is no monitoring or moderating of either the resources themselves or their descriptions (i.e., metadata).

The Portal search interface is non-standardised across the website and not all search functions give accurate results. Future development work is planned for the Portal in the second half of 2015 and should include improvements to the user interface and the uploading process.

9. RECOMMENDATIONS

This section outlines priority recommendations that will assist the implementation of best practice information management in the Pacific Region. The recommendations focus on ensuring that regional bodies and national governments have a supportive environment for managing, sharing, delivering and utilising climate change data and information. The intention of these recommendations is to ensure that data and information management practices facilitate more effective adaptation and resilience planning in the Pacific.

The following recommendations are subject to the availability of necessary resources and would require coordination between SPREP, other CROP agencies and key stakeholders.

A more detailed breakdown of the possible actions and tasks that could be carried out in order to address the below recommendations is provided in Annex 4.

Institutional Recommendations

- 1. SPREP to investigate options for establishing a formal working group to coordinate and guide policy and practices for climate change data and information management in the Pacific.
- 2. SPREP and SPC to establish a formal agreement to guide their collaboration on the integration of climate change and disaster risk reduction data and information into climate change-related activities.
- 3. SPREP to work with climate change focal points in Fiji, Tonga and Vanuatu to promote a culture of climate change information sharing by raising national-level awareness of the benefits of climate change data and information sharing.

Policy Recommendations

- 4. SPREP to investigate options for establishing a regional policy framework that can guide climate change and disaster risk reduction information management activities in the Pacific.
- 5. Governments of Fiji, Vanuatu and Tonga to investigate options for providing national policy guidance for climate change and disaster risk reduction information management.

Operational and Human Resource Recommendations

6. SPREP to establish and host a Regional Coordinator position for climate change information management.

- 7. SPREP to work with Governments of Fiji, Vanuatu and Tonga on the identification of guidance material and resources to support national-level sharing of climate change data and information.
- 8. Governments of Fiji, Vanuatu and Tonga to establish whole-of-government working groups to facilitate best practice national climate change data and information management.
- 9. SPREP to work with Governments of Fiji, Vanuatu and Tonga to identify options for funding a climate change information management officer in each country.

Information and Communications Technology Recommendations

- 10. SPREP to work with Governments of Fiji, Vanuatu and Tonga to investigate regional or cloud hosting options for national portals.
- 11. Governments of Fiji, Vanuatu and Tonga to conduct whole-of-government stocktakes of climate change data and information, including the capture of adequate metadata descriptions.
- 12. SPREP to offer Governments of Fiji, Vanuatu and Tonga the option of upgrading their current national climate change portals to a standardised Drupal architecture package developed as part of the Pacific iCLIM project.

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ANNEX 1: FIJI NATIONAL SUMMARY

Summary of Key Barriers

- Lack of whole-of-government policies, strategies and guidelines for information management.
- Organisational cultures where information management and sharing is not institutionalised as a core business activity.
- No standard framework for brokering information sharing among government departments or with non-government organisations.
- Difficulties in securing funding for ongoing information/ knowledge management positions (as opposed to short-term, project based positions).
- Staff responsible for information management have limited experience and often have multiple responsibilities that reduce their time on information management activities.
- Limited awareness of national and global copyright laws and their compliance requirements.
- Limited understanding of national climate change portal user needs.
- Lack of quality ICT systems and expertise to maintain national climate change portals.

Relevant Recommendations

It is recommended that the Fiji Government consider the following actions in order to overcome the above barriers to effective climate change data and information management.

- 1. Work with SPREP to promote a culture of climate change data sharing in Fiji by raising national-level awareness of the benefits of climate change data and information sharing.
- 2. Investigate options for providing national policy guidance on climate change and disaster risk reduction information management.
- 3. With guidance from SPREP, identify, develop and deliver guidance materials and resources for encouraging national level sharing of climate change data and information.
- 4. Establish a whole-of-government working group to facilitate national climate change data and information management.
- 5. Work with SPREP to identify options for funding a national climate change information management officer in Fiji.
- 6. With guidance from SPREP, investigate sustainable hosting or back-up options for the Fiji national climate change portal.
- 7. Conduct a whole-of-government stocktake of climate change data and information, including the capture of adequate metadata descriptions.

Background

The Fiji Climate Change Division (FCCD) is based in the Ministry of Foreign Affairs and is the responsible national agency for addressing climate change issues. The FCCD works in collaboration with government agencies, statutory bodies and development partners on climate change issues. The FCCD manages the Fiji Climate Change Portal (established 2013), which aims to:

- Provide a "one-stop shop" for all climate change activities in Fiji as indicated by the National Climate Change Policy
- Improve the collection and dissemination of climate change information in the country for informed decision making
- Enable climate change information holders to share information
- Contribute towards obtaining financial support for climate change activities in Fiji.

Policy Context

The Government of Fiji has a range of policy and strategy documents that reference the importance of information management in adaptation and resilience planning (see Table 5). While these documents highlight the Fiji Government's understanding and commitment to climate change data and information management, there is no whole-of-government strategy or framework in place that would support the implementation of these policies and plans.

Plan/Policy	Summary
National Climate Change Policy (NCCP) 2012	 Data collection, storage and sharing strategies are specifically outlined in NCCP Policy Objective 2. Strategies include: establish clearing house mechanism within CCD for climate change data and information establish collaboration with relevant sectors and regional and international agencies on the collection and sharing of climate change-related data ensure data management is aligned with international best practice standards encourage and promote robust research to provide sound climate change-related data.
Roadmap for Democracy and Sustainable Socio-Economic Development (RDSSED) 2010- 2014	Recognises need to increase access to government information for the public in all areas of life, including climate change and disaster risk management information. Provides framework for Information Technology & Computing (ITC) Services commitment to using ICT as a tool to make government services more accessible to communities.
Green Growth Framework for Fiji (2014)	Recognises the importance of timely information generation and dissemination for informed decision-making, and the need to establish an efficient system for collecting and disseminating market information.
National Strategic Plan on Disaster Risk Management and Climate Change (in development 2015)	Aims to strengthen existing data and information management systems in place at all levels to provide timely and scientifically sound information for informed decision-making.

Table 4: Key Plans and Polices Related to climate change Information Management in Fiji

Institutional context

In May 2015 the Pacific iCLIM project facilitated a data-sharing workshop with the FCCD, which was attended by government departments and agencies that create and hold climate change-related data and information. The workshop highlighted that more can be done to ensure that a culture of climate change data and information sharing is generated in Fiji. In particular, greater awareness of the steps involved and benefits of data sharing needs to be articulated to government departments.

Two current examples where data sharing is being targeted as an outcome include:

- **TNC Project:** Under the UNFCCC Third National project (TNC Project),² the Fiji Climate Change Division (FCCD), is facilitating the development of memorandums of understanding (MOUs) to facilitate cooperation and information sharing with relevant government departments and external organisations (e.g., NGOs, public utilities, private sector). It is envisaged that the MOUs will have a three-year lifespan (until July 2017) and will serve as an important guide to long-term data sharing agreements.
- **Fiji Geospatial Information Management Council** is leading an information sharing initiative and has developed a draft National Geospatial Strategy to enable the sharing of standardised geospatial information. The Director of the Geospatial Division within the Ministry of Lands and Mineral Resources also stated recently that the Division is aiming to transition from selling geospatial information to making it freely available (*pers comm,* 14.4.15).

Operational Context

The FCCD is working to provide data and information via the CCD Portal with limited human resources. Population and maintenance of the Portal is undertaken by a project officer in addition to their day-to-day communication and awareness responsibilities, and with no formal training in information management. This role is currently delivered on an *ad-hoc* basis, in the absence of standard operating procedures for data and information identification, collection, documentation and storage, or broader guidelines for information management activities within the Division.

There is significant information management activity taking place in regional organisations based in Suva, (e.g., GIZ manages content for the Fiji REDD+ website and SPC/SOPAC Division manages a number of geospatial data repositories) and staff at the FCCD may be able to take advantage of formal or informal communities of practice or knowledge sharing activities, thereby maximising the opportunity to share resources and expertise.

ICT Context

The Government of Fiji embarked on the Fiji e-Government Program in 2006, with the aim of providing Fiji citizens and government employees with up-to-date and accessible government information & resources. The Fiji e-Government program involves three main streams:

² Fiji ratified the United Nations Framework Convention on Climate Change (UNFCCC) in 1993 as a Non-Annex 1 Party and became legally compelled to adopt and implement policies and measures intended to adapt and to mitigate the effects of climate change. The Global Environment Facility (GEF) through the United Nations Environment Program (UNEP) has provided funding for the development of Fiji's National Communications to the UNFCCC which are required to fulfil Fiji's obligation under the Convention.

- Public Contact Centre (PCC): whereby citizens can call to clarify or register complaints
- Government Information Infrastructure: responsible for upgrading and maintenance of information infrastructure (e.g., implementation of VoIP across Government, connection of Government offices to the Government Network, GOVNET)
- E-Applications: responsible for managing and developing government online applications and websites, and deployment via an e-Government SharePoint Framework.

The Fiji Climate Change Portal is currently hosted at an offshore commercial data centre, with development work delivered by an external consultant. It is envisaged that portal hosting will migrate to the Government Data Centre in mid-2015. To take advantage of in-house Joomla CMS expertise, the portal will be rebuilt using Joomla, and content migrated from the current Drupal CMS.

From a resource discovery and access perspective, the CCD Portal currently provides information about national projects, news and events, and provides access to a small number of publications. Content items are described using limited metadata profiles. In particular, existing metadata profiles do not allow for the addition of descriptive subject metadata (e.g., theme or sector keywords). This potentially limits the discoverability of resources in the Portal and means users do not have the option of browsing by topic or theme (a common feature of similar environmental information portals). Further Portal development work is planned for the second half of 2015.



ANNEX 2: TONGA NATIONAL SUMMARY

Summary of Key Barriers

- Lack of whole-of-government policies, strategies and guidelines for information management.
- Organisational cultures where information management and sharing is not institutionalised as a core business activity.
- No standard framework for brokering information sharing among government departments or with non-government organisations.
- Difficulties in securing funding for ongoing information/ knowledge management positions (as opposed to short-term, project based positions).
- Staff responsible for information management have limited experience and often have multiple responsibilities that reduce their time on information management activities.
- Limited awareness of national and global copyright laws and their compliance requirements.
- Limited understanding of national climate change portal user needs.
- Lack of quality ICT systems and expertise to maintain national climate change portals.

Relevant Recommendations

It is recommended that the Tongan Government consider the following actions in order to overcome the above barriers to effective climate change data and information management.

- 1. Work with SPREP to promote a culture of climate change data sharing in Tonga by raising nationallevel awareness of the benefits of climate change data and information sharing.
- 2. Investigate options for providing national policy guidance on climate change and disaster risk reduction information management.
- 3. With guidance from SPREP, identify, develop and deliver guidance materials and resources for encouraging national level sharing of climate change data and information.
- 4. Establish a whole-of-government working group to facilitate national climate change data and information management.
- 5. Work with SPREP to identify options for funding a national climate change information management officer in Tonga.
- 6. With guidance from SPREP, investigate sustainable hosting or back-up options for the Tonga national climate change portal.
- 7. Conduct a whole-of-government stocktake of climate change data and information, including the capture of adequate metadata descriptions.
- 8. Work with SPREP to determine opportunities for deploying a standardised ("vanilla package") Drupal climate change portal in Tonga.
- 9. Investigate network storage options for government climate change data, information and knowledge.

Background

The Tonga Climate Change Department (TCCD) coordinates climate change information management and provision in the Kingdom of Tonga. Located within the Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change & Communications (MEIDECC), the TCCD's mandate is to ensure the protection and proper management of the environment and the promotion of sustainable development.

The TCCD is responsible for the Tonga Environment and Climate Change (ECC) Portal (established 2014). The core aim of the ECC Portal is to ensure that environment, climate change and disaster risk management information is readily accessible to stakeholders in a coordinated and accessible manner.

Policy Context

The Governments of Tonga has a range of policy and strategy documents that reference the importance of information management in adaptation and resilience planning (see Table 6). While these documents highlight the Tonga Government's understanding and commitment to climate change data and information management, there is no whole-of-government strategy or framework in place that would support the implementation of these policies and plans.

Plan/Policy	Summary
National Information and Communications Technology Policy 2009	Provides a vision to encourage and support the use of ICT to predict, monitor and respond to disasters and in environmental management.
Joint National Action Plan on Climate Change Adaptation and Disaster Risk Management 2010-2015	Recognises the need to strengthen evidence-based decision and policy making through the application of relevant and updated information. Aims for effective use of ICT for climate change and disaster risk
(JNAP-CCADRM)	management information management.
Tonga National Strategic Development Framework (TSDF) 2011-2014	Aims to improve the performance of the information and communications sector, through free and fair availability of information, geographical coverage, and service affordability. Aims to utilise ICT as a mechanism to improve accountability and transparency.
Tonga Freedom of Information Policy (effective June 2012)	Commits to providing the maximum amount of information to citizens as a right, subject to limited exceptions. Will be converted to legislation, meaning the Government will have a legal obligation to provide reliable and high quality information to the public. Specifies the development of improved records management systems, guidance manuals for use by public bodies, and training for information officers, records managers and archivists as part of the development of a whole-of-government information strategy.

Table 5: Key Plans and Polices Related to climate change Information Management in Tonga

Institutional Context

The Pacific iCLIM project held a data sharing workshop in collaboration with the Tonga Climate Change Department (TCCD) in February 2015, which was followed by a Knowledge Exchange visit to Australia by the Directors of Climate Change and Information Systems within MEIDECC. Following these activities, the TCCD is

investigating the development of MOUs or formal data sharing agreements to broker information sharing arrangements with other government departments and external organisations (e.g., NGOs, public utilities, private sector) and to formalise sharing activities and enable population of the Portal with a wider variety of climate change-related information. The iCLIM project will also visit Tonga mid-2015 to attend meetings with individual information custodians to discuss data sharing.

Operational Context

While there has been significant national-level commitment in Tonga to increasing information transparency and sharing in recent years, minimal resources have been directed towards the Tonga Climate Change Department (TCCD) to assist with information management activities. The Departmental IT Officer is currently tasked with maintaining and populating the ECC Portal. The current officer has limited prior experience or formal training in information management and undertakes this role in addition to day-to-day IT responsibilities. In the absence of information management guidelines and standard operating procedures for data collection and documentation, this complex role is currently delivered on an *ad-hoc* basis.

There are a number of existing relationships and activities within the Department that provide opportunities for increased information sharing and these can be exploited to mainstream information management into everyday operations. For example regular departmental meetings with NGOs could be expanded to include a formal information transfer component, and project partners could be required to include data management and information sharing plans in their proposals.

ICT Context

Tonga faces a number of ICT and power infrastructure challenges that have implications for the ECC Portal. These include the high costs of satellite connectivity, high costs of ICT hardware, as well as the difficulty of ensuring connectivity of outer islands (Network Strategies 2010). To address these challenges, regional initiatives such as the Pacific Regional Connectivity Program (Phase 1 - Tonga-Fiji Connectivity Project), which aim to reduce the cost and increase the availability of international bandwidth, are already underway in Tonga.

Within the Climate Change Department, existing ICT infrastructure comprises a local server, which provides staff with access to password-protected storage and daily data backups. Prior to 2015 there were plans to move the ECC Portal from its current offshore host (the databanks of Pasifika Technology) to in-house hosting within the Department. However based on power and ICT infrastructure challenges in Tonga, and the ability of the offshore host to provide reliable, secure, 24 hour data access and backup, the decision was made to continue hosting the Portal offshore, and financing from GIZ is in place with Pasifika Technology to 2018. As part of their contract, Pasifika Technology has provided training in Portal maintenance and development to the division's IT officer, with the expectation that the Department will have full, back-end access to the Portal and take over this role.

From a resource discovery and access perspective, the ECC Portal has the capacity to become a user-friendly repository through expansion of the descriptive information (metadata) used to describe resources, and improvements to the user interface and search functionality available to users. Currently there is only a very basic metadata profile for describing resources stored in the portal. An expanded metadata profile would allow for more comprehensive resource description, which would in turn enable more sophisticated search

and browse functionality to be added to the user interface and improve resource discoverability. This will become more important as the amount of material stored on the Portal increases. As of April 2015 Pasifika Technology, in collaboration with the Climate Change Department's IT Officer, has commenced work on expanding metadata profiles and search functionality of the Portal.



ANNEX 3: VANUATU NATIONAL SUMMARY

Summary of Key Barriers

- Lack of whole-of-government policies, strategies and guidelines for information management.
- Organisational cultures where information management and sharing is not institutionalised as a core business activity.
- No standard framework for brokering information sharing among government departments or with non-government organisations.
- Difficulties in securing funding for ongoing information/ knowledge management positions (as opposed to short-term, project based positions).
- Staff responsible for information management have limited experience and often have multiple responsibilities that reduce their time on information management activities.
- Limited awareness of national and global copyright laws and their compliance requirements.
- Limited understanding of national climate change portal user needs.
- Lack of quality ICT systems and expertise to maintain national climate change portals.

Relevant Recommendations

It is recommended that the Vanuatu Government consider the following actions in order to overcome the above barriers to effective climate change data and information management.

- 1. Work with SPREP to promote a culture of climate change data sharing in Vanuatu by raising nationallevel awareness of the benefits of climate change data and information sharing.
- 2. Investigate options for providing national policy guidance on climate change and disaster risk reduction information management.
- 3. With guidance from SPREP, identify, develop and deliver guidance materials and resources for encouraging national level sharing of climate change data and information.
- 4. Establish a whole-of-government working group to facilitate national climate change data and information management.
- 5. Work with SPREP to identify options for funding a national climate change information management officer in Vanuatu.
- 6. With guidance from SPREP, investigate sustainable hosting or back-up options for the Vanuatu national climate change portal.
- 7. Conduct a whole-of-government stocktake of climate change data and information, including the capture of adequate metadata descriptions.
- 8. Work with SPREP to determine opportunities for deploying a standardised ("vanilla package") Drupal climate change portal in Vanuatu.
- 9. Investigate services offered by Office of the Government Chief Information Officer (OGCIO) with regards to secure data hosting, information system development and Drupal expertise.

Background

In 2012 Vanuatu established a national advisory board (NAB) for the joint governance of climate change and disaster risk reduction. The NAB is managed by the Climate Change/Disaster Risk Reduction Project Management Unit (CC/DRR PMU), which sits within the Vanuatu Meteorology and Geohazards Department (VMGD). As Vanuatu's overarching policymaking and advisory body for all disaster risk reduction and climate change programs, projects, initiatives and activities, the NAB serves as an effective forum for information sharing among relevant ministries, departments and sectors.

The NAB PMU manages The NAB Portal (established 2012), which aims to:

- Provide a centralised site for CC/DRR information sharing, collaboration, advice, communication and outreach
- Provide a database of all current and past CC/DRR programs, projects and activities undertaken in Vanuatu
- Provide an up-to-date contact list of nationally available technical experts and international consultants relevant to CC/DRR programs.
- Capture traditional knowledge for incorporation into planning activities.

Policy Context

The Governments of Vanuatu has a range of policy and strategy documents that reference the importance of information management in adaptation and resilience planning (see Table 7). While these documents highlight the Vanuatu Government's understanding and commitment to climate change data and information management, there is no whole-of-government strategy or framework in place that would support the implementation of these policies and plans.

Table 6: Key Plans and Polices Related to climate change Information Management in Vanuatu

Plan/Policy	Summary
Draft National Climate Change and Disaster Risk Reduction Policy – DRAFT January 2015	 Highlights 'knowledge and information' as one of six key priorities. Knowledge and information objectives are 'to meet knowledge information needs, improve understanding and communicate to empower action'. Specifies the establishment of an accessible and up-to-date database. Provides a policy framework for integrated CC/DRR activities, strategies and priorities in Vanuatu.
Priorities and Action Agenda 2006-2015	Encourages reform to enable the "free flow of information on government programs and services to Members of Parliament, citizens, civil society and development partners".
Draft National ICT Policy 2011	Sets out a vision of "ICT for all". Includes the aim of educating all people about environment and climate change issues.
Right to Information Policy (approved 2013)	Aims to provide a free flow of information on government programs and services to Members of Parliament, citizens, civil society and development partners. To be followed by Right to Information legislation which will formalise the policy arrangements to ensure that the Government actively releases information and provides information where it is requested by the public.

Institutional Context

The Vanuatu National Advisory Board's (NAB) role as overseer of all climate-change and DRR-related programs, projects, initiatives and activities in Vanuatu means that it has strong networks and relationships with agencies holding relevant data and information. The NAB makes extensive use of its Portal to disseminate climate change and DRR information, and the Portal is strongly supported by management.

However the NAB PMU reports that there is currently minimal formal information sharing between the NAB and other government or non-government agencies. Some inter-governmental data sharing is taking place in other government agencies, a notable example being the National Statistics Office which has a number of formal data sharing agreements in place with other government agencies and makes a variety of statistics and documents available online.

The Pacific iCLIM project co-hosted a data sharing workshop with the NAB in November 2014 to initiate discussions about formal information sharing with relevant agencies. This has set the scene for visits to individual information custodians scheduled for July 2015.

Operational Context

Within the Vanuatu National Advisory Board (NAB), there is on-going advocacy from senior and mid-level management for information management and sharing activities, but staffing constraints have limited activity and capacity-building in this area.

Responsibility for overseeing and adding information to the NAB Portal rests with one Communication and Outreach Officer who has multiple other responsibilities. The incumbent officer does not have formal training in information management, and, with the exception of a short manual on use of the Portal, there are no guidelines or standard operating procedures for information management activities. Technical assistance for the Portal and all other information management activities is provided by the VMGD IT manager, however this falls outside their core role, and the current IT manager has no specific training in the Drupal content management system used to build the Portal.

Given the breadth of the NAB PMU's role in information gathering and dissemination, in the longer term an appropriately trained, ongoing information/knowledge manager position will be needed. However with current staffing constraints, attention can focus on building strategic partnerships with information providers and using existing knowledge sharing activities as an opportunity to gather information for the Portal (e.g., Vanuatu Climate Action Network meetings, PRRP activities).

The NAB's formal role in CC/DRR project development and endorsement in Vanuatu also presents an opportunity to request the incorporation of formal information management and sharing activities into new projects. Many research funding bodies worldwide now require that grant recipients outline how they will make their outputs openly available at project completion, and the NAB could include similar requirements as a way of collecting and disseminating CC/DRR information.

ICT Context

In 2012 the Vanuatu Government established Office of the Government Chief Information Officer (OGCIO). Under its iGOV Initiative, the OGCIO is working with Ministries to create agency-managed, sector-based information systems. This includes strategic planning and needs analysis, platform building and application development, and secure data hosting in a centralised data centre with cloud-based backup. The OGCIO aims to eventually store all Government data, with access via a Government data portal, and to have officers based in each Ministry to coordinate information management activities. To date, the NAB has not explored the services on offer from the OGCIO.

Within the NAB, existing ICT infrastructure comprises laptops and PCs connected to an in-house networked file server, which is shared by all VMGD Divisions. The NAB Portal is housed on a separate server. In late 2014, an attempt was made to move the NAB Portal onto the main VMGD server, however this was unsuccessful and a large number of document and project records were lost or corrupted. The NAB PMU has full back-end access to the Portal however due to lack of in-house Drupal expertise and staff time constraints, major maintenance and development activities require the hiring of a Drupal consultant.

From a resource discovery and access perspective, the NAB Portal currently provides access to a calendar of events, a directory of organisational and professional contacts, a CC/ DRR projects database, a resource library and a set of "adaptation actions". The resource library and projects databases both have extensive metadata profiles which means a large amount of descriptive information can be potentially added by uploaders; however the quality and quantity of the existing resource descriptions currently available are highly variable. Some metadata fields are repetitive and could be combined to make uploading and searching for information easier.

A decision was made to give approved external information providers access permissions to upload their resources directly to the Portal; however limited resources are currently being added by approved agencies. The uploading process is time-consuming and complex, which may discourage potential providers. Allowing external providers to add resources to the Portal has the potential to build content faster, but it also means that quality control is lacking, as there is no monitoring or moderating of either the resources themselves or their descriptions (metadata).

The Portal search interface is non-standardised across the website and not all search functions give accurate results. Future development work is planned for the Portal in the second half of 2015 and should include improvements to the user interface and the uploading process.



ANNEX 4: PROPOSED ACTIONS FOR CONSIDERATION

This section provides a more detailed breakdown of the possible actions and tasks that could be carried out in order to address the recommendations outlined in the above report. The intention of the possible actions and tasks list is to provide both SPREP and the three pilot countries with some initial options to consider when looking at how to address the report recommendations. In particular, the list of possible actions and tasks breaks down options for SPREP and the three pilot countries into regional, national, ministry and divisional level responses.

Regional Level

- Regional organisations should be information management champions in the Pacific region.
- Promote and lead IM awareness activities.
- Promote and lead knowledge sharing and exchange activities formal and informal.
- Provide Information management guidelines and training for region.
- Provide advice and expertise, e.g., metadata standards, data sharing agreements, copyright and licensing issues and solutions, ethical issues and solutions.
- Provide 'templates' and prototypes for new national-level initiatives, e.g., repository platforms, metadata profiles.
- Build ICT and project management skills and expertise e.g., through the use of shared code repositories, free online training (e.g., codeacademy), use of job tracking systems (e.g., Jira), and documentation sharing wikis (e.g., Confluence).
- Ensure appropriate technology for information delivery initiatives must take account of how stakeholders will be accessing information.
- PCCP should include a "links" page to point users to relevant databases/repositories of CC/DRM-related information.
- Regional IM guidelines should be made available in online format similar to PARBICA website as well as print/pdf format.
- Learn from implementation of PIFACC and HFA frameworks, specifically during the SRDP consultation process, ensure that included in the strategy is an action plan for sharing CC and DRR data and information sharing between agencies.
- The approach for data and information needs to be top-down thus a directive at the CROP CEOs level needs to be considered.
- The FAIDP concept "many partners, one team" approach needs to accepted and adopted by all partners and their employees regardless of which echelon of the organisation they work in.
- Initiatives should be needs-based, i.e., based on user needs or stakeholder analysis.
- Monitoring and evaluation (M&E) should be incorporated into capacity building initiatives to identify successes and failures.
- Ensure that an action plan for information management (IM) and information sharing is incorporated into the SRDP process.
- Dedicated positions in partner organisations to take on the role of knowledge brokering.

- Directive at the CROP CEOs level for information sharing.
- Adopt the concept "many partners, one team" approach which recognises that numerous stakeholders contribute to information management development in the region and accepts them as equal partners.;
- Capacity building for information and knowledge brokers.
- Ensure adequate, core-level funding of IM positions.
- Work closely with the CROP ICT working group for the FAIDP to explore ways to synergise some of the activities.

National-level

- Consider development of 'whole of government' information management frameworks and policies to provide a vision for information management and sharing, support government departments and agencies requests for sufficient allocation of funds for information manager positions, and guide the adoption of best practices for managing information.
- Commence high-level discussions to establish national positions on open data and the use of open licenses for government information. Where possible, encourage or specify the use of open licences (e.g., Creative Commons licences) by government and project partners involved in the creation of climate change related information.

Ministry-level

- Ensure strong leadership within institutions during the initiation, implementation, promotion and ongoing support of information management developments.
- Develop protocols to manage data and information sharing between government departments and between government and non-government agencies.
- Develop information management guidelines tailored to the national context; e.g., outlining procedures for securing information transfer, storage and preservation, information description and metadata standards, legal and ethical information management issues).
- Ensure budget allocations are sufficient to support information management requirements; e.g., training, IT support, hardware and bandwidth requirements of Portals.
- Where possible, employ a staff member with information management expertise to oversee information management activities, and/or prioritise formal training of staff with information management responsibilities.

Division-level

- Identify and train 'champions' within divisions to support information management and sharing, and build rewards for inter-departmental sharing into key executive roles.
- Move from project-funded information management activities to 'business as usual' information management roles and work practices.

- Build information sharing activities into existing partnerships and activities, and exploit opportunities to build formal information management and sharing requirements into new projects.
- Develop division- and Portal-specific information management policies and procedures; e.g., to guide storage, filing, back-up and ensure Portals use recognised standards for information description.
- Fully exploit existing ICT infrastructure and prioritise improvements to infrastructure to support information management activities.
- Undertake user-needs assessment to focus content and user interface development of Portals.
- Based on assessment, audit and prioritise climate change and disaster-risk related data and information for addition to Portals.
- Upgrade Portals to allow for more comprehensive resource description and easier resource discovery. This will include expansion/modification of existing metadata profiles, incorporation of regional controlled vocabularies and metadata standards, and improvements to user interfaces and search options.
- Investigate systematic storage and/or digitisation of paper-based material. Digitisation projects should ensure materials are prioritised based on user-needs assessment; where materials are not digitised, consider creation of metadata records within Portals to alert stakeholders to material's existence and location.



